



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

Report Nos.: 50-280/90-17 and 50-281/90-17

Licensee: Virginia Electric and Power Company

Docket Nos.: 50-280 and 50-281

License Nos.: DPR-32 and DPR-37

Facility Name: Surry Units 1 and 2

Inspection Conducted: April 9, 1990 thru April 12, 1990

Inspector: G. R. Wiseman  
G. R. Wiseman, Reactor Inspector

5/8/90  
Date Signed

Approved By: T. E. Conlon  
T. E. Conlon, Chief, Plant Systems Section  
Engineering Branch  
Division of Reactor Safety

5-9-90  
Date Signed

#### SUMMARY

##### Scope:

This special announced inspection was conducted in the areas of fire protection/prevention; employee concerns regarding implementation of the Fire Protection Program; and, Halon fire protection system interaction events associated with the March 23, 1990 pipe rupture.

##### Results:

The employee concerns were not substantiated.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

\*W. R. Bentall, Supervisor, Licensing  
\*M. L. Bowling, Assistant Station Manager-North Anna  
C. R. Core, Fire Protection Specialist  
E. Furley, Quality Assurance  
\*E. S. Grecheck, Assistant Station Manager  
\*D. S. Hart, Supervisor, Quality Assurance  
\*M. R. Kansler, Station Manager  
R. S. Lynch, Senior Fire Protection Specialist  
\*A. L. Meekins, Supervisor, Administrative Services  
B. B. McDuffie, Supervisor, Station Safety/Loss Prevention  
R. L. Morgan, Quality Assurance  
\*W. A. Robbins, Corporate Safety/Loss Prevention  
\*E. R. Smith Jr., Manager Quality Assurance  
T. Raspanti, Nuclear Safety Engineering  
\*L. C. White, Senior Fire Protection Specialist

Other Licensee employees contacted during this inspection included, engineers, fire watches, technicians, and administrative personnel.

#### Other Organizations

Dick Moisant, Phoenix Corporation of Tide Water

#### NRC Resident Inspectors

\*W. E. Holland  
\*S. G. Tingen

\*Attended exit interview

### 2. Employee Concerns

#### a. Concern

The NRC (RII) received an employee concern regarding maintenance and surveillance frequency of fire doors identified in the plant Safety Evaluation Reports (SERS) and 10 CFR 50, Appendix R analysis.

(1) Discussion

The inspector reviewed the licensee's program for maintenance and surveillance of fire doors. The licensee has implemented surveillance procedures for non electrically supervised fire doors. The licensee is ensuring fire doors are closed and operable by inspecting doors with self-closures and non-locked fire doors daily (Procedures OC-35 and PT-24.24); Locked-closed fire doors weekly (Procedure 24.23); and other fire doors monthly (Procedure PT-24.11A).

The inspector also reviewed the plants Fire Protection Deviation Report Log for a one year period ending April 1990 which indicated a number of self-identified discrepancies with fire doors over the period; of which, most all have been corrected and/or the appropriate actions of the Technical Specifications (Fire watches were posted) had been implemented.

In addition, the inspector inspected fire doors to the Mechanical Equipment Room 3, Emergency Switchgear Rooms, Battery Rooms, Emergency Diesel Generator Rooms, Technical Support Center, and Turbine Building. During the walkthrough it was noted that the fire door to the Technical Support Center would not close to a latched position. The licensee took immediate corrective action to adjust the dual-closing mechanisms such that the door would close and latch properly.

Quality Assurance Triennial Fire Protection Audit S89-24 dated December 15, 1989, included a review of fire door surveillance program and identified no major weaknesses in the program.

(2) Conclusion

The concern regarding maintenance and surveillance frequency of fire doors was not substantiated; in that, based on the inspector's review of plant procedures and visual inspection of fire doors, there are sufficient procedural controls in place to provide reasonable assurance that non-operable fire doors are identified and repaired within the scope of NRC guidelines and licensee commitments regarding Appendix R fire barriers.

b. Concern

The NRC RII received information on the possibility of inadequate fulfillment of a licensee commitment of a Halon fire protection system modification to have Halon cylinder heads replaced or reworked to ensure bottles will not leak and that seals are in good condition. The replacement parts may not have been installed as required by invoices submitted by an outside fire protection firm contracted to perform the work.

(1) Discussion

On December 9, 1986 the Surry Nuclear Power Station experienced a feedwater pipe failure in the Unit 2 Turbine Building. As a result of this event the Halon Fire Suppression System protecting the Units 1 and 2 emergency switchgear rooms on elevation 9'-6" activated. The licensee, as a result of the spurious system actuations proposed a number of Halon fire protection system modifications as documented in NRC Inspection Report 87-01, dated February 6, 1987, including a modification to replace or rework the Halon cylinder heads.

Discussion's were held with Safety/Loss Prevention personnel who coordinated the receipt of parts and replacement of the Halon cylinder valves. Signed service receipt forms provided by the licensee indicate that 21 cylinder valves (Stock No. 1-061-0934-1) were received by Virginia Power and Electric. The licensee representatives stated that the old cylinder valves were marked by the manufacturer with a stamp series "E" and no manufacturers date. The new replacement cylinder valves have a "F" series stamp on the valve with stamped manufacturers dates either 10-86 or 12-86. These markings were confirmed by the service representative/technician presently contracted to maintain the Emergency Switchgear Rooms' Halon Fire Suppression Systems. As further followup to the concern, the inspector visually inspected each installed Halon cylinder for these systems and verified that the cylinder valves were indeed stamped with the appropriate manufacturers markings indicating the newer models were installed.

(2) Conclusion

The inspector agrees with the licensee that the subject Halon system cylinder valves were replaced after the 1986 pipe failure as committed.

c. Concern

The NRC RII received information that in 1987 the Fire Protection Loss Prevention department was forced to perform testing and replacement of the Control Room Habitability Air Bottle Systems outside of their work responsibility. In addition, the employee indicated that no one cared if the work was done according to Virginia Power and Electric Company and NRC Regulations.

(1) Discussion

Interviews were held with several Loss Prevention Specialists, and the department supervisor. The Control Room Habitability bottle air system located in the Mechanical Equipment Room 3 was examined during this inspection. The following information was obtained:

a. Loss Prevention Supervisor

The Loss Prevention Supervisor provided the inspector with a copy of a follow-up memo of the Company's investigation into the employee's concerns. This investigation indicated that the decision to have Loss Prevention perform the test was based primarily on the fact that they had an existing contract with an outside vendor to perform pressure tests of bottles. According to the results of the investigation, the supervisor of Loss Prevention at that time (1987) recalled discussing this issue with the Station Manager.

b. Loss Prevention

The Loss Prevention Staff provided the inspector with copies of their review of hydrostatic testing records for the Control Room Habitability system cylinders. These records indicate that Loss Prevention made the necessary arrangements with an outside contract service company to have the air system bottles hydrostatically pressure tested. Copies of the Contractors Job Invoices were provided to the inspector and indicate that on December 1, 1987, 45 air cylinders were hydrostatically tested and recharged and on December 14, 1987, 37 additional cylinders were serviced as above. The Loss Prevention Personnel stated that they coordinated these activities with the operations shifts and did not violate Technical Specification requirements in the process.

(2) Conclusions

From the inspectors interviews, along with the examination of the Control Room Habitability system, it is apparent that the Loss Prevention Department made arrangements with a qualified outside contractor to perform the necessary work and were not forced to perform work outside their work classification. In addition, no violations of Plant Technical Specifications occurred as a result of this work. The concern was not substantiated.

d. Concern

NRC (RII) received a concern regarding the use of plastic bag liners for trash receptacles located within the plant in that they may be a fire hazard.

(1) Discussion:

The inspector reviewed site Fire Prevention Administrative Procedures (See paragraph 3) which establish plant policy for trash removal and control of ignition sources. These procedures require frequent trash removal and have established a No Smoking Policy for safety-related safe shutdown areas of the plant.

As further follow-up to the employee's concern, the inspector discussed housekeeping practices at the site with licensee Site and Administrative Services personnel. The licensee stated that new trash receptacles with liners were installed during a site Beautification Program established in late 1988 and, are equipped with covers and are emptied daily and monitored by the responsible Maintenance Services organization. During several daily plant walkthroughs, the inspector visually verified that the receptacles are emptied frequently throughout various shifts and there was no evidence of improper use of smoking materials to ignite the plastic receptacle liners. As noted in paragraph 3.d the inspector also reviewed past plant fire event history which indicated that no major fire incidents have been reported involving trash receptacles or plastic liners. In addition, no housekeeping deficiencies involving the receptacles were documented in the station Safety and Loss Prevention monthly Fire Prevention Inspection Reports since 1988. In general, the inspector found the housekeeping in safety related plant areas to be very good.

## (2) Conclusions

The concern regarding the use of plastic bag liners for trash receptacles was not substantiated.

From interviews with plant personnel along with examination of the plant facilities, it is apparent that site housekeeping procedures and policy implementation provide sufficient controls to provide assurance that the use of plastic bag liners in trash receptacles pose minimal fire risk to the plant.

In addition the inspector found no documented evidence of fire hazard problems related to the trash receptacles which would jeopardize fire or plant safety.

## 3. Fire Protection/Prevention Program (64704)

### a. Fire Prevention/Administrative Control Procedures

The inspector reviewed the following Fire Prevention Administrative Procedures.

<u>Procedure No.</u>	<u>Title</u>
FPP	Fire Protection Program dated April 5, 1988
ADM-56	Special Processes Involving Ignition Sources, dated April 26, 1988.

The procedures were found to comply with the NRC guidelines in the document entitled, "Nuclear Fire Protection Functional Responsibilities, Administrative Controls, and Quality Assurance," dated June 14, 1977.

### b. Fire Protection Surveillance Inspections and Tests

The inspector reviewed the following inspection procedures and test records for the periods indicated:

RIS 06-10      Fire Protection Inspection Report  
(Monthly Routine) January 1987  
through December 1989.

PT-24.11A      Fire Doors (Monthly) April 1989  
through December 1989.

PT-24.44

Emergency Switchgear Room Halon  
(Annually) Units 1 and 2 - May 1,  
1987, May 9, 1988, and March 15,  
1989.

PT-24.45

Emergency Switchgear Room Halon  
Check (Monthly) June 1987 through  
December 1987.

The surveillance test data and testing frequency associated with above fire protection system surveillance test/inspections were found to be satisfactory with regard to meeting the requirements of the plant Fire Protection Technical Specifications.

c. Fire Protection Audits

The most recent audit reports of the Fire Protection Program were reviewed:

Fire Protection Annual Quality Assurance Audit, March 20-31, 1989. (S89-18)

°Results: 5 findings; 2 observations

°Status: Two findings open pending QA effectiveness review.

Triennial Fire Protection Audit performed by DJC Enterprises Inc. (S89-24)

°Results: 6 Findings; 6 Observations

°Status: Five Findings open of which three are pending QA effectiveness review.

The above Quality Assurance Department audits were thorough and effective as they related to the review of 10 CFR 50 Appendix R/Safe Shutdown compliance review. Significant audit findings related to Appendix R Emergency Lighting Systems initiated a more thorough surveillance program for eight-hour battery emergency lighting systems. A review of the Plant Fire Protection Deviation Reports identified numerous problems with emergency lighting systems during this period. The licensee has effectively initiated corrective actions associated with these fire protection audit findings and deviation reports.

In addition, the QA department has initiated an effective Fire Protection Audit response and corrective action review and tracking system.

d. Fire Reports

The inspector reviewed the station fire reports for 1989 and 1990. These reports indicated that there were eight fire events in safety related areas in 1989 from a total of twelve for the site in that year. Most of those small fires in safety-related areas involved welding and cutting processes occurring in Unit 1; however, none were of a major significance.

e. Permanent Plant/Appendix R Fire Protection Features

A plant tour was made by the inspector. During the plant tour, the following safe shutdown related plant areas and their related fire protection features were inspected.

<u>Fire Area</u>	<u>Description</u>
3	Unit 1 Emergency Switchgear and Relay Room
4	Unit 2 Emergency Switchgear and Relay Room
6	Emergency Diesel Generator Room 1
7	Emergency Diesel Generator Room 2
8	Emergency Diesel Generator Room 3
31	Turbine Building Walkway Area
45	Mechanical Equipment Room No. 3

The fire/smoke detection systems, manual firefighting equipment (i.e., portable extinguishers, hose stations, etc.) and the fire area boundary walls, floors and ceiling associated with the above plant areas were inspected and verified to be in service or functional, except fire doors to the Mechanical Equipment Room No. 3 were administratively open due to ongoing maintenance work being performed in the area. The inspector verified that fire watches were posted in the affected areas. Interviews with fire watch personnel indicated that they are well versed in their responsibilities and requirements for identifying and reporting a fire event.

The CO<sub>2</sub> systems and Halon systems installed in the three Diesel Generator Rooms and Emergency Switchgear and Relay Rooms were inspected and found to be in service.

The inspector performed a walkdown of the three-hour rated TSI Thermolag fire barrier installation around the fiberglass reinforced plastic piping routed through Fire Area 45 from the charging pump service water pump 1-SW-P-10A to the Emergency Switchgear and Relay Rooms. This fire barrier application appeared to be properly maintained.

The following eight-hour emergency lighting units were inspected:

<u>Unit No.</u>	<u>Location</u>
2ELT 84B Room	Unit 1 Emergency Switchgear
1ELT-125	Emergency Diesel Generator
1ELT-120	Room 1
1ELT-126	
2ELT-105	Emergency Diesel Generator Room 3

It was noted that lighting unit 2ELT-105 was not operable but was properly tagged out for repair on Work Order WR-685280 dated February 14, 1990. Review of the station Deviation Report printout indicated that Deviation Report 2-90-0111 was written which identified that this lighting unit had failed Periodic Test 2-PT-47C. Corrective Action for repair of the unit was assigned to the Maintenance Department.

Based on this inspection, it appears that the fire protection features associated with the above plant areas are satisfactorily maintained.

The plant tour also verified the licensee's implementation of the fire prevention administrative procedures. The control of ignition sources, combustibles and flammable materials, liquids and gases, and the general housekeeping were found to be very good in the areas inspected.

#### 4. Fire Protection System Spurious Activations

On March 23, 1990, at approximately 2300 hours the Surry Nuclear Power Station experienced a secondary pipe failure on the discharge piping of the Low Pressure Heater Drain Pump B (1SD-P-2B).

Within minutes of the event two sprinklers in the turbine building actuated. At approximately 2318 hours the Unit 1 Halon Fire Suppression System protecting the Emergency Switchgear room on elevation 9'-6" actuated. About five minutes later the Unit 2 Halon Fire Suppression System spuriously actuated. Spurious actuation of these systems is similar to those observed during a similar pipe rupture event which occurred on December 9, 1986. System actuation of this nature discharges 7% to 10% Halon concentration into the emergency switch gear rooms. Personnel who were performing period testing on Unit 2 and a firewatch left the emergency switchgear room because of the Halon discharge. However, it should be noted that the concentrations of Halon as a result of the spurious discharges are sufficiently low so to not have created a life hazard to personnel in the areas. No personnel were injured by the piping failure or the Halon discharge.

At the time of this inspection the licensee had completed inspection, repair, and return-to-service of the affected Halon systems. The Halon systems' vendor/contractor noted during their inspection that fire Halon cylinder safety burst disc (#7-061-0236, See Attachment Plate H-27E) on cylinders nearest the pipe rupture had relieved during the pipe rupture event. These safety devices are designed to burst at 1000 psi cylinder pressure thus relieving internal Halon gas pressure to atmosphere preventing cylinder overpressurization or rupture of the Halon cylinder.

At the time of this inspection, the licensee had not yet completed their task team evaluation into root cause of the pipe rupture event or spurious actuation of the Halon Fire Suppression Systems.

#### 5. Exit Interview

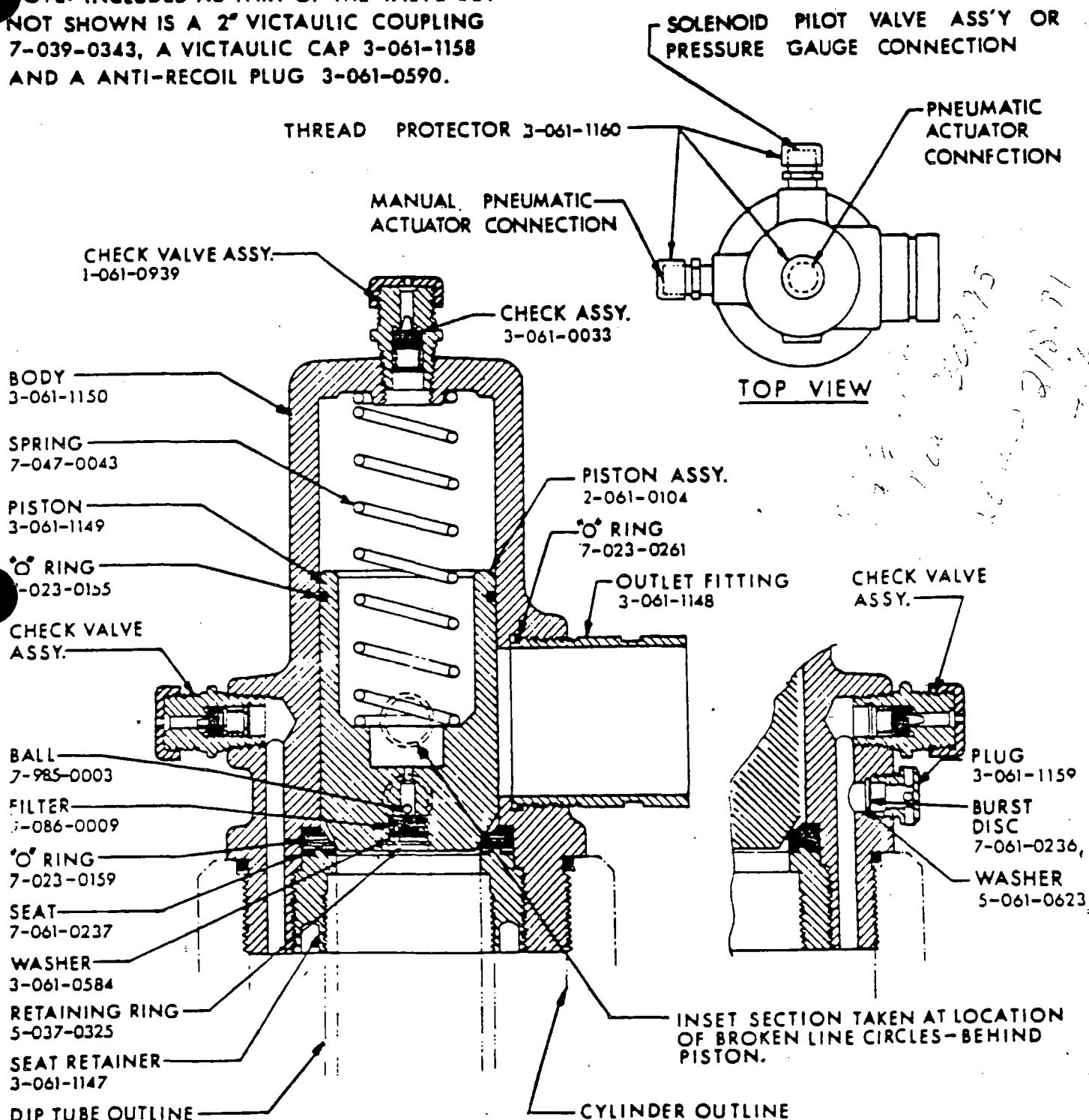
The inspection scope and results were summarized on April 12, 1990, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report and dissenting comments were not received from the licensee.

Attachment:  
Chemtron Cylinder Valve  
1-061-0934, Plate H-27E

# ATTACHMENT

**CHEMETRON** fire extinguishing equipment....

NOTE: INCLUDED AS PART OF THE VALVE BUT  
NOT SHOWN IS A 2" VICTAULIC COUPLING  
7-039-0343, A VICTAULIC CAP 3-061-1158  
AND A ANTI-RECOIL PLUG 3-061-0590.



**CYLINDER VALVE**  
**HIGH FLOW-360 MODEL B HALON 1301 SYSTEM**

1-061-0934

PLATE H-27E