JUN 25 1982

Docket Nos. 50-237
and 50-249

Mr. L. DelGeorge
Director of Nuclear Licensing
Commonwealth Edison Company
P. O. Box 767
Chicago, Illinois 60690

Dear Mr. DelGeorge;

Re: Dresden Nuclear Power Station, Units 2 and 3

The Commission has issued the enclosed Exemption from certain requirements of Section 50.54(o) and Appendix J to 10 CFR Part 50 for the Dresden Nuclear Power Station, Units 2 and 3, in response to your letter dated September 26, 1975, as supplemented by letters dated September 9, 1976, and April 5, 1977. This Exemption, which is being forwarded to the Office of the Federal Register for publication, pertains to the test sequence for Type A and C tests, the exclusion of instrument line and main steamline isolation valves from the Type C test requirements and extends the interval between Type B tests for the containment airlock.

Your requests, however, to exempt the reactor building closed cooling water supply and return isolation valves from the test requirements and to exempt the containment airlock from the required test pressure have been denied. Furthermore, we have evaluated your request for exemptions related to the proposed methodology for testing the traversing incore probe system, hydraulic closure of certain feedwater check valves prior to testing, modifications to certain systems in order to perform the required tests, and exclusion of the low pressure coolant injection and core spray suction valves from the test requirements and have determined that no exemptions for these items are necessary.

The bases for our findings and the disposition of all of your exemption requests are contained in the enclosed Safety Evaluation.

OFFICE ▶	.....	.....	.....	.....	.....	.....	.....
SURNAME ▶	.....	.....	.....	.....	.....	.....	.....
DATE ▶	.....	.....	.....	.....	.....	.....	.....

With regard to the exemption requests that have been denied, we request that you inform us within 60 days of receipt of this letter regarding your plans, schedules, and proposed TS changes for meeting the requirements of Appendix J. Until revised TS are issued, you should continue to adhere to the provisions of the existing specifications pertaining to leak rate testing.

This request for information is specific to the Dresden Nuclear Power Station, Units 2 and 3; therefore, OMB clearance is not required under P.L. 96-511.

Sincerely,

Original signed by
Darrell G. Eisenhut

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

Enclosures:
1. Exemption
2. Safety Evaluation

cc w/enclosures
See next page

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UNITED STATED OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	Docket Nos. 50-237
COMMONWEALTH EDISON COMPANY	)	and 50-249
(Dresden Nuclear Power Station, Units 2 and 3	)	
	)	

EXEMPTION

I.

The Commonwealth Edison Company (CECo/the licensee) is the holder of Provisional Operating License No. DPR-19 and Facility Operating License No. DPR-25 (the licenses) which authorize operation of the Dresden Nuclear Power Station, Units 2 and 3, respectively, located in Grundy County, Illinois, at steady state reactor core power levels not in excess of 2527 megawatts thermal (rated power). These licenses provide, among other things, that they are subject to all rules, regulations and Orders of the Commission now or hereafter in effect.

II.

Section 50.54(o) of 10 CFR Part 50 requires that primary reactor containments for water cooled power reactors be subject to the requirements of Appendix J to 10 CFR Part 50. Appendix J contains the leakage test requirements, schedules, and acceptance criteria for tests of the leak-tight integrity of the primary reactor containment and systems and components which penetrate the containment. Appendix J was published on February 14, 1973 and in August 1975, each licensee was requested to review the extent to which its facility met the requirements.

On September 26, 1975, Commonwealth Edison Company (CWE but now referred to as CECo) submitted its evaluation of the Zion Station Unit Nos. 1 and 2, Dresden Station Unit Nos. 1, 2, and 3, and Quad Cities Station Unit Nos. 1 and 2 in which it assessed compliance with the rule and also requested an exemption from certain requirements of the rule. This Exemption addresses only the Dresden Nuclear Power Station, Units 2 and 3. The CECo submittal for the Dresden Nuclear Power Station, Units 2 and 3 was supplemented by letters dated September 9, 1976 and April 5, 1977. In these submittals, CECo requested that certain test sequences and methodology, components, and penetrations be exempted from Appendix J requirements. The Franklin Research Center, as a consultant to NRR, has reviewed the licensee's submittals and prepared a Technical Evaluation Report (TER) of its findings. The NRC staff has reviewed this TER and in its Safety Evaluation Report dated June 25, 1982. The staff has concurred in the TER's bases and findings with the exception of Item 4 below, which required additional staff evaluation prior to determining the acceptability of the licensee's request.

The exemption requests found to be acceptable are as follows:

1. Section III.A.1.(a) of Appendix J requires, in part, that the Type A test be performed as close as practical to the "as is" condition. When excessive leakage paths are identified during the Type A test, the test is to be terminated and leakage through such paths is to be measured by local leakage rate procedures. After repair or adjustment, a subsequent Type A test is performed.

   CECo requested an exemption from this requirement in order to perform

local valve leakage rate tests (Type C tests) prior to the integrated primary containment leakage rate test (Type A test) and to back-correct the results of the Type A test with the results of the Type C tests. CECo submitted its methodology and justification that performance of the test sequence in this manner would yield conservative results.

We have reviewed CECo's submittals and have concluded that the licensee's methodology will yield conservative results under certain conditions. Therefore, the licensee's request for exemption from the required sequence of conducting Type A and C tests is acceptable, provided that:

a. When performing Type C tests, the conservative assumption that all measured leakage is in a direction out of the containment is applied, unless the test is performed by pressurizing between the isolation valves; and,

b. When performing Type C tests by pressurizing between the isolation valves, the conservative assumption that the two valves leak equally is applied, where the isolation valves are shut by normal operation without preliminary exercising or adjustment.

2. Section II.4.1 of Appendix J requires, in part, Type C testing of containment isolation valves which provide a direct connection between inside and outside atmospheres of the primary reactor containment under normal operation. CECo requested an exemption from this requirement in order to exclude certain instrument line manual isolation valves from the

Type C test requirements and submitted certain design information as justification.

We have reviewed the licensee's submittals and have determined that the instrument line manual isolation valves are not instrument valves which provide a direct connection between the inside and outside atmospheres of the primary reactor containment under normal operation. In addition, the instrument lines were installed in accordance with Regulatory Guide 1.11, Instrument Lines Penetrating Primary Reactor Containment.

Since these valves remain open in both normal and accident conditions, the licensee's request for exemption from Type C test requirements for the instrument line manual isolation valves is acceptable, provided that the affected instrument lines are not isolated from the containment atmosphere during the performance of a Type A test.

3. Section III.C.2 of Appendix J requires, in part, that Type C testing be performed at the peak calculated accident pressure (Pa). CECo requested an exemption from this requirement for the Main Steam Isolation Valves (MSIVs) to permit testing at 25 psig rather than at Pa (48 psig) and submitted certain design information as justification.

The MSIVs are leak tested by pressurizing between the valves. The MSIVs are angled in the main steam lines in the direction of flow in order to afford better sealing upon closure. Consideration of this feature was included at the design stage of the facility when the

original test pressure of 25 psig was established. A test pressure of Pa acting under the inboard disc is sufficient to lift the disc off its seats, and results in excessive leakage into the reactor vessel.

We have reviewed the licensee's submittals and have concluded that testing of the MSIVs at a reduced pressure of 25 psig will result in a conservative determination of the leakage rate through the MSIVs and, therefore, the proposed exemption is acceptable.

4. Section III.D.2 of Appendix J requires, in part, that Type B tests be performed on containment airlocks at six-month intervals at a test pressure of not less than Pa. CECo requested an exemption from the frequency requirement in order to permit testing on a schedule consistent with the plant operating cycle (i.e., each refueling outage). CECo also requested an exemption to conduct the tests at a reduced pressure. This latter request was denied by the staff based on the need to periodically demonstrate airlock integrity at accident pressure.

Our contractor's evaluation of the licensee's submittals concluded that the licensee's program related to test frequency and pressure should conform to the requirements of Section III.D.2 of Appendix J. However, subsequent discussions with the licensee regarding test methodology and additional evaluation by us of airlock degradation causal factors and operating history have resulted in a reevaluation of our position. The staff agrees with the licensee that without this exemption from the

Appendix J requirements, the plant would have to be shutdown and the equipment hatch opened in order to install a strongback on the inner airlock door to perform the test, and subsequent door and hatch openings to remove it. This would result in an outage of several days for the licensee, the cost of replacement power to the public, and could subject operating personnel to additional radiation exposure. In addition, the additional openings of the equipment hatch and airlock provide additional opportunities for inadvertent seal degradation.

As a result, the staff has reevaluated the six-month test requirement and has developed a revised position which is believed to meet the objectives of Appendix J requirements for containment airlock door tests. This revised position still requires the containment airlock to be tested at six-month intervals at a pressure of Pa in accordance with Appendix J, except that this test interval may be extended up to the next refueling outage (up to a maximum interval between Pa tests of 24 months) if there have been no airlock openings since the last successful test at Pa and a Pā test is performed following the next airlock opening. The intent of the Appendix J requirement is to assure that the airlock door seal integrity is maintained and no degradation has occurred as a result of opening of the airlock doors between testing intervals at Pa. Since there is an inadequate basis to conclude that no airlock seal degradation occurs if the airlock doors have not been opened between extended testing intervals at Pa, we believe that a reduced pressure test or testing between seals every six months

should be performed to assure that the airlock door seal integrity is maintained between the extended testing intervals at Pa. We believe this position satisfies the objectives of the requirements. The licensee will be requested to propose appropriate modifications to the Technical Specifications.

Therefore, the exemption from the airlock testing frequency requirement of Appendix J requested by the licensee should be granted provided the licensee complies with the staff's revised position on airlock testing.

III.

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 the common defense and security and is otherwise in the public interest. Therefore, the Commission hereby approves the following exemption requests:

1. Exemption is granted from the requirements of Section III.A.1(a) of Appendix J pertaining to the sequence for conducting Type A and Type C tests provided that:
   a. When performing Type C tests, the conservative assumption that all measured leakage is in a direction out of the containment is applied unless the test is performed by pressurizing between the isolation valves; and,
   b. When performing Type C tests by pressurizing between the isolation valves, the conservative assumption that the two valves leak equally (and therefore one half of the measured

leakage is in a direction out of the containment) is applied, where the isolation valves are shut by normal operation without preliminary exercising or adjustment.

2. Exemption is granted from the requirements of Section II.H.1 of Appendix J pertaining to the Type C testing of instrument lines provided that the affected instrument lines are not isolated from the containment atmosphere during the performance of a Type A test.

3. Exemption is granted from the requirements of Section III.C.2 of Appendix J pertaining to the Type C testing of the main steamline isolation valves at a test pressure of Pa. Testing at a reduced pressure of 25 psig is acceptable due to the unique design of the valves.

4. Exemption is granted from the requirements of Section III.D.2 of Appendix J pertaining to the test frequency for conducting Type B tests at six-month intervals at a test pressure of not less than Pa. The test interval may be extended to the next refueling outage, but in no case shall exceed 24 months from the last test at Pa, provided that there have been no airlock openings since the last successful test at Pa and a Pa test is performed following the next airlock opening. A reduced pressure test or testing between seals every six months shall be performed to assure that airlock door seal integrity is maintained between extended testing intervals at Pa.

The NRC staff has determined that the granting of these exemptions will not result in any significant environmental impact and that pursuant to 10 CFR 51.5(d)(4), an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with this action.

FOR THE NUCLEAR REGULATORY COMMISSION

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland
this 25th day of June 1982

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

SAFETY EVALUATION REPORT BY THE OFFICE OF NUCLEAR REACTOR REGULATION

APPENDIX J REVIEW

DRESDEN STATION, UNITS 2 AND 3

DOCKET NOS. 50-237 AND 50-249

Authors: J. Huang, J. Hegner

1.0 Introduction

On August 5, 1975 (Reference 1), the NRC requested Commonwealth Edison Company (licensee) to review its containment leakage testing program for Dresden Nuclear Power Station, Units 2 and 3 (Dresden 2 and 3) and the associated Technical Specifications, for compliance with the requirements of Appendix J to 10 CFR Part 50.

Appendix J to 10 CFR Part 50 was published on February 14, 1973. Since by this date there were already many operating nuclear plants and a number more in advanced stages of design or construction, the NRC decided to have these plants reevaluated against the requirements of this new regulation. Therefore, beginning in August 1975, requests for review of the extent of compliance with the requirements of Appendix J were made of each licensee. Following the initial responses to these requests, NRC staff positions were developed which would assure that the objectives of the testing requirements of the above cited regulation were satisfied. Subsequently, Section III.D.2 of Appendix J was revised, effective October 22, 1980 and conformance is considered in our evaluation. These staff positions have since been applied in our review of the submittals filed by the licensee for Dresden 2 and 3. The results of our evaluation are provided below.

2.0 Evaluation

Our consultant, the Franklin Research Center (FRC), has reviewed the licensee's submittals (References 2, 3 and 5) and prepared the enclosed Technical Evaluation Report (TER-C5257-15/16), Containment Leakage Rate Testing for Dresden 2 and 3. We have reviewed FRC's evaluation and concur in its bases and findings, with the exception of its assessment of the licensee's request for exemption pertaining to the frequency of Type B tests for the containment airlock, which is further evaluated below. The remaining exemption requests are further discussed in the enclosed TER.

Section III.D.2 of Appendix J, effective October 22, 1980, requires testing of the airlock as follows:

1. Every six months at a pressure of not less than accident pressure (Pa) and after periods when the airlock is opened and containment integrity is not required.

2. Within three days of opening (or every three days during periods of frequent opening) when containment integrity is required, at a pressure of Pa or at a reduced pressure as stated in the Technical Specifications.

By letter dated September 26, 1975, the licensee requested an exemption from the frequency requirements of Section III.D.2 in order to permit testing on a frequency consistent with the plant operating cycle (i.e., each refueling outage). FRC's evaluation of the licensee's submittals in support of the exemption request which is contained in the enclosed TER concluded that the licensee's program related to the test frequency and pressure should conform to the requirements of Section III.D.2 of Appendix J.

However, subsequent discussions with the licensee regarding test methodology and additional evaluation by the staff of airlock degradation causal factors and operating history have resulted in a reevaluation of our position. Test performance requires shutting down the reactor and opening the equipment hatch in order to install a strongback on the inner airlock door to prevent unseating the airlock door, and subsequent door and hatch openings to remove the strongback. This would result in an outage of several days for the licensee, the cost of replacement power to the public, and could subject operating personnel to additional radiation exposure. In addition, the additional openings of the equipment hatch and airlock provide additional opportunities for inadvertent seal degradation.

Based on these considerations, we have developed the following modified position which we believe meets the objectives of Appendix J requirements for Type B tests of containment airlocks.

We will still require containment airlocks to be tested every six months at a pressure of not less than Pa in accordance with Appendix J, except that the test interval may be extended to the next refueling outage (up to a maximum interval between Pa tests of 24 months) provided that there have been no airlock openings since the last successful test at Pa and a Pa test is performed following the next airlock opening. The intent of the Appendix J requirement is to assure that the airlock door seal integrity is maintained and no degradation has occurred as a result of opening of the airlock doors between testing intervals at Pa. Since there is an inadequate basis to conclude that no airlock seal degradation occurs if the airlock doors have not been opened between extended testing intervals at Pa, we believe that a reduced pressure testing or testing between seals every six months should be performed to assure that the airlock door seal integrity is maintained between the extended testing intervals at Pa. We believe this position satisfies the objectives of the requirements. The licensee will be requested to propose appropriate modifications to his Technical Specifications.

Therefore, the exemption from the airlock testing frequency requirements of Appendix J requested by the licensee should be granted provided the licensee complies with the staff's revised position on airlock testing.

3.0 Summary

Based on our review of the enclosed Technical Evaluation Report and our additional review of the containment airlock testing requirements, our conclusions regarding all exemption requests are summarized below:

1. The licensee's request (Reference 3) for exemption from the required sequence of conducting Type A and C tests is acceptable provided that:

   a. When performing Type C tests, the conservative assumption that all measured leakage is in a direction out of the containment is applied unless the test is performed by pressurizing between the isolation valves; and

   b. When performing Type C tests by pressurizing between the isolation valves, the conservative assumption that the two valves leak equally (and therefore one half of the measured leakage is in a direction out of the containment) is applied, where the isolation valves are shut by normal operation without preliminary exercising or adjustment.

2. The licensee's request (Reference 3) for exemption from Type C testing requirements for instrument line isolation valves is acceptable provided that the affected instrument lines are not isolated from the containment atmosphere during the performance of a Type A test.

3. The licensee's request (Reference 2) for exemption from the required containment airlock test frequency is acceptable provided the licensee adheres to the provisions of the staff's revised position on containment airlock testing.

   The licensee's request for exemption from the required containment airlock test pressure is denied. Periodic testing of the airlock at a test pressure of Pa will be required in order to demonstrate airlock integrity at accident pressures. The licensee will be requested to inform us regarding its plans and schedule for meeting this requirement. The licensee may propose design modifications or alternate test methodology to meet the objectives of the regulation.

4. The licensee's request (Reference 3) for exemption from Type C testing requirements for main steam isolation valves is acceptable due to the unique design of these valves.

5. The licensee's proposal (Reference 5) to perform Type C testing of the traversing incore probe system valves by disconnecting the tubes at fittings just inside the drywell is acceptable and no exemption is required since the licensee has developed an acceptable methodology for performing the Type C tests.

6. The licensee's proposal (Reference 3) to shut check valves using a hydraulic differential pressure of 50 psig prior to draining the lines for Type C testing is acceptable and does not require an exemption from the requirements of Appendix J since the procedure is in compliance with Section III.C.1 regarding closing the valves by normal operation.

7. The licensee's proposed (References 3, 5) system modification to permit performance of Type C testing for containment air sample valves, isolation condenser vent valves and HPCI suction valves is acceptable.

8. The licensee's proposal (References 3 and 5) to exclude the LPCI suction valves and core spray suction valves from Type C testing requirements is acceptable and no exemption is required.

9. The licensee's request (References 3 and 5) for exemption from the Type C testing requirements for the reactor building closed cooling water supply and return isolation valves is not acceptable. As part of the Systematic Evaluation Program, the staff has reviewed the containment isolation system for Dresden 2 (SEP Topic VI-4). The staff found that the subject valves are relied on to perform a containment isolation function. As a result, system modifications should be made to permit Type C testing of these valves. The licensee will be requested to inform us regarding its plan and schedule for meeting this requirement.

4.0 Environmental Considerations

We have determined that the amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendments involve an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement, or negative declaration and eivnronmental impact appraisal need not be prepared in connection with the issuance of these amendments.

5.0 Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendments do not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significant decrease in a safety margin, the amendments do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

6.0 References

1. K. R. Goller (NRC) Generic Letter to CWE on Containment Leakage Testing, dated August 5, 1975.

2. G. J. Pliml (CWE) letter to K. R. Goller (NRC), dated September 26, 1975.

3. G. J. Pliml (CWE) letter to K. R. Goller (NRC), dated September 9, 1976.
4. D. L. Ziemann (NRC) letter to R. L. Bolger (CWE), dated February 2, 1977.
5. M. S. Turbak (CWE) letter to D. L. Ziemann (NRC), dated April 5, 1977.

Dated: June 25, 1982

Enclosure: Technical Evaluation Report

TECHNICAL EVALUATION REPORT

CONTAINMENT LEAKAGE RATE TESTING

COMMONWEALTH EDISON COMPANY
DRESDEN STATION, UNITS 2 AND 3

NRC DOCKET NO. 50-237/50-249

NRC TAC NO. 08668/08669

NRC CONTRACT NO. NRC-03-79-118

FRC PROJECT C5257

FRC TASKS 15, 16

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June 11, 1981

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CONTENTS

1. BACKGROUND

On August 5, 1975 [1], the NRC requested Commonwealth Edison Company (CWE) to review the containment leakage testing program for Dresden Station Units 2 and 3 (Dresden 2 and 3) and to provide a plan for achieving full compliance with 10CFR50, Appendix J, including appropriate design modification, changes to technical specification, or requests for exemption from the requirements pursuant to 10CFR50.12, where necessary.

CWE responded to the NRC's request in a letter dated September 26, 1975 [2], in which five requests for exemption from the requirements of Appendix J were listed for Dresden 2 and 3. On September 9, 1976 [3], CWE submitted several additional requests for exemption. The NRC responded in a letter dated February 2, 1977 [4], providing CWE with several questions regarding these submittals.

On April 5, 1977 [5], CWE replied to the NRC's questions. In this letter, CWE provided additional information relative to the requests for exemption from the requirements of Appendix J for Dresden 2 and 3 and also requested one additional exemption for Dresden 2 and 3 regarding a proposed feedwater check valve testing procedure. Subsequently, on April 28, 1978 [6], CWE submitted a proposed technical specification change related to reducing the minimum time requirement for conducting the integrated primary containment leak rate tests.

The purpose of this report is to provide technical evaluations of the outstanding submittals regarding the implementation of the requirements of 10CFR50, Appendix J at Dresden 2 and 3. Consequently, technical evaluations of the exemption requests submitted in References 2, 3, and 5 are included. The issue of conducting Type A tests in less than a minimum 24-hour period is being reviewed by the NRC staff on a generic basis. Consequently, CWE's proposal of Reference 6 is not evaluated as part of this report.

2. EVALUATION CRITERIA

Code of Federal Regulations, Title 10, Part 50 (10CFR50), Appendix J, Containment Leakage Testing, was specified by the NRC as the basis of the evaluation. Where applied to the evaluations in this report, the criteria are either referenced or are briefly stated where necessary in support of the conclusions. Furthermore, in recognition of the plant-specific conditions which could lead to requests for exemption not explicitly covered by the regulations, the NRC directed that the technical review constantly emphasize the basic intent of 10CRF50, Appendix J, that potential containment atmospheric leakage paths be identified, monitored, and maintained below established limits.

3. TECHNICAL EVALUATION

3.1 REQUESTS FOR EXEMPTION FROM THE REQUIREMENTS OF APPENDIX J

In Reference 2, CWE requested approval of the following exemptions:

> Exemption from the required sequence of conducting Type A and C tests.
>
> Exemption from Type C testing requirements for instrument line isolation valves.
>
> Exemption from the required frequency of testing containment airlocks.
>
> Exemption from the required pressure for testing containment airlocks.
>
> Exemption from Type C testing requirements for main steam isolation valves.

In Reference 3, CWE requested an additional exemption from Type C testing requirements for the traversing incore probe system valves. In Reference 5, CWE requested an exemption from Type C testing requirements for the feedwater check valves and other miscellaneous isolation valves.

A technical evaluation of each of these requests for exemption is included in the following sections.

3.1.1 Exemption from the Required Sequence of Conducting Type A and Type C Tests

Section III.A.1.(a) of Appendix J requires that the Type A test be performed as close as practical to the "as is" condition. When excessive leakage paths are identified during the Type A test, the test is to be terminated and leakage through such paths is to be measured by local leakage rate procedures. After repairs or adjustments are made, a subsequent Type A test is performed. The subsequently determined overall integrated containment leakage rate, as well as the leakage rates from the local leakage rate tests, are reported to the Commission.

In Reference 2, CWE stated its view concerning this requirement as follows:

> "Our plan has been to conduct local leak rate tests during the first part of an outage. We then conduct an integrated leak rate test close to the end of the outage. The results of the integrated leak rate test are then corrected back to determine the conditions that existed at the beginning of the outage using local leak rate test results."

In Reference 4, the NRC indicated to CWE that this procedure would be acceptable provided that in correcting back to determine the results of the integrated test, a conservative assumption is applied that all measured local leakage rate is in a direction out of the containment. In Reference 5, however, CWE asserted that the assumption that the total measured leakage of the local leakage rate test was in a direction out of the containment is not representative of the actual containment outleakage when the combined leakage of two isolation valves is measured in a single test by pressurizing between the valves. In this case, CWE maintained that a conservative assumption would be that one half of the total measured local leakage from these valves was outleakage. CWE stated:

> "In those cases where the combined leakage of two isolation valves is measured in a single test by pressurizing between the valves, the above assumption cannot apply since under accident conditions, the leakage out of the containment via such a penetration would have to pass through the smaller leak rate of the two valves since it effectively throttles the flow through the penetration. In these cases, we intend to make the most conservative assumption possible--the valves leak equally."

CWE further stated that a multiple single failure criteria imposed upon all valves measured by local leakage rate procedures was unnecessarily conservative and that their proposed procedure provided results of the integrated leakage rate test which were more nearly "as is" while the NRC's conservative assumption represented a "worst possible case."

Evaluation. When conducting a local leakage rate test of an isolation valve located inside the containment in the direction in which it performs its safety function, several potential leakage paths may be available which do not

result in containment outleakage (packing leaks, body-to-bonnet leaks, gasket seal leaks, etc.). Since these potential leakage paths cannot be easily separated from valve seat leakage which does result in outleakage, the NRC conservative assumption that all measured leakage is outleakage must be applied. However, when conducting a normal Type A test, where test pressure is applied through two shut isolation valves in series, the actual leakage to the outside atmosphere will be no greater than the smaller of the leakage rates of the two valves taken individually. Therefore, when testing by pressurizing between the isolation valves during a local leakage rate test (assuming that the reverse direction testing of the inboard valve is a least equivalent to or more conservative than testing in the direction of accident pressure), the assumption that the two valves leak equally is a conservative assumption for the purpose of back-correcting the results of the Type A test. In fact, where one of the two valves is leaktight while the other has significant leakage, the effect of back-correcting with the assumption that both valves leak equally will add a conservatively large value to the results of the Type A test since normal Type A testing would have yielded in zero leakage through the penetration.

The Type A testing procedures of Appendix J accounts for the possibility of active failures in determining the "as is" condition of the containment by requiring that the isolation valves be shut by normal means without any adjustments, exercising, or other special precautions. Consequently, if both valves shut by normal means prior to the Type A test, the test pressure is applied to the penetration with isolation provided by two shut valves in series. If one valve fails to shut, the "as is" test is performed with the single valve isolation. Since CWE proposes to adhere to the requirements of Appendix J in shutting the valves prior to conducting the local leakage rate test, requiring that the total leakage resulting from the pressurizing between the valves be considered outleakage imposes an unreasonable conservatism in back-correcting to determine the "as is" condition. However, should one valve fail to shut prior to the local leakage rate test, after the other valve has been repaired and shut, the total measured local leakage rate (pressurizing between the valves) must then be attributed to the single shut valve and

therefore the assumption that the total measured leakage rate is in the direction out of the containment must be applied for this penetration. In this way, the condition that would have existed if the Type A test were performed prior to the local leakage rate test will be achieved.

Therefore, CWE's proposal to conduct local leakage rate tests prior to the integrated primary containment leakage rate test is considered to be acceptable. When performing local leak rate tests by pressurizing between isolation valves, the assumption that the valves leak equally is acceptable when back-correcting the results of the integrated containment leakage rate test (Type A test), provided that the closure of the valves has been accomplished by normal operation and without any preliminary exercising or adjustments in accordance with Section III.A.1.(b) of Appendix J.

3.1.2 Exemption From Type C Testing Requirements for Instrument Line Isolation Valves

In Reference 2, CWE requested an exemption from the requirements of paragraph II.H.1 of Appendix J as relating to the Type C testing of instrument line manual isolation valves. The Licensee's view was stated as follows:

> "Paragraph II.H.1 specifies the leakage tests be conducted on isolation valves of instrument lines penetrating the primary containment. These manually operated valves have not been routinely tested in the past because they are not normally closed in the event of a primary containment isolation, nor should they be. These lines provide channels for the transfer of information about conditions inside the containment. They are equipped with check valves which automatically limit excess flow through the line, should high flow conditions develop. These check valves are routinely tested. Since these instrument line manual isolation valves are not relied upon to limit the consequences of an accident, there is no basis for them to be tested periodically."

In Reference 5, CWE provided an additional technical discussion supporting the request for exemption from Type C testing requirements for some 96 (per unit) instrument lines penetrating the drywell. In addition to a discussion of the evaluation of the radiological consequences of the failure of one of these lines, CWE indicated that the instrument lines of both units were in accordance with the provisions of Regulatory Guide 1.11 (Instrument Lines Penetrating Primary Reactor Containment) and its supplements.

Evaluation. Section II.H.1 of Appendix J requires Type C testing of containment isolation valves which provide a direct connection between inside and outside atmospheres of the primary reactor containment under normal operation, such as purge and ventilation, vacuum relief, and instrument valves. The instrument valves for which CWE has requested exemption are not those instrument valves which provide a direct connection between the inside and outside atmospheres of the containment under normal operation since these valves are open under both normal operation and post-accident conditions. These particular valves, in fact, provide a path for leakage of primary containment atmosphere only upon a rupture or other failure of the associated instrument line. The regulatory guidance provided to prevent unacceptable releases of radioactivity in case of a failure or rupture of instrument lines is Regulatory Guide 1.11.

Consequently, since Type C testing of these valves is not required by Section II.H.1 of Appendix J and also since the penetrations conform to the requirements of Regulatory Guide 1.11, there is no need to perform Type C testing of these valves and no exemption is required.

3.1.3 Airlock Testing

In Reference 2, CWE requested exemption from the Type B testing requirements for containment airlocks regarding both the frequency of testing the airlock and the pressure of the test. Each of these requests is evaluated separately.

3.1.3.1 Exemption from the Required Frequency of Testing Containment Airlocks

CWE requested an exemption from the Type B testing requirements for containment airlocks to permit testing of airlocks during each refueling outage. CWE stated that experience indicated that testing at each refueling outage would satisfactorily ensure that the integrity of the locks would be maintained. The NRC replied to this request in Reference 4 stating that more frequent testing was required because airlocks represent a potentially large

leakage path that is more subject to human error than other isolation barriers. The NRC provided CWE with additional guidance to assist the Licensee in the preparation of an acceptable program for the testing of airlocks.

In response to Reference 4, CWE submitted additional information in Reference 5 supporting the contention that airlocks should be tested during each refueling outage. CWE stated that the electrical and mechanical penetrations of the airlocks, including airlock cylinders, hinge assemblies, welded connections, and other leakage paths formed parts of rigid boundaries which are not subjected to mechanical cycling, or to the mating of seating surfaces, or to human error and therefore should be tested at the same once-per-cycle interval as other containment penetrations. CWE further proposed to conduct a detailed visual examination of the door seals following each series of entries to ensure timely identification of developing problems.

Evaluation. Appendix J, Section III.D.2 requires that airlocks be tested at 6-month intervals and that airlocks which are opened during the 6-month intervals be tested after each use. Airlocks represent a potentially large leakage path that is more subject to human error than other isolation barriers; therefore, they are tested more often than other isolation barriers. In addition, to ensure that the sealing mechanisms were not damaged during an airlock entry and to ensure that these large potential leakage paths were correctly secured after use, the requirement to test after each use was added.

For certain types of reactors, airlocks have been used frequently. Testing of airlocks after each opening, therefore, may create a situation which results in more rapid degradation of the critical isolation barriers being tested. Moreover, experience obtained since 1969 from the testing of airlocks indicates that only a very few airlock tests have resulted in greater than allowable leakage rates. This infrequent failure of airlock test plus the possibility that excessive testing could lead to a loss of reliability due to equipment degradation leads to the conclusion that testing after each opening may be undesirable. As a compromise between the various interests, the requirement to test after each opening has been defined as within 3 days

of each opening or every 3 days during periods of frequent openings. By this definition, the intent of Appendix J that airlock integrity be verified within a reasonable period of time after use is achieved without the excessive testing that would otherwise be required when a series of entries (every few hours) occurs within a short period of time.

CWE proposes to test airlocks once-per-cycle with a detailed visual examination of the door seals following a series of entries. This testing program is not acceptable. CWE's proposal does not make adequate allowances to detect potential deterioration of airlocks through normal use, to detect potential damage to the airlocks through moving equipment in and out of containment, and to detect possible fouling of the door seals during closure. The detailed visual inspection following each series of openings might reveal some of these potential problems but cannot be considered an adequate substitute for an actual airlock test. In view of the potential consequences of failure to detect these deficiencies, use of a visual inspection in lieu of an actual test cannot be accepted.

Consequently, the minimum acceptable airlock testing program which complies with the requirements of Appendix J requires that the entire airlock be tested at 6-month intervals and that intermediate tests be performed within 72 hours of each opening (or every 72 hours during periods of frequent opening) during the interim between 6-month tests. CWE's request for exemption from the requirements of Section III.D.2 is not acceptable.

3.1.3.2 Exemption From the Required Pressure for Testing Containment Airlocks

CWE has requested an exemption from the Type B testing requirements to permit airlock testing at 2 psig in lieu of peak calculated accident pressure (Pa) of 62 psig. As a basis for this request, CWE stated:

> "The airlock is 'designed to seal the door against a pressure of 2 psig and against 62 psig pressure of the containment vessel existing in the vessel or vessel and lock.' Were the airlock to be tested at Pa, the inner door and door mechanism would be subjected to a force of approximately 172,000 lbs. in excess of design.

> Even with the normal mechanism augmented by the use of strongbacks, such a test is inconsistent with good engineering practice and presents an unacceptable safety hazard. In addition, the use of special restraint is contrary to the premise that meaningful data requires containment boundaries be set without employing extraordinary means."

In addition, CWE objected to performing the intermediate tests at a reduced pressure saying that even at 1 psig, the nearly 2 tons of force exerted against the inner door would cause serious threat of equipment damage, that there is no practical means of having personnel enter the drywell to inspect the inner door, and that the test would not necessarily be a meaningful representation of its ability to perform its safety function. CWE concluded that, in view of the fact that there had been no airlock door seal failure at Dresden or at Quad Cities, a proposed detailed visual examination following each series of entries in place of the reduced pressure test would provide comparable reliability and timely identification of developing problems.

Evaluation. Appendix J, Section III.B.2 requires that airlocks be tested at a pressure of not less than Pa. For plants designed prior to the issuance of Appendix J with airlocks not designed to withstand this pressure in the reverse direction against the inner door, this criteria requires the installation of strongbacks or other holding devices to support the normal door operating mechanism in order to perform the test. Due to the necessity to prove the integrity of this potentially large leakage source at 6-month intervals, as discussed in Section 3.1.2.1, actions necessary to support this test must be undertaken at least every 6 months.

Since 1969, there have been approximately 70 instances where airlock leak tests have resulted in greater than allowable leakage rates. However, 75% of these failures were caused by improper seating of door seals. Testing these seals at a reduced pressure will suffice for the purpose of verification of seal integrity following an entry, particularly in view of the fact that a full pressure containment airlock test is performed every 6 months. Consequently, for the purpose of verification of airlock door seals following airlock openings between the 6-month tests, a reduced pressure test may be

used which does not require the use of strongbacks or other holding devices provided that the results of the reduced pressure tests can be adequately extrapolated to the test results from a full pressure test.

FRC does not concur with CWE's contention that testing of airlocks at Pa is inconsistent with good engineering practice and an unacceptable safety hazard. The door is designed to withstand the force resulting from peak calculated accident pressure when the pressure is on the containment side of the door. The typical problem with pressurizing an airlock from the inside is that the reverse direction pressure causes the inner door to unseat and leak to where the test results become invalid. The application of the strongbacks maintains the seat of the inner door seal so that a valid test can be performed. In fact, since the 172,000 lbs of force in an actual accident condition would tend to seat the inner door, testing the airlock from within, even with strongbacks in place, provides a conservative estimate of the capability of the airlocks to seal against atmospheric leakage.

FRC also does not concur with CWE's contention that reduced pressure testing is not a meaningful representation of the ability of the airlock to perform its safety function. Since the test is a pressure drop test, the test may be conducted without inspecting the inner door. The purpose of these intermediate tests is to ensure that the airlock has not been damaged or has not significantly deteriorated since the last 6-month test. Satisfactory performance of a pressure drop test, with the results conservatively extrapolated to the results of the Pa test, is a satisfactory indication that such degradation has not occurred.

Consequently, CWE's proposal to test airlocks at 2 psig is unacceptable. The airlock test conducted every 6 months must be at a pressure of Pa. The intermediate tests performed in complicance with the "after each use" requirement of Appendix J may be performed at a reduced pressure not requiring the application of strongbacks, provided that the test results are conservatively extrapolated to be within the acceptable criteria of the Pa test results. These requirements conform to the recent revision to Section III.D.2, effective October 1980. The Licensee should ensure that all requirements of the revised regulation are met.

3.1.4 Exemption from Type C Testing Requirements for Main Steam Isolation Valves

In Reference 2, CWE requested an exemption from the Type C testing requirements for the main steam isolation valves (MSIVs) to permit testing at 25 psig rather than peak calculated accident pressure (Pa), 62 psig. CWE's basis for this request is that the design of these valves require that the valves be tested by pressurizing between two valves but that using a pressure of Pa will cause the inboard valve to lift off its seat (this valve is being tested in the reverse direction) and therefore erroneously high leakage rates result.

Evaluation. The main steam system design in most operating BWR plants necessitates leak testing of the MSIVs by pressurizing between the valves. The MSIVs are angled in the main steam lines to afford better sealing in the direction of accident leakage. A test pressure of Pa acting under the inboard disc lifts the disc off its seat, resulting in excessive leakage into the reactor vessel. Consideration was given to this feature when the original test pressure of 25 psig was established for the MSIVs at the design stage of the BWR plants.

Testing of the MSIVs at reduced pressure results in a conservative determination of the leakage rate through the valves, and therefore the proposed exemption is acceptable.

3.1.5 Exemption from Type C Testing Requirements for Traversing Incore Probe System Valves

In Reference 3, CWE requested an exemption from the Type C testing requirements of Appendix J for the traversing incore probe (TIP) system valves saying that the valves were untestable. In Reference 5, however, TIP system and purge line valves were reported to have been successfully tested by disconnecting the TIP tubes at fittings just inside the drywell. By this technique, CWE was capable of testing the TIP system valves without performing any piping modifications. CWE stated that testing of the TIP system valves would be performed by this method in the future.

Evaluation. Since these valves will be tested as required by Appendix J, no exemption is necessary.

3.1.6 Local Leak Rate Test Methods for the Feedwater Check Valves

In Reference 6, CWE submitted a request for exemption concerning a modified local leak rate testing method for the feedwater check valves. This method would use a hydraulic differential pressure across the check valves to shut the valves, then would drain the lines of fluid and conduct a local leak rate test in accordance with normal Type C testing procedures. This procedure was developed because CWE discovered that without initially seating the valves using a fluid medium, the valves were not adequately seated and provided unsatisfactory test results, but if hydraulically seated, the valves would perform satisfactorily. CWE's basis for this procedure is that the revised test method simulates, as closely as possible, the normal closing operation of these valves during accident conditions. Since there would still be water on the valves at the time of closing due to their position in the low point of the line, the valves will initially shut by a differential pressure acting on a column of water. After the water has leaked out or flashed to steam, the valves will be required to seal against potential leakage of containment atmosphere. CWE maintains that this procedure test approximates the requirements of Section III.C.1 of Appendix J with regard to the requirement to close the valves to be tested by normal operation without preliminary exercising or adjustment.

Evaluation. Section III.C.1 of Appendix J requires that the testing of valves be performed after closing by normal operation without preliminary exercising or adjustments. The method proposed by CWE approximates as closely as possible the actual conditions which will shut these valves in an accident situation. Since the procedure is in compliance with the requirements of Section III.C.1 with regard to closing the valves by normal operation, this method is acceptable. No exemption from the requirements of Appendix J is necessary.

3.1.7 Exemptions from the Type C Testing Requirements of Appendix J

In Reference 3, CWE requested several exemptions from Type C testing requirements of Appendix J. Each of these requests is evaluated separately below.

3.1.7.1 Modification of Containment Air Sample Valves

In Reference 3, CWE requested exemption from Type C testing for the drywell air sample valves, stating that these valves were not testable. However, in Reference 5, CWE stated that a method would be developed, similar to that used on the TIP system, to allow testing of these valves.

Evaluation. Since these valves will be tested in accordance with Appendix J, no exemption is necessary.

3.1.7.2 Modification of Isolation Condenser Vent Valves

In Reference 3, CWE requested an exemption from Type C testing for the isolation condenser vent valves, stating that these valves were not testable. In Reference 5, however, CWE modified the request to a temporary exemption until a program could be completed to modify the valves to allow testing.

Evaluation. Upon completion of the system modifications, the valves will be tested in accordance with the Appendix J. No exemption is necessary.

3.1.7.3 Modification of HPCI Suction Valves

In Reference 3, CWE requested an exemption from Type C testing for the HPCI suction valves, stating that these valves were not testable. In Reference 5, however, CWE modified the request to a temporary exemption until a program could be completed to modify the valves to allow testing.

Evaluation. Upon completion of the system modification, the valves will be tested in accordance with Appendix J. No exemption is necessary.

3.1.7.4 Exemption of LPCI Suction Valves

In both References 3 and 5, CWE has requested exemption from Type C testing for LPCI suction valves, stating that these valves have no control function, do not operate intermittently, do not respond to any isolation signal, and do not act as post-accident isolation valves. Further, these valves are locked open to assure a suction path from the torus.

Evaluation. Section III.A.1(d) of Appendix J requires Type C testing of containment isolation valves in systems that are normally filled with water and operating after an accident. Section II.B, however, defines containment isolation valves as those valves relied upon to perform a containment isolation function. The LPCI suction valves are locked-open manual valves which are water-covered by the water inventory of the suppression pool throughout the post-accident period and therefore are not relied upon to perform a containment isolation function. Consequently, Appendix J does not require that these valves be tested and no exemption from Type C testing requirements is necessary.

3.1.7.5 Exemption of Core Spray Suction Valves

In both References 3 and 5, CWE has requested exemption from Type C testing for core suction valves, stating that these valves have no control function, do not operate intermittently, do not respond to any isolation signal, and do not act as post-accident isolation valves. Further, these valves are locked open to assure a suction path from the torus.

Evaluation. Section III.A.1(d) of Appendix J requires Type C testing of containment isolation valves in systems that are normally filled with water and operating after an accident. Section II.B, however, defines containment isolation as those valves relied upon to perform a containment isolation function. The core spray suction valves are locked-open manual valves which are water-covered by the water inventory of the suppression pool throughout the post-accident period and therefore are not relied upon to perform a containment isolation function. Consequently, Appendix J does not require that these valves be tested and no exemption from Type C testing requirements is necessary.

3.1.7.6 Exemption of RBCCW Supply and Return Valves

In Reference 3, CWE requested exemption from Type C testing for the RBCCW system isolation valves. CWE states that the RBCCW system inside containment is neither part of the reactor coolant pressure boundary nor connected directly to the containment atmosphere.

In Reference 5, CWE stated:

Our request for an exemption for these valves is based on the following:

a. The special "closed loop inside the drywell/closed loop outside the drywell" construction of this system insures its integrity even with a single failure. The worst case accident, a catastrophic pipe failure on the return line just inside the contained area, would eventually allow the containment atmosphere to enter the RBCCW system (after the header had drained back to the drywell), but it would still be contained within the closed loop outside the drywell.

b. The Technical Specifications do not list these valves as "primary containment isolation valves."

c. The FSAR states that isolation valves in lines which form a closed loop, either within the containment or outside the containment, will not be separately leak tested.

d. Extensive system modifications including major valves in the supply and return lines as well as test connections would be required to make this system testable. These modifications would neither improve system safety nor affect containment integrity.

Evaluation. In addition to the justification provided by CWE, FRC notes that the make-up water supply to the cooling water system expansion tank is automatically provided from a 500,000-gallon demineralized water storage tank, using redundant make-up pumps. Consequently, in the unlikely event that the closed loop piping inside containment were to rupture, there is sufficient water inventory to maintain a water seal in the closed loop outside containment by continuous system operation throughout the post-accident period.

The primary consideration for granting an exemption from the Type C testing requirements of 10CFR50, Appendix J, for the RBCCW supply and return isolation valves is that these valves remain open following a loss-of-coolant

accident (LOCA). In view of this condition, there would appear to be little rationale for a requirement to leak test these valves from a standpoint of postaccident containment integrity.

However, a review of the Dresden FSAR indicates that the RBCCW system does not satisfy the requirements for a closed system as specified in ANSI N271-1976 (Section 3.6.7) and Standard Review Plan (SRP) 6.2.4 (Section 9). Since the RBCCW system does not qualify as a closed system, the containment isolation requirements of 10CFR50, Appendix A (General Design Criteria), Criterion 57 are not applicable; therefore, remote-manual isolation valves are not sufficient to perform the containment isolation function. Consequently, before the subject of containment isolation valve leakage testing can be addressed, the acceptability of the RBCCW containment isolation valves, vis-a-vis the containment isolation function of the General Design Criteria (GDC), must be established. Once the containment isolation issue has been resolved, Type C leakage testing requirements can be determined.

The Licensee should submit justification for the isolation of this system by remote-manual valve operation in view of the requirements of GDC Criterion 56, Criterion 57, ANSI N271-1976, and SRP 6.2.4. NRC action on the Licensee's request for exemption from Type C testing requirements of 10CFR50, Appendix J, for the RBCCW supply and return isolation valves is held in abeyance until the containment isolation issue is resolved.

4. CONCLUSIONS

This report contains technical evaluations of requests for exemption from the requirements of 10CFR50, Appendix J, related to the containment leakage testing program at Dresden Station Units 2 and 3. The following is a summary of the conclusions of these evaluations:

- CWE's request for exemption to perform local valve leakage rate tests (Type C tests) prior to the integrated primary containment leakage rate test (Type A test) and to back-correct the results of the Type A test with the results of the Type C test is acceptable provided that:

  When performing Type C testing, the conservative assumption that all measured leakage is in a direction out of the containment is applied unless the test is performed by pressurizing between the isolation valves.

  When performing Type C testing by pressurizing between the isolation valves, the conservative assumption that the two valves leak equally (and therefore one half of the measure leakage is in a direction out of the containment) is applied where the isolation valves are shut by normal operation without preliminary exercising or adjustment.

- CWE's request for exemption from Type C testing for instrument line manual isolation valves which meet the requirements of Regulatory Guide 1.11, Instrument Lines Penetrating Primary Reactor Containment, is acceptable and no exemption from Appendix J is required.

- CWE's proposal to test containment airlocks at 2 psig in lieu of 62 psig and to test once per cycle instead of every 6 months and after each opening in the interim is unacceptable. The minimum acceptable program should require testing of airlocks at 62 psig once each 6 months and a reduced pressure within 72 hours of each opening or every 72 hours during periods of frequent openings during the interim, in accordance with the October 1980 revision to Section III D.2 of Appendix J.

- CWE's proposal to test main steam isolation valves (at 25 psig) by pressurizing between the valves is an acceptable exemption to the requirements of Appendix J due to the unique design of these valves.

- CWE's proposal to perform Type C testing of the traversing incore probe system valves by disconnecting the tubes at fittings just inside the drywell is acceptable. No exemption from the requirements of Appendix J is required.

- CWE's proposal to shut feedwater check valves using a hydraulic differential pressure of 50 psig prior to draining the lines for Type C testing is acceptable and does not require an exemption from the requirements of Appendix J.

- CWE's proposal to exclude the LPCI suction valves, and core spray suction valves from Type C testing requirements is acceptable. No exemption from the requirements of Appendix J is necessary because Appendix J does not require that these valves be tested.

- NRC action on the Licensee's request for exemption from Type C testing requirements of 10CFR50, Appendix J, for the RBCCW supply and return isolation valves is held in abeyance until the containment isolation issue is resolved.

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