

December 6, 1990

Docket No. 50-280

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

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Dear Mr. Stewart:

SUBJECT: SURRY UNIT 1 - EXEMPTION FROM SUBSECTION III.0 OF APPENDIX R TO
10 CFR PART 50 (TAC NO. 79032)

By letter dated November 14, 1990, Virginia Electric and Power Company (VEPCO) requested a one-time exemption from the requirements of Subsection III.0 of Appendix R to 10 CFR Part 50.

Based on our evaluation, we have granted the enclosed one-time exemption from the requirements of 10 CFR Part 50, Appendix R, Subsection III.0 (Enclosure 1). Our Safety Evaluation is also enclosed (Enclosure 2).

A copy of the exemption is being filed with the Office of the Federal Register for publication.

Sincerely,

Original signed by

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

Enclosures:
As stated

cc w/enclosures:
See next page

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Virginia Electric and Power Company

Surry Power Station

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)	
)	
VIRGINIA ELECTRIC AND POWER)	Docket No. 50-280
COMPANY)	
)	
Surry Power Station, Unit 1)	

EXEMPTION

I.

The Virginia Electric and Power Company (the licensee) is the holder of Facility Operating License No. DPR-32, which authorizes operation of the Surry Power Station, Unit 1. The license provides, among other things, that it is subject to all rules, regulations and Orders of the Commission now or hereafter in effect.

The Surry facility consists of two pressurized water reactors at the licensee's site located in Surry County, Virginia. This exemption addresses only Surry, Unit 1.

II.

On November 19, 1980, the Commission published a revised Section 10 CFR 50.48 and a new Appendix R to 10 CFR Part 50 regarding fire protection features of nuclear power plants (45 FR 76602). The revised Section 50.48 and Appendix R became effective on February 17, 1981. Section III of Appendix R contains 15 subsections, lettered A through O, each of which specifies requirements for a particular aspect of the fire protection features at a nuclear power

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plant. One of these 15 subsections, III.0., is the subject of this exemption request. Specifically, Subsection III.0. requires that each reactor coolant pump (RCP) have an oil collection system capable of collecting oil from potential pressurized and non-pressurized leakage sites and routing it to a vented, closed container of sufficient capacity to hold the entire lube oil system inventory.

III.

By letter dated November 14, 1990, the licensee requested a one-time exemption from the requirements of Subsection III.0 of Appendix R, for one of the three RCPs at Surry, Unit 1.

Prior to the shutdown for refueling at the end of Operating Cycle 10 on October 8, 1990, the Surry, Unit 1 RCP motor oil collection system satisfied the requirements of Subsection 0. The Unit 1 "C" RCP motor required a routine, 5-year refurbishment at the end of Operating Cycle 10. This required that the RCP motor be shipped to an offsite facility. A replacement motor was purchased for the "C" pump; however, certain components of the new RCP motor have a different physical configuration than the motor which was removed. Because of the configurational differences, the RCP oil collection system from the original "C" motor cannot be fitted to the new motor without extensive modifications, which cannot be made within the current Cycle 10 refueling outage. Consequently, a one-time exemption was requested from Subsection III.0 to permit an interim oil collection method in conjunction with other compensatory measures to mitigate the consequences should a oil fire occur. The exemption would be effective through Operating Cycle 11, which is currently scheduled to commence on December 5, 1990 and end in February 1992.

The acceptability of the exemption request is addressed below. More details are contained in the NRC staff's related Safety Evaluation dated Decemeber 6, 1990. 1990.

Reactor Coolant Pump Oil Collection System

The licensee, for this cycle of operation, has proposed an interim oil collection method for the "C" pump motor. This method consists of implementing certain fire protection modifications in the "C" RCP/steam generator cubicle in conjunction with compensatory measures. Through implementation of this method, the licensee will detect potential lube oil system leakage in the spare RCP motor by an increase in motor temperature and any leakage which does occur will be confined and contained in the "C" RCP/steam generator cubicle.

The "C" cubicle is located southeast of the reactor vessel. The cubicle has a concrete base at the minus 3 ft. 6 in. elevation with the concrete walls extending up to the 47 ft. 4 in. elevation. The access doors to this cubicle are located at the minus 3 ft. 6 in. and the 18 ft. 6 in. elevations. In addition, there are penetrations in the walls and the floor of the cubicle. This cubicle is located adjacent to the cable penetrations from the cable vault. The licensee, in order to contain any potential oil leakage from the "C" RCP motor or a fire condition in the "C" cubicle, has implemented the following additional interim fire protection modifications:

- Four-inch oil-tight dikes have been installed at the door openings;
- Pipes which penetrate the cubicle floor are sleeved. The piping sleeves extend 4 in. above the floor of the cubicle. The pipes which extend from the sleeves are provided with either a spray cover or the penetration is filled with a liquid-tight fire-rated penetration sealant material;

- A heat detector has been installed above the "C" RCP motor. This detector is annunciated in the control room;
- The "C" cubicle is separated from the cable penetration area by the crane wall. The open penetrations in the crane wall will be sealed with fire-rated penetration sealant material; and
- Spray shields will be installed as necessary to prevent high pressure oil spray from impinging on hot reactor coolant system (RCS) piping.

In addition to the above fire protection modifications, the licensee will maintain the following compensatory measures during the operation phase of Cycle 11:

- RCP motor bearing temperature increase is an indication of an oil leak. Therefore, the licensee will conduct more frequent surveillance of the "C" RCP motor temperature-related parameters;
- Plant procedures will be revised prior to startup to address operator actions and their expected response to adverse motor temperature conditions (e.g., containment entry to assess the reason for the temperature condition, shutdown of the pump, response of the fire brigade);
- Additional fire brigade briefings will be held on the potential for a fire in the "C" cubicle and on the means to mitigate a fire in this area; and
- Additional foam fire suppression equipment will be maintained outside the containment. This equipment, to be used by the fire brigade in the event of a lube oil fire, will be located near the containment access hatch.

Based on our evaluation of the licensee's proposed interim oil collection method and compensatory measures, we agree that if a lube oil system failure leading to a leak and a subsequent fire were to occur in the "C" RCP motor, the consequences of the fire would be mitigated and the plant's ability to achieve safe shutdown conditions would not be affected.

Therefore, the staff concludes that the licensee's interim oil collection method, consisting of temporary fire protection modifications, compensatory measures, and the partially installed oil collection system as described above, results in an acceptable fire hazard level which is essentially equivalent to that which existed with the permanent oil collection system. The staff also concludes that this method provides reasonable assurance that any potential lube oil leakage from the "C" RCP motor will be adequately controlled and contained within the "C" RCP/steam generator cubicle. The staff finds the licensee's request to operate the "C" RCP, with an interim oil collection method in place for Cycle 11 to be acceptable and, therefore, the licensee's request for exemption is granted.

IV.

Pursuant to 10 CFR 50.12(a)(2)(v), the licensee must have made good faith efforts to comply with the regulation. The NRC staff believes that VEPCO could not have reasonably foreseen the configurational incompatibility between the existing and replacement "C" pump motors and has taken appropriate measures to mitigate the effects of this incompatibility.

Based on our evaluation, the NRC staff has concluded that special circumstances as described in 10 CFR 50.12(a)(2)(v) exist, in that the exemption would provide only temporary relief from the applicable regulation, and VEPCO has made good faith efforts to comply with the requirements of Appendix R.

V.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12, an exemption is authorized by law and will not endanger life or property or common defense and security and is otherwise in the public interest, and hereby grants an exemption from the requirements of Subsection III.0 of Appendix R to 10 CFR Part 50 to the extent discussed in Section III above. This exemption will be effective for the duration of Operating Cycle 11 for Surry, Unit 1, which is currently scheduled to end in February 1992.

Pursuant to 10 CFR 51.32 the Commission has determined that the granting of this exemption will not result in any significant environmental impact (55 FR 50256).

A copy of the licensee's request for exemption dated November 14, 1990, as well as the staff's associated Safety Evaluation dated December 6 , 1990, are available for public inspection at the Commission's Public Document Room, 2120 L Street, N.W., Washington, D.C., and at the Swem Library, College of William and Mary, Williamsburg, Virginia 23185.

This exemption is effective upon issuance and will expire at the end of Operating Cycle 11.

FOR THE NUCLEAR REGULATORY COMMISSION



Steven A. Varga, Director
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland
this 6th day of December, 1990.



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

ENCLOSURE

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ONE-TIME EXEMPTION FROM 10 CFR PART 50, APPENDIX R, SUBSECTION III.0

SURRY POWER STATION UNIT 1

DOCKET NO. 50-280

1.0 INTRODUCTION

By letter dated November 14, 1990, Virginia Electric and Power Company (licensee) requested a one-time exemption to 10 CFR Part 50, Appendix R, Subsection III.0 for the Surry Power Station Unit 1. The licensee, as part of their preventative maintenance program, requires that the reactor coolant pump (RCP) motors be refurbished on a 5-year cycle. The Unit 1 "C" pump was scheduled to be refurbished at the end of this current operating cycle (Cycle 10 operations ceased on October 8, 1990). The schedule for completion of the refurbishment process exceeded the current refueling outage schedule (unit startup scheduled for December 5, 1990) and, therefore, could not support the planned return of Unit 1 to power operations. Based on the known schedular conflicts, the licensee, in preparation for this task, purchased a spare RCP motor. The licensee expected the spare motor to be physically identical to the old motor. However, upon delivery, physical differences were noted. The differences between the two motors would require extensive modifications to the existing "C" pump motor oil collection system. The only portion of the existing RCP "C" motor oil collection system which was found to be interchangeable was the lower bearing drip pan oil collection assembly. The licensee has installed this portion of the system on the spare RCP motor. Upon discovery of the motor differences, the licensee initiated a design modification to fabricate an oil collection system for the spare motor. The schedule to complete the design, fabricate, and install an oil collection system for the spare RCP motor could not be accomplished within the time frame to support the unit's return to power operations. Therefore, in order to support the unit's startup from the current refueling outage, the licensee, for Cycle 11 operation only, has requested permission to operate the Unit 1 "C" pump without an oil collection system which fully complies with the technical requirements of Appendix R. The licensee, in their exemption request, has proposed an interim oil collection configuration. This proposed configuration includes instituting additional fire protection and compensatory measures which will assure that the consequences of a fire associated with an oil leak on the "C" pump motor are mitigated.

2.0 EVALUATION

Each Surry Unit 1 RCP motor is equipped with its own oil collection system that meets the technical requirements of 10 CFR Part 50, Appendix R, Subsection III.0, Reactor Coolant Pump Oil Collection System. The oil collection system provided for each RCP consists of leak-proof pans installed under the bearings and enclosures around all potential oil leakage sites (i.e., lube oil piping,

pumps, coolers). These oil collection devices are connected to an oil drain header which drains the oil to an enclosed tank. Each RCP oil collection tank has been adequately sized (tank capacity 265 gallons) to hold the entire oil contents of the RCP (RCP oil capacity 250 gallons) and is equipped with a flame arrester on the tank vent.

The licensee, for this cycle of operation, has proposed an interim oil collection method for the "C" pump motor which consists of implementing certain fire protection modifications and compensatory measures. Through implementation of this method, the licensee will detect potential lube oil system leakage in the spare RCP motor by an increase in motor temperature and any leakage which does occur will be confined and contained in the "C" RCP/steam generator cubicle.

The "C" cubicle is located southeast of the reactor vessel. The cubicle has a concrete base at the minus 3 ft. 6 in. elevation with the concrete walls extending up to the 47 ft. 4 in. elevation. The access doors to this cubicle are located at the minus 3 ft. 6 in. and the 18 ft. 6 in. elevations. In addition, there are penetrations in the walls and the floor of the cubicle. This cubicle is located adjacent to the cable penetrations from the cable vault. The licensee, in order to contain any potential oil leakage from the "C" RCP motor or a fire condition in the "C" cubicle, has implemented the following additional fire protection modifications:

- Four-inch oil-tight dikes have been installed at the door openings;
- Pipes which penetrate the cubicle floor are sleeved. The piping sleeves extend 4 in. above the floor of the cubicle. The pipes which extend from the sleeves are provided with either a spray cover or the penetration is filled with a liquid tight fire-rated penetration sealant material;
- A heat detector has been installed above the "C" RCP motor. This detector is annunciated in the control room;
- The "C" cubicle is separated from the cable penetration area by the crane wall. The open penetrations in the crane wall will be sealed with fire-rated penetrations sealant material; and
- Spray shields will be installed as necessary to prevent high pressure oil spray from impinging on hot reactor coolant system (RCS) piping.

In addition to the above fire protection modifications, the licensee will maintain the following compensatory measures during the operation phase of Cycle 11:

- RCP motor bearing temperature increase is an indication of an oil leak. Therefore, the licensee will conduct more frequent surveillance of the "C" RCP motor temperature related parameters;
- Plant procedures will be revised prior to startup to address operator actions and their expected response to adverse motor temperature conditions (e.g., containment entry to assess the reason of the temperature condition, shutdown of the pump, response of the fire brigade);

- Additional fire brigade briefings will be held on the potential for a fire in the "C" cubicle and on the means to mitigate a fire in this area; and
- Additional foam fire suppression equipment will be maintained outside the containment. This equipment, to be used by the fire brigade in the event of the lube oil fire, will be located near the containment access hatch.

Based on our evaluation of the licensee's proposed interim oil collection method, if a lube oil system failure, leading to a leak and a subsequent fire, were to occur in the "C" (spare) RCP motor, the consequences of the fire would be mitigated and the plant's ability to achieve safe shutdown conditions would not be affected. The primary fire hazard associated with each RCP consists of 250 gallons of lube oil. Motor problems that could result in a loss of oil can be detected by several existing plant means: bearing temperature, motor vibration, and motor running current. In the event an oil leak were to occur, a lube oil high/low level alarm would be annunciated in the control room. With the partial oil collection system in place on the lower bearing of the "C" motor, an estimated maximum of 175 gallons of oil would be released to the cubicle. The spray shields installed on the RCS piping in the cubicle are expected to prevent lube oil from coming in contact with hot RCS piping surfaces. In addition, the modifications to preclude leakage will contain the oil spill within the cubicle. If the oil were to ignite, the RCP cubicle heat detection equipment, the ambient air temperature monitors, and RCP stator temperature alarms would give control room operators warning of the fire. If the fire were to continue to burn and the manual fire suppression efforts of the fire brigade were not successful, the fire in the "C" RCP cubicle could disable the cabling associated with the "C" RCS instrumentation loop. Even if this were to occur, hot standby can be achieved by utilizing either redundant instrumentation loops "A" or "B". Indication in the control room and at the remote monitoring panel for these loops would be available to assure that safe shutdown conditions can be achieved.

In addition to the above interim measures, the licensee has committed to design and fabricate an oil collection system for the spare RCP motor. This oil collection system will be installed on the motor during the refueling outage following Cycle 11 operation.

3.0 CONCLUSION

Based on our evaluation, the staff concludes that the licensee's interim oil collection method, consisting of temporary fire protection modifications, compensatory measures, and the partially installed oil collection system as described in Section 2.0 above, results in an acceptable fire hazard level which is essentially equivalent to that which existed with the permanent oil collection system. The staff also concludes that this method provides reasonable assurance that any potential lube oil leakage from the "C" RCP motor will be adequately controlled and contained within the "C" RCP/steam generator cubicle. In addition, if a fire were to occur in the "C" cubicle, the staff concludes

that the licensee's interim oil collection method would limit fire damage and assure that safe shutdown can be achieved and maintained. The staff finds the licensee's request to operate the "C" RCP, with an interim oil collection method in place for Cycle 11 to be acceptable and, therefore, the licensee's request for exemption is granted.

Dated: December 6, 1990

Principal Contributor
P. Madden