

April 18, 1988

*Exemption to PDR-16*

Docket No. 50-219

DISTRIBUTION

Mr. P. B. Fiedler  
Vice President and Director  
Oyster Creek Nuclear Generating Station  
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<u>Docket File</u>	ADromerick
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Dear Mr. Fiedler:

SUBJECT: EXEMPTION FROM THE REQUIREMENTS OF APPENDIX J TO 10 CFR PART 50, PARAGRAPH III.A.3 (TAC NO. 67356)

The Commission has issued an exemption from certain requirements of Appendix J to 10 CFR Part 50 in response to your letter dated February 19, 1988. The exemption pertains to certain requirements of 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," for all Type A (Containment Integrated Leakage Rate) tests to be performed in accordance with the provisions of the American National Standard (ANSI) N45.4-1972, "Leakage Rate Testing of Containment Structures for Nuclear Reactors," dated March 16, 1972. This standard requires that containment leakage rate calculations be performed using either the point-to-point method or the total time method.

In your letter dated February 19, 1988, you requested an exemption to allow use of the mass point method (as provided in ANSI/ANS 56.8-1981). The Commission grants the enclosed exemption to use the mass point method for calculating containment leakage, with the explicit condition that such tests be conducted with a minimum test duration of 24 hours. The exemption is granted until Section III.A.3 of Appendix J is modified. The exemption applies only to the method of calculating leakage by use of the mass point method and not to any other aspects of the tests. A copy of our related Safety Evaluation is enclosed.

The Exemption is being forwarded to the Office of the Federal Register for publication.

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Mr. P. B. Fiedler

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In your letter of February 19, 1988, you also requested changes to Technical Specifications 3.5.A and 4.5. Matters related to this request will be the subject of a future letter from the staff when the evaluation is completed.

Sincerely,

original signed by  
Alexander W. Dromerick, Project Manager  
Project Directorate I-4  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Exemption
- 2. Safety Evaluation

cc w/enclosures:  
See next page

*No legal objections subject to modifications noted - ADW*

LA:PDI-4  
SNorris  
03/15/88

PM:PDI-4  
ADromerick:bd  
03/15/88

PSB  
JCraig  
03/16/88

D:PDI-4  
JStolz  
03/18/88

OGC  
S. H. Law  
03/29/88

ADRI  
BBoger  
04/06/88

DRP/DCRP  
SVarga  
03/16/88

Mr. P. B. Fiedler  
Oyster Creek Nuclear Generating Station

Oyster Creek Nuclear  
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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of

GPU NUCLEAR CORPORATION AND  
JERSEY CENTRAL POWER AND LIGHT  
COMPANY

(Oyster Creek Nuclear Generating  
Station)

Docket No. 50-219

EXEMPTION

I.

The GPU Nuclear Corporation and Jersey Central Power & Light Company (the licensee) are the holders of Provisional Operating License No. DPR-16, which authorizes operation of the Oyster Creek Nuclear Generating Station, (the facility) at steady state reactor core power levels not in excess of 1930 megawatts thermal. The license provides, among other things, that Oyster Creek Nuclear Generating Station is subject to all rules, regulations, and Orders of the Commission now or hereafter in effect.

The plant is boiling water reactor (BWR) located at the licensee's site in Ocean County, New Jersey.

II.

The Code of Federal Regulations, 10 CFR 50.54(o), specifies that primary reactor containments for water-cooled power reactors shall comply with Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." Paragraph III.A.3 of Appendix J incorporates by reference the American National Standard ANSI N45.4-1972, "Leakage Rate Testing of Containment Structures for Nuclear Reactors." This standard requires that

containment leakage calculations for Containment Integrated Leakage Rate Tests (CILRTs) be performed using either the point-to-point method or total time method.

A more recent standard, ANSI/ANS 56.8-1981, "Containment System Leakage Testing Requirements," which was intended to replace ANSI N45.4-1972, specifies the use of the mass point method to the exclusion of the two older methods. A proposed revision to Appendix J, which has been published for public comment (53 FR 5985, February 29, 1988) would permit the use of the mass point method provided it is used with a test duration of at least 24 hours. Pending approval of the revision to Appendix J, licensees who wish to use the mass point technique must submit an application for partial exemption from the requirement that Appendix J test calculations for CILRTs will conform with ANSI N45.4-1972.

### III.

By letter dated February 19, 1988, the licensee requested a partial exemption from 10 CFR Part 50, Appendix J, Paragraph III.A.3, which requires that all CILRTs be performed in accordance with ANSI N45.4-1972, "Leakage Rate Testing of Containment Structures for Nuclear Reactors." ANSI N45.4-1972 requires that leakage calculations be performed using either the total time method or the point-to-point method. The licensee has stated in support of the application for exemption from Appendix J that the mass point method is a more accurate method of calculating containment leakage.

It has been recognized by the professional community that the mass point method is superior to the two other methods, point-to-point and total time, which are referenced in ANSI N45.4-1972 and endorsed by the present regulations. The mass point method calculates the air mass at each point in time, and plots it against time. A linear regression line is plotted through the mass-time points using a least square fit. The slope of this line is the leakage rate.

In addition to the method of calculation, consideration of the length of the test should also be included in the overall program. In accordance with Section 7.6 of ANSI N45.4-1972, a test duration less than 24 hours is only allowed if approved by the NRC, and the only currently approved methodology for such a test is contained in Bechtel Topical Report BN-TOP-1, Revision 1, "Testing Criteria for Integrated Leakage Rate Testing of Primary Containment Structures for Nuclear Power Plants," dated November 1, 1972. This approach only allows use of the total time method. Therefore, the staff will condition the exemption to require a minimum test duration of 24 hours when the mass point method is used.

The licensee's letter also submitted information to identify the special circumstances for granting this exemption for Oyster Creek Nuclear Generating Station pursuant to 10 CFR 50.12. The purpose of Appendix J to 10 CFR Part 50 is to assure that containment leak-tight integrity can be verified periodically throughout the service lifetime so as to maintain containment leakage rate within the limit specified in the plant technical specifications. The underlying purpose of the rule specifying particular methods for calculating leakage rates

is to assure that accurate and conservative methods are used to assess the results of containment leakage rate tests. As set forth above, the mass point method has been a widely used method providing accurate results and the staff has determined that this method of calculating leakage rate satisfies the purpose of the rule.

Based on the above discussion, the licensee's proposed partial exemption from paragraph III.A.3 of Appendix J, to allow use of the mass point method as requested in the submittal dated February 19, 1988, is acceptable with the condition of 24 hours minimum test duration, until such provision of Appendix J is modified. The exemption applies only to the method of calculating leakage rate by use of the mass point method and not to any other aspects of the tests.

#### IV.

Accordingly, the Commission has determined that, pursuant to 10 CFR Part 50.12, this exemption is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security. The Commission has further determined that special circumstances, as set forth in 10 CFR 50.12(a)(2)(ii), are present justifying the exemption, namely that the application of the regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule. Accordingly, the Commission hereby grants an exemption as described in Section III above from Paragraph III.A.3 of Appendix J to the extent that the mass point method

may be used for containment leakage rate calculations, provided it is used with a minimum test duration of 24 hours. The exemption is granted until such provision of Appendix J is modified. The exemption applies only to the method of calculating leakage rate by use of the mass point method and not any other aspects of the tests.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will have no significant impact on the environment (53 FR.12617 April 15, 1988).

This exemption is effective upon issuance.

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 April 18, 1988



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

CONCERNING AN EXEMPTION FROM APPENDIX J

FOR CONTAINMENT INTEGRATED LEAKAGE RATE TEST METHODOLOGY

GPU NUCLEAR CORPORATION AND  
JERSEY CENTRAL POWER & LIGHT COMPANY

OYSTER CREEK NUCLEAR GENERATING STATION

DOCKET NO. 50-219

INTRODUCTION

By letter dated February 19, 1988, the licensee requested an exemption from 10 CFR Part 50, Appendix J, Paragraph III.A.3, which requires that all Containment Integrated Leakage Rate Tests (CILRTs) be performed in accordance with the American National Standard (ANSI) N45.4-1972, "Leakage Rate Testing of Containment Structures for Nuclear Reactors." ANSI N45.4-1972 requires that leakage rate calculations be performed using either the total time method or the point-to-point method to calculate containment leakage rate. The mass point method is described in a more recent standard, ANSI/ANS 56.8-1981, "Containment System Leakage Testing." The staff's review of this request for exemption follows.

EVALUATION

The licensee was recently informed by the staff that the use of the mass point method has not been incorporated into the current provisions of 10 CFR Part 50, Appendix J, and is therefore not legally permitted without an exemption. In response to this staff position, the licensee has requested an Appendix J exemption. The licensee has stated in support of the application for exemption from Appendix J, that the mass point method is a more accurate method of calculating containment leakage.

It has been recognized by the professional community that the mass point method is an acceptable means for calculation of containment leakage rate in addition to the two other methods, point-to-point and total time, which are referenced in ANSI N45.4-1972 and endorsed by the present regulations. The mass point method calculates the air mass at each point in time, and plots it against time.

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A linear regression line is plotted through the mass-time points using a least square fit. The slope of this line divided by the intercept of this line, and multiplied by an appropriate constant is the leakage rate. The mass point method has some advantages when it is compared with the other methods. In the total time method, a series of leakage rates is calculated on the basis of air mass differences between an initial data point and each individual data point thereafter. If for any reason (such as instrument error, lack of temperature equilibrium, ingassing, or outgassing) the initial data point is not accurate, the result of the test will be affected. In the point-to-point method, the leakage rates are based on the mass difference between each pair of consecutive points which are then averaged to yield a single leakage rate estimate. Mathematically, this can be shown to be the difference between the air mass at the beginning of the test and the air mass at the end of the test expressed as a percentage of the containment air mass. It follows from the above that the point-to-point method does not make use of any mass readings taken during the test and thus the leakage rate is calculated on the basis of the difference in mass between two measurements taken at the beginning and at the end of the test, which are 24 hours apart.

ANSI/ANS 56.8-1981, which was intended to replace ANSI N45.4-1972, specifies the use of the mass point method, to the exclusion of the two older methods. However, the staff has determined that these three methods (mass-point, total time and point-to-point) are acceptable methods which may be used to calculate containment leakage rates. A proposed revision to Appendix J, which has been published for public comment (53 FR 5985, February 29, 1988) would permit the use of the mass point method provided it is used with a test duration of at least 24 hours.

In addition to the method of calculation, consideration of the length of the test should also be included in the overall program. In accordance with Section 7.6 of ANSI N45.4-1972, a test duration less than 24 hours is only allowed if approved by the NRC, and the only currently approved methodology for such a test is contained in Bechtel Topical Report BN-TOP-1, Revision 1, "Testing Criteria for Integrated Leakage Rate Testing of Primary Containment Structures for Nuclear Power Plants," dated November 1, 1972. This approach only allows use of the total time method. Therefore, the staff will condition the exemption to require a minimum test duration of 24 hours when the mass point method is used.

The licensee's letter also submitted information to identify the special circumstances for granting this exemption pursuant to 10 CFR 50.12. The purpose of Appendix J to 10 CFR Part 50 is to assure that containment leak tight integrity can be verified periodically throughout the service lifetime so as to maintain containment leakage rate within the limit specified in the facility Technical Specifications. The underlying purpose of the provision specifying particular methods for calculating leakage rates is to assure that accurate and conservative methods are used to assess the results of containment leakage rate tests. The staff has determined that the mass point method is an acceptable method for calculation of containment leakage rate and satisfies the purpose of the rule. Thus, there are special circumstances in this case.

CONCLUSION

Based on the above discussion, the staff finds that the licensee's proposed partial exemption from paragraph III.A.3 of Appendix J, to allow use of the mass point method as requested in the submittal dated February 19, 1988, is acceptable with the condition of 24 hours minimum test duration, until such provision of Appendix J is modified. The exemption applies only to the method of calculating leakage rate by use of the mass point method and not to any other aspects of the tests.

Dated: April 18, 1988

Principal Contributors:

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