



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
230 PEACHTREE STREET, N.W. SUITE 818
ATLANTA, GEORGIA 30303

IE Inspection Report Nos. 50-280/76-14 and 50-281/76-14

Licensee: Virginia Electric and Power Company
P. O. Box 26666
Richmond, Virginia 23261

Facility Name: Surry Power Station
Docket Nos.: 50-280 and 50-281
License Nos.: DPR-32 and DPR-37
Category: C/C

Location: Surry, Virginia

Type of License: PWR (W), 2441 MWT

Type of Inspection: Routine, Unannounced

Dates of Inspection: September 15-17, 1976

Dates of Previous Inspection: August 24-27, 1976

Inspector-in-Charge: R. F. Rogers, Reactor Inspector
Reactor Projects Section No. 2
Reactor Operations and Nuclear
Support Branch

Accompanying Inspectors: G. R. Jenkins, Radiation Specialist
Radiation Support Section
Fuel Facility and Materials
Safety Branch

G. L. Troup, Radiation Specialist
Radiation Support Section
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Safety Branch

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IE Rpt. Nos. 50-280/76-14
and 50-281/76-14

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Principal Inspector: M. V. Sinkule

10/19/76

M. V. Sinkule, Reactor Inspector
Reactor Projects Section No. 2
Reactor Operations and Nuclear
Support Branch

Date

Reviewed By: R. C. Lewis

10/19/76

R. C. Lewis, Chief
Reactor Projects Section No. 2
Reactor Operations and Nuclear
Support Branch

Date

SUMMARY OF FINDINGS

I. Enforcement Items

Infraction

Contrary to Technical Specification 6.4.D, certain log book entry, review and initialling requirements specified in VEPCO Administrative Procedure 29, "Conduct of Operations" were not followed during the period of August 23 through September 16, 1976. (Details I, paragraph 5)

II. Licensee Action on Previously Identified Enforcement Matters

A. Region II Letter Dated June 24, 1976

The inspector verified implementation of corrective action as discussed in VEPCO's response dated July 15, 1976. This item is closed. (Details I, paragraph 3)

B. Region II Letter Dated August 11, 1976

The inspector verified implementation of corrective action as described in VEPCO's response dated August 31, 1976. This item is closed. (Details I, paragraph 4)

III. New Unresolved Items

76-14/1 Removal Efficiency of Iodine Samplers

The licensee has not determined the iodine removal efficiency of charcoal cartridges used for sampling airborne iodine, including the ventilation vent and air ejector samplers. (Details II, paragraph 2.b)

76-14/2 Blowdown Tank Iodine Partition Factor

A request for guidance and resolution of questions regarding partition factor, which has been used by the licensee in calculating gaseous iodine releases' has been forwarded to IE Headquarters. (Details II, paragraph 2.a)

IV. Status of Previously Reported Unresolved Items

None

V. Unusual Occurrences

Unit 2 was shutdown on September 15, 1976 due to a tube leak in steam generator 2A. (Details I, paragraph 6)

VI. Other Significant Findings

Deviation

Contrary to FSAR Section 10.3.8.2, the steam generator blowdown tank condensate, when contaminated, doesn't go to the vent and drain system and the flashed vapor does not exhaust through the process vent. (Details II, paragraph 4)

VII. Management Interview

A management interview was held on September 17, 1976, with T. L. Baucom, Station Manager, and members of his staff. The results of the inspection, as described in the Summary and Details Sections I and II of this report, were discussed.

DETAILS I

Prepared by: R. F. Rogers

10/19/76

Date

R. F. Rogers, Reactor Inspector
Reactor Projects Section No. 2
Reactor Operations and Nuclear
Support Branch

Dates of Inspection: September 15-17, 1976

Reviewed by: R. C. Lewis

10/19/76

Date

R. C. Lewis, Chief
Reactor Projects Section No. 2
Reactor Operations and Nuclear
Support Branch

1. Personnel Contacted

T. L. Baucom - Station Manager
W. L. Stewart - Superintendent, Station Operations
J. L. Wilson - Operating Supervisor
W. W. Cameron - Health Physics Supervisor
D. Richeardt - Assistant Control Room Operator

2. Verification of Modification of Service Water Valve Pit

The service water valve installation as described in VEPCO Abnormal Occurrence Report AO-52-75-01 was in conflict with single failure criteria in that an overflow of the turbine building sump could flood the service water valve pit rendering all four recirculation spray motor operators inoperable. Corrective action was verified by the inspector. The overflow line has been plugged satisfactorily to prevent flooding of the service water valve pit. This item is closed.

3. Separation of Emergency Diesel Generator Air Systems

On June 3, 1976, the two redundant air supplies for the No. 1 Diesel Air Start System were found to be valved together and not operating as independent systems. This infraction was reported in IE inspection report 50-280/76-7 and 50-281/76-7 and the licensee's corrective action was reported to NRC by letter dated July 15, 1976. The inspector verified that valve line-up procedures had been written and incorporated into operating procedure 6, "Emergency Diesel Generator," which assure adequate separation of redundant air supplies for the diesel generators. This item is closed.

4. Inadvertent Emergency Boration

On June 26, 1976, the control room operator opened the emergency boration valve (MOV 2350) instead of the flow control valve (MOV 2113B) specified in the operating procedure for normal boration. This infraction was reported in IE inspection report 50-280/76-10 and 50-281/76-10. The inspector verified that the operator in question had been appropriately counseled regarding the importance of procedural compliance. And that the lessons learned had been promulgated to all operators. This item is closed.

5. Review of Plant Operations

A review was conducted to ascertain whether facility operation was in conformance with regulatory requirements, Technical Specifications, and Administrative Procedures. Shift logs, operating records, jumper logs, tag logs, and logbook reviews were inspected against the requirements of Administrative Procedure (ADM) 29, "Conduct of Operations" (August 23, 1976) and Technical Specification 6.4, "Unit Operating Procedures." A plant tour was conducted to verify that monitoring equipment was recording as required, equipment was properly tagged, operations personnel were aware of plant conditions, and that plant housekeeping efforts were adequate. An infraction concerning shift operator documentation practices was identified. Contrary to Technical Specification 6.4.D, certain requirements contained in VEPCO Administrative Procedure 29 were not followed as evidenced by a review of August 23 - September 16, 1976 Control Room Records as follows:

a. Boron Recovery, Liquid, and Gaseous Waste Disposal Log

Article 29.1.11 of ADM-29 states that the Boron Recovery, Liquid and Gaseous Waste Disposal log will be used to log the status of and changes to these systems. Also the procedure requires the log to contain complete information concerning the radioactive releases from these systems. The inspector found that the end-of-shift status section had been filled out by the operator about 30% of the time. The inspector also found that contrary to Article 29.1.11, the Radioactive Release Section was blank approximately 90% of the time. Article 29.3.1 of ADM-29 requires operators to review the logs for which they are responsible prior to relieving the shift. The inspector noted that proper reviews had been documented only about 30% of the time.

b. Shift Orders

Article 29.9.3 of ADM-29 requires that the shift orders be reviewed by the shift supervisor and the assistant shift supervisor prior to assuming their duties. Article 29.3.1 requires that the shift orders be initialed prior to assuming the watch. The inspector found that neither the on-shift supervisor or his assistant on September 16, 1976, had initialed this log as required. A review of previous logs indicates that initials were proper. A statement at the bottom of this logsheet indicates that if an entry requires shift action, the time should be noted in the margin when the action is accomplished. This is not being done. Article 29.9.4 requires that shift orders are to be forwarded via the operating supervisor to station records on a monthly basis. This was not done for August 1976.

c. Containment Entrance Logs

Article 29.1.13 of ADM-29 requires that the containment entrance log be maintained. The inspector reviewed the logs for both units on September 15, 1976. Both units were at 100% power on that date. Unit 1 log indicated that 41 people had not logged out of the Unit 1 containment. Unit 2 log indicated that 29 people had not logged out of the Unit 2 containment. The shift supervisor stated that no one was presently in either containment.

d. Required Reading

Article 29.8 of ADM-29 states that the shift supervisor will ensure that his personnel are aware of all material that may be of immediate importance to plant operation. It requires all personnel to read the information placed in the required reading file and initial the cover sheet within the specified time. The inspector reviewed outstanding items in the Category I Section (immediate bearing on plant operations) of the required reading file. The inspector found that a number of shift personnel had not yet initialed documents and were overdue. Required reading documentation is necessary to assure that plant operators are aware of changes in plant operations with safety significance. Operator ignorance of these changes has the potential to cause or contribute to a serious event. Required reading practices were contrary to the procedures in Article 29.8. The status on September 16, 1976 was as follows:

<u>Item</u>	<u>Date to be Read By</u>	<u>Number of Personnel Who had not Initialed Material</u>
1. Standing order on solid plant operations	ASAP (entered July 15, 1976)	18
2. Memo on revised hot channel factors	September 3, 1976	27
3. ADM 29 "Conduct of Operations"	August 27, 1976	15
4. OP-6 "Emergency Diesel Generator"	August 24, 1976	16
5. New Jumper Log Forms	August 20, 1976	17

Items a through d above are contrary to Administrative Procedure 29, "Conduct of Operations" which is required by Technical Specification 6.4.A.1. and required to be followed by Technical Specification 6.4.D.

6. Steam Generator Tube Leak

At approximately 2:00 PM on September 15, 1976, a tube leak occurred on 2A steam generator. Unit 2 was shutdown from 100% power and a plant cooldown commenced. The inspector arrived in the control room approximately 15 minutes after the occurrence and verified that the situation was being properly controlled and that operator actions were adequate.

DETAILS II

Prepared by:

for

A F Gibson

10/18/76

Date

G. R. Jenkins, Radiation Specialist
Radiation Support Section
Fuel Facility and Materials
Safety Branch

G. L. Troup, Radiation Specialist
Radiation Support Section
Fuel Facility and Materials
Safety Branch

10/18/76

Date

Dates of Inspection: September 15-17, 1976

Reviewed by:

A F Gibson

10/18/76

Date

A. F. Gibson, Chief
Radiation Support Section
Fuel Facility and Materials
Safety Branch

1. Individuals Contacted

T. L. Baucom - Station Manager
W. L. Stewart - Superintendent, Station Operations
J. L. Wilson - Operating Supervisor
W. W. Cameron - Health Physics Supervisor
B. A. Boger - Supervisor of Engineering Services
R. M. Smith - Health Physicist
J. S. Dodson - Health Physics Technician

2. Evaluation and Accountability of Radioactive Effluents

Through in-plant observations, discussions with licensee representatives, and review of records and procedures, the licensee's method of evaluation and accountability of radioactive effluents from all known release points was inspected. The following gaseous release points were evaluated:

Process vent
Ventilation vent
Condenser steam jet air ejectors
Steam generator blowdown tank vent
Containment hoggers effluent
Containment hoggers drive steam
Auxiliary feedwater pump drive steam
Turbine seal vacuum pump
Turbine Building ventilation

The following liquid release points were evaluated:

Waste disposal test tanks

Contaminated drain tanks

Steam generator blowdown liquid

Turbine Building floor drains

Subsurface drain system

Pipe trench from Auxiliary Building to Turbine Building

With the exception of the items discussed below, the inspectors had no questions on the evaluation and accountability methods in use.

a. Steam Generator Blowdown Tanks

To determine the gaseous iodine activity being discharged from a steam generator blowdown tank vent, the licensee multiplies the blowdown radioactivity concentration by the blowdown flow rate, by a partition factor of 0.05, and by a flashing factor which is a function of blowdown temperature (reactor power). The partition factor of 0.05 was taken from Regulatory Guide 1.42. The flashing factor is taken from a curve of flashing factor versus reactor power, which was constructed by the licensee from an energy balance equation. The inspectors questioned the use of the partition factor and flashing factor in combination, noting that NRC Report NUREG-0017, April 1976, provides that the basis for the partition factor of 0.05 is that approximately one-third of the blowdown flashes to steam at a blowdown temperature of 550°F. The inspectors agreed that Surry's heat balance calculations indicate that 0.244 fractional blowdown flashes to steam at maximum blowdown temperature (100% reactor power). However, the inspectors stated that it appeared that, based on NUREG-0017, the appropriate total correction factor at 100% power should be .05 multiplied by the ratio 0.244/0.33. Therefore, the generally applicable correction would be .05 multiplied by 3 times the flashing factor for any given power level. Subsequent to the inspection, Region II notified the licensee that questions regarding the appropriateness of the correction factors used at Surry and the possible need for recalculating data of previous releases will be submitted to IE Headquarters for resolution and guidance. This is an unresolved item. The Station Manager said that, in the interim, airborne iodine from the blowdown tank will be based on a partition factor of 0.05, with no credit taken for a flashing factor. During the inspection, the inspectors noted that the total quantity of blowdown radioactivity (liquid and gaseous) released to the

environment is over-estimated, due to the fact that all of the blowdown activity in the flash tank enfluent is accounted for as a liquid release and an additional fraction is accounted for as a gaseous release. However, it appears that the licensee's use of a flashing factor may have caused them to underestimate the amount of radioactive iodine released to the atmosphere via the blowdown flash tank vent.

b. Airborne Iodine Sampler Efficiencies

Licensee representatives stated that the iodine removal efficiency of charcoal cartridges used to sample the ventilation vent, process vent, and air ejector discharge was assumed to be 100%, but had not been determined by the licensee. The inspectors stated that the assumed 100% efficiency may not be valid, and that the actual iodine removal efficiency for each air sampler used should be determined. The inspectors noted that the flow rate in the ventilation vent sampler is about 10 CFM, and stated that the resultant residence time on the charcoal cartridge is probably too short to provide a high removal efficiency. The flow rate in the air ejector samplers is also high (6-10.5 CFM), and the inspectors stated that temperature and humidity conditions may further reduce the collection efficiency of that charcoal. Flow rate in the process vent sampler is 1-1.5 CFM. This is an unresolved item pending the determination of the iodine removal efficiency for all air samplers and an evaluation of the impact of the resultant efficiencies on previously reported effluent monitoring results.

c. Main Steam Loss Accountability

Radioactivity released through main steam losses (leaks in Turbine Building, turbine seal vacuum pump, steam driven containment hoggers, steam driven feedwater pumps, etc.) is accounted for as liquid releases, based on secondary water makeup balance for volume and analysis of main steam samples for radioactivity concentration. As a result of comments by the inspectors, the licensee agreed to start accounting for gaseous components identified through sample analysis as gaseous releases. The inspectors had no further questions.

d. Turbine Building Exhaust Accountability

Turbine Building ventilation air is exhausted through roof vents which are neither filtered nor monitored. Periodic air samples are taken in the building, and the sampling frequency is increased during periods of primary to secondary leakage.

The Health Physics Supervisor stated that occasionally an air sample with detectable activity is obtained. He said this activity has not been accounted for as an airborne release because the quantity is minute with respect to other release points. Based on the inspector's comments, the licensee agreed to start accounting for such releases. The inspectors had no further questions.

3. Violation of Technical Specification Average Gaseous Release Limit

The licensee reported by telephone on September 14, 1976, that gaseous releases, when averaged over 12 consecutive months, had exceeded the Technical Specification limit of 10% of the instantaneous release limit. This is a licensee identified item of noncompliance with Technical Specification 3.11.B.2. Licensee representatives stated that the violation resulted from their interpretation that the Technical Specification limit included only radioactive halogens and particulates and excluded noble gases. They stated that this interpretation resulted from a verbal statement by a representative of the former NRC Division of Licensing. Subsequent to a telephone conversation between a Region II inspector and the Health Physics Supervisor on September 10, 1976, effluent data was recalculated to include the noble gas releases. A licensee representative stated that this calculation showed that the average gaseous release rate for 12 consecutive months through August, 1976, was 10.37% of the instantaneous release rate limit. He said that the sum of monthly release rates for the eleven months of October, 1975, through August, 1976, totaled 120.5% of the instantaneous release rate limit. Therefore, the 12 month average through September, 1976, would also exceed the limit even if the release rate was zero during September. However, a previously submitted change request to Technical Specification 3.11 was approved by the NRC Office of Nuclear Reactor Regulation, effective September 13, 1976. The licensee appeared to be in compliance with the revised Technical Specification.

4. Deviation from Final Safety Analysis Report

An inspector noted that FSAR Section 10.3.8.2 states, in part, that the flashed vapor from the steam generator blowdown tank is discharged to the atmosphere through the process vent while the condensate is normally drained by gravity to the circulating water discharge tunnel and, when contaminated, to the vent and drain system. FSAR Section 10.3.8.1 states, in part, that the blowdown tank is vented directly to the atmosphere. FSAR Figure 10.3.8-1 indicates that the blowdown tank is vented through the roof and that the condensate can be valved to the contaminated drain system. Contrary to the

FSAR, licensee representatives said that the contaminated blowdown tank condensate is not valved to the contaminated drain system; contrary to FSAR Section 10.3.8.2, the blowdown tank vent does not discharge through the process vent. By telephone call to the Station Manager on September 22, 1976, an inspector identified the above discrepancies with the FSAR as a deviation.

5. Effluent Data Corrections

Inspection Report 50-280/76-13 and 50-281/76-13 discussed corrections to 1975 radioactive effluent data, and concluded that a corrected report would be included in the 1976 Annual Report. Subsequent to that inspection, however, the licensee has made a number of additional corrections to both 1975 and 1976 effluent data. These included: (a) additional correction of calculational errors; (b) corrections to take credit for blowdown vapor being a function of reactor power (see paragraph 2.a of these details); (c) corrections to include noble gas release rates in the calculation of percent of Technical Specification limits (see paragraph 3 of these details). As a result of the multiplicity of corrections, the licensee has agreed to submit a separate supplemental report for 1975. The supplemental report will be withheld, however, until the unresolved items in paragraphs 2.a and 2.b of these details are resolved and the impact, if any, on 1975 data is determined.

6. Documentation of Effluent Data

The inspectors identified several areas where worksheets used by the health physics group for compiling, summarizing, and integrating effluent data should be more formalized. For example, no form or other standard format is used to calculate and compile radioactivity released through main steam losses. Also, no prepared forms are used for the monthly collection and summarization of isotopic activity released from the various individual release points. The inspectors noted that the lack of such formalized "bookkeeping" could lead to errors and omissions in reported data. The Health Physics Supervisor agreed, and stated that the necessary worksheets will be formalized. He also said that a program for computerization of effluent data is in progress and is expected to be placed in use in early 1977. The inspectors had no further questions.