

Docket Nos. 50-280
and 50-281

Posted

Amdt. 163 to DPR-37

Mr. W. L. Stewart
Senior Vice President - Nuclear
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060

Dear Mr. Stewart:

SUBJECT: SURRY UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: LIMITING DOSE TO CONTROL ROOM OPERATORS (TAC NOS. M75603 AND M75604)

The Commission has issued the enclosed Amendment No. 164 to Facility Operating License No. DPR-32 and Amendment No. 163 to Facility Operating License No. DPR-37 for the Surry Power Station, Unit Nos. 1 and 2, respectively. The amendments consist of changes to the licenses in response to your application transmitted by letter dated October 26, 1989.

These amendments add a license condition stating that the current assessment of the control room dose calculations/habitability is documented in letter Serial No. 89-381 and that the limiting predicted control room doses are revised in accordance with that submittal.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

/s/
Bart C. Buckley, Senior Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 164 to DPR-32
2. Amendment No. 163 to DPR-37
3. Safety Evaluation

cc w/enclosures:
See next page

OFC	: LA: PDII-2	: PM: PDII-2	: D: PDII-2	: PRPB	: GGC
NAME	: D. Myler	: B. Buckley	: H. Be...	: L. Cunningham	: Bachmann
TE	: 11/21/91	: 11/27/91	: 12/13/91	: 12/19/91	: 12/19/91

Mr. W. L. Stewart
Virginia Electric and Power Company

Surry Power Station

cc:

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-280

SURRY POWER STATION, UNIT NO. 1

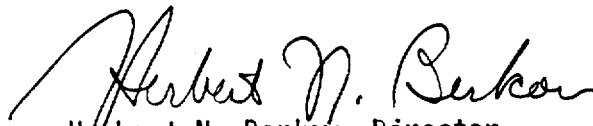
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 164
License No. DPR-32

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Virginia Electric and Power Company (the licensee) dated October 26, 1989, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, license condition 3.N is added to Facility Operating License No. DPR-32 to read as follows:
 - 3.N The current assessment of control room dose calculations/habitability is documented in the licensee's submittal dated June 1, 1989 (Serial No. 89-381). The limiting predicted control room doses, which remain within the limits of 10 CFR 50, Appendix A, General Design Criteria 19, are revised in accordance with the above-mentioned submittal.
3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION



Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Page 5a of license

Date of Issuance: December 26, 1991

*Page 5a is attached, for convenience, for the composite license to reflect this change.

K. Secondary Water Chemistry Monitoring Program

The licensee shall implement a secondary water chemistry monitoring program to inhibit steam generator tube degradation. This program shall include:

1. Identification of a sampling schedule for the critical parameters and control points for these parameters;
2. Identification of the procedures used to quantify parameters that are critical to control points;
3. Identification of process sampling points;
4. Procedure for the recording and management of data;
5. Procedures defining corrective actions for off control point chemistry conditions; and
6. A procedure for identifying the authority responsible for the the interpretation of the data, and the sequence and timing of administrative events required to initiate corrective action.

3.L The licensee shall fully implement and maintain in effect all provisions of the Commission-approved Nuclear Security Personnel Training and Qualifications Program, including amendments and changes made pursuant to 10 CFR 50.54(p). The approved Nuclear Security Personnel Training and Qualifications Program consists of a document withheld from public disclosure pursuant to 10 CFR 2.790(d) identified as "Surry Power Station Nuclear Security Personnel Training and Qualifications Program" dated September 15, 1980. The Nuclear Security Personnel Training and Qualifications Program shall be fully implemented in accordance with 10 CFR 73.55(b)(4), within 60 days of this approval by the Commission. All security personnel shall be qualified within two years of this approval.

3M. The design of the reactor coolant pump and steam generator supports may be revised in accordance with the licensee's submittals dated November 5, 1985 (Serial No. 85-136), December 3, 1985 (Serial No. 85-136A), and January 14, 1986 (Serial No. 85-136C).

3.N The current assessment of control room dose calculations/habitability is documented in the licensee's submittal dated June 1, 1989 (Serial No. 89-381). The limiting predicted control room doses, which remain within the limits of 10 CFR 50, Appendix A, General Design Criteria 19, are revised in accordance with the above-mentioned submittal.

4. This license is effective as of the date of issuance, and shall expire at midnight on May 25, 2012.

FOR THE ATOMIC ENERGY COMMISSION

Original signed by A. Giambusso

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Enclosure
Appendix A -
Technical Specifications

Date of Issuance: May 25, 1972

Amendment No. 164



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-281

SURRY POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 163
License No. DPR-37

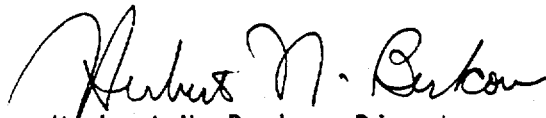
1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Virginia Electric and Power Company (the licensee) dated October 26, 1989, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public;
and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, license condition 3.N is added to Facility Operating License DPR-37 to read as follows:*

3.N The current assessment of control room dose calculations/habitability is documented in the licensee's submittal dated June 1, 1989 (Serial No. 89-381). The limiting predicted control room doses, which remain within the limits of 10 CFR 50, Appendix A, General Design Criteria 19, are revised in accordance with the above-mentioned submittal.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION



Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Page 6a of license

Date of Issuance: December 26, 1991

*Page 6a is attached, for convenience, for the composite license to reflect this change.

K. Secondary Water Chemistry Monitoring Program

The licensee shall implement a secondary water chemistry monitoring program to inhibit steam generator tube degradation. This program shall include:

1. Identification of a sampling schedule for the critical parameters and control points for these parameters;
 2. Identification of the procedures used to quantify parameters that are critical to control points;
 3. Identification of process sampling points;
 4. Procedure for the recording and management of data;
 5. Procedures defining corrective actions for off control point chemistry conditions; and
 6. A procedure for identifying the authority responsible for the the interpretation of the data, and the sequence and timing of administrative events required to initiate corrective action.
- 3.L The licensee shall fully implement and maintain in effect all provisions of the Commission-approved Nuclear Security Personnel Training and Qualifications Program, including amendments and changes made pursuant to 10 CFR 50.54(p). The approved Nuclear Security Personnel Training and Qualifications Program consists of a document withheld from public disclosure pursuant to 10 CFR 2.790(d) identified as "Surry Power Station Nuclear Security Personnel Training and Qualifications Program" dated September 15, 1980. The Nuclear Security Personnel Training and Qualifications Program shall be fully implemented in accordance with 10 CFR 73.55(b)(4), within 60 days of this approval by the Commission. All security personnel shall be qualified within two years of this approval.
- 3M. The design of the reactor coolant pump and steam generator supports may be revised in accordance with the licensee's submittals dated November 5, 1985 (Serial No. 85-136), December 3, 1985 (Serial No. 85-136A), and January 14, 1986 (Serial No. 85-136C).
- 3.N The current assessment of control room dose calculations/habitability is documented in the licensee's submittal dated June 1, 1989 (Serial No. 89-381). The limiting predicted control room doses, which remain within the limits of 10 CFR 50, Appendix A, General Design Criteria 19, are revised in accordance with the above-mentioned submittal.
4. This license is effective as of the date of issuance, and shall expire at midnight on January 29, 2013.

FOR THE ATOMIC ENERGY COMMISSION

Original signed by Roger Boyd/for

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Enclosure
Appendix A -
Technical Specifications

Date of Issuance: January 29, 1973

Amendment No. 163



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 164 TO FACILITY OPERATING LICENSE NO. DPR-32
AND AMENDMENT NO. 163 TO FACILITY OPERATING LICENSE NO. DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNIT NOS. 1 AND 2
DOCKET NOS. 50-280 AND 50-281

1.0 INTRODUCTION

In March 1989, Virginia Electric and Power Company, the licensee for North Anna Units 1 and 2, and Surry Units 1 and 2, submitted an engineering evaluation of the radiological consequences to North Anna control room operators during and following certain design basis accidents (DBAs). The licensee committed to provide such engineering evaluation and any proposed corrective actions, if needed, to ensure that multiple entries to the North Anna control room during and following an accident will not cause exposure of the control room operators exceeding the dose limits specified in General Design Criterion (GDC) 19. The licensee's commitment was precipitated by a control room habitability survey conducted at North Anna by the NRC in December 1986 and followup NRC inspections in September 1987 and 1988. The staff reviewed the licensee's submittals and found the North Anna control room habitability system to be acceptable in a Safety Evaluation dated February 2, 1990.

In conjunction with the North Anna evaluation, the licensee has voluntarily performed a similar control room habitability reevaluation for Surry Units 1 and 2 and, by letter dated October 26, 1989, submitted its reassessment, including a reevaluation of the radiological consequences to Surry control room operators during and following DBAs. This reassessment incorporates multiple entries into the Surry Units 1 and 2 control room during and following postulated DBAs. The offsite radiological consequences evaluated previously in the Surry Units 1 and 2 Safety Evaluation Report (SER) are not affected. The limiting control room operator doses calculated by the licensee in this reevaluation exceeded those previously submitted to NRC in response to Item III.D.3.4 of NUREG-0737, as shown below.

	<u>Thyroid</u> <u>(rem)</u>	<u>Whole Body</u> <u>(rem)</u>	<u>Skin</u> <u>(rem)</u>
Previous submittal	23	0.1	1.4
Reevaluation	27	0.5	1.3
Applicable Limits (SRP Section 6.4)	30	5.0	30

Therefore, the licensee has determined the increase in control room operator doses to be an unreviewed safety question, as defined by 10 CFR Part 50.59. In both evaluations, as indicated above, the control room operator doses calculated by the licensee were within the limits specified in General Design Criterion 19 of Appendix A to 10 CFR Part 50 and within the guidelines provided in Standard Review Plan (SRP) Section 6.4.

Along with the submittal of the Surry control room habitability reevaluation, the licensee also requested proposed changes (which were the same as North Anna) to Facility Operating License Nos. DPR-32 and DPR-37 for Surry Units 1 and 2, respectively. The proposed changes add a new license condition to each license stating:

"The current assessment of control room dose calculations/habitability is documented in the licensee's submittal dated June 1, 1989 (Serial No. 89-381). The limiting predicted control room doses, which remain within the limits of 10 CFR 50, Appendix A, General Design Criterion 19, are revised in accordance with the above-mentioned submittal."

2.0 DISCUSSION AND EVALUATION

The Surry control room habitability system for radiological protection includes a compressed bottled air system and an emergency filtered air system which is the same as that for the North Anna station. The compressed breathing air system is provided to maintain a positive interior control room pressure to ensure outward leakage when the outside air is contaminated. The compressed breathing air system is automatically initiated by the safety injection system, and may also be manually activated. The emergency filtered air system, taking suction from the turbine building through high efficiency particulate air (HEPA) filters and charcoal adsorbers, is provided to ensure continued outward leakage and to continue the pressurization of the control room indefinitely upon depletion of the bottled air supply.

The licensee calculated the 30-day radiation exposures to the Surry control room operators for the following six DBAs:

- (1) loss of coolant (LOCA)
- (2) main steam line breaks (MSLBs)
- (3) fuel handling accident (FHA)
- (4) steam generator tube rupture (SGTR)
- (5) volume control tank rupture (VCTR)
- (6) waste gas decay tank rupture (WGDTR)

The licensee's calculated doses indicate that the control room operator doses from these six accidents are all within the limits specified in GDC 19 of Appendix A to 10 CFR Part 50, and within the guidelines provided in the Standard Review Plan (SRP) Section 6.4. In reviewing the licensee's findings, the staff independently calculated the thyroid and whole-body doses for the LOCA, which the staff determined to be the most limiting accident for radiation exposures to the control room operator. The NRC assumptions and parameters used in the calculations of the control room operator doses are listed in Table 1 and NRC's calculated doses are summarized in Table 2.

To calculate the consequences of the hypothetical LOCA, the staff used the conservative assumptions of Positions C.1.a through C.1.e of Regulatory Guide 1.4, Revision 2, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Loss-of-Coolant Accident for Pressurized Water Reactors." In its calculation, the staff considered (1) leakage from the containment for the first hour of the accident, and (2) leakage from the emergency core cooling system (ECCS) outside of the containment over the entire 30 day period. The primary containment was assumed to leak at a rate of 0.1 percent per day for the first hour, and because the containment pressure would become subatmospheric within 1 hour, the leak rate was assumed to be zero after 1 hour.

The containment structure for Surry Units 1 and 2 uses the subatmospheric design. During normal operation, the containment structure is maintained at a subatmospheric pressure. In the event of a high energy line break accident, the containment pressure would be reduced to subatmospheric following a small positive (above atmospheric) pressure spike. A subatmospheric condition would then be maintained for at least 30 days following an accident. The safety injection signals automatically isolate the control room and activate the bottled air system. The bottled air pressurizes the control room for 1 hour, after which time a filtered outside air intake of 1000 ft³/min. was assumed. During the first hour, due to the multiple entries to the control room, the staff used an iodine protection factor of 31. A 10 cubic foot per minute (CFM) unfiltered inleakage was assumed to account for the effects of multiple entries to the Surry control room envelope during and following an accident.

The fraction of core inventory released into the containment was assumed to be 50 percent for iodine and 100 percent for noble gases. The analysis took into account radiological decay during holdup in the containment, mixing in the containment, and iodine removal by the containment spray and wall deposition. The refueling water chemical addition tank contains 4200 gallons of solution at a concentration of 17 to 18 percent sodium hydroxide and flow from one or two containment spray pumps will discharge into the containment at an initial pH of 8.5 to 11.0. The borated water in the containment sump will rise from a pH of approximately 7.6 to 8.0 when flow from the refueling water storage tank is terminated. Therefore, the staff assumed 10 percent of the iodine in the ECCS leakage will become airborne.

The staff used the most up-to-date site meteorological data through 1987 which was provided by the licensee in their June 1, 1989 submittal. The atmospheric dispersion factors (ADF) were lower than the values used in the staff's SER for Surry. The ADF used in this evaluation are given in Table 1. In calculating the control room operator thyroid dose, the staff used updated dose factors contained in Publication No. 30 of the International Commission on Radiological Protection (ICRP).

The staff's calculated thyroid and whole-body doses from the hypothetical LOCA are summarized in Table 2. As shown in Table 2 of this report, the staff calculated whole body dose of 1.4 rems to the control room operator is well within the GDC 19 limit of 5 rems; also, the skin dose of 1.7 rems is well

within the whole body equivalent dose limit to that organ (30 rems), as stated in SRP Section 6.4. The staff calculated thyroid dose of 32 rems is slightly higher than the whole body equivalent dose limit to the thyroid (30 rems), as stated in SRP Section 6.4. However, this marginally higher value is acceptable, since it is based on quite conservative assumptions, such as an ECCS leak rate of 9600 cc/hr for an extended period of time (20 minutes to 30 days) and an airborne fraction of 10 percent for iodine activity from the ECCS leakage during the entire time it occurs. Using the iodine protection factor (IPF) of 31 and the assumptions listed in Table 1, the staff finds that Surry control room operators will be adequately protected against an accidental radiological release as specified in GDC 19 of Appendix A to 10 CFR Part 50. The IPF is defined as the ratio of iodine activity concentration without protection (iodine source without removal) over iodine activity concentration with protection (iodine reduction by charcoal adsorbers).

3.0 SUMMARY

On the basis of the above evaluation, the staff concludes that the Surry control room will remain in a safe and habitable condition during and following a DBA by providing adequate protection against radiation so that the radiological exposures to the control room operator meet the intent and purpose of GDC 19. The staff further concludes that the proposed license amendments to incorporate a new license condition to each license (Surry Units 1 and 2) to be acceptable. The offsite radiological consequences evaluated previously in the Surry Units 1 and 2 SER are not affected.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Virginia State official was notified of the proposed issuance of the amendments. The State official had no comment.

5.0 ENVIRONMENTAL CONSIDERATION

These amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that these amendments involve no significant hazards consideration and there has been no public comment on such finding (55 FR 4287). Accordingly, these amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of these amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the

public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: J. Lee
C. Nichols

Date: December 26, 1991

Table 1

Assumptions Used in Calculating the Control Room Operator Doses

<u>Parameter</u>	<u>Quantity</u>
Power level, Mwt	2554
Operating time, yr	3
Fraction of core inventory available for leakage, %	
Iodine	25
Noble gases	100
Initial iodine composition in containment, %	
Elemental	91
Organic	4
Particulate	5
Containment leak rate, %/day	
0 - 24 hr	0.1
After 24 hr	0
Free containment volume, ft ³	1.86 x 10 ⁶
Atmospheric dispersion factors, sec/m ³	
0 - 8 hr	4.1 x 10 ⁻³
8 - 24 hr	2.5 x 10 ⁻³
24 - 96 hr	8.6 x 10 ⁻⁴
96 - 720 hr	1.6 x 10 ⁻⁴
Control room net free volume, ft ³	2.23 x 10 ⁵
Control room unfiltered inleakage (cfm)	10
Breathing rate (m ³ /sec)	3.47 x 10 ⁻⁴
Control room occupancy factors	
0 - 24 hr	1.0
24 - 96 hr	0.6
96 - 720 hr	0.4
Containment spray removal constants (hr ⁻¹)	
Elemental iodine	10
Organic iodine	0
Particulate iodine	0.45

Iodine protection factor 0 - 60 min	31
Iodine partition factor (ECCS leakage)	10
Makeup air intake rate (cfm)	1000
Intake air iodine removal filter efficiency (%)	90
Iodine dose factors	ICRP 30 Supplement to Part 1
Safeguard area filter efficiency (%) (ECCS leak)	90
ECCS leak rates (cc/hr)	
0 - 5 minutes	0
5 - 20 minutes	1928
20 minutes - 30 days	9600

Table 2
Control Room Operator Doses
(rem)

	<u>VEPCO</u>	<u>NRC</u>	<u>SRP 6.4</u>
Whole Body	0.5	1.4	5
Skin	1.3	1.7	30
Thyroid	27 ⁽¹⁾	32 ⁽²⁾	30

(1) used Publication No. 2, ICRP (1959)
(2) used Publication No. 30, ICRP (1978)