CP&L

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Mr. D. B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing
USNRC
Washington, DC 20555

Brunswick Steam Electric Plant, Unit No. 2
License No. DPR-62
Docket No. 50-324
10CFR50, Appendix J, Containment Testing Exemptions

Dear Mr. Vassallo:

Appendix J to 10CFR50 sets forth the requirements for primary reactor containment leakage testing for water-cooled power reactors. This document details the testing conditions and configuration requirements that must exist for plant systems when doing both the local leak rate tests and the integrated leak rate tests. Although these requirements can be met for most systems, there are several cases where operational requirements, test requirements, and system configuration do not permit strict adherence to the standard. This letter is to request exemption from the standard for these cases, to present our reasons for these exemptions, and to present the alternative approaches we will pursue to compensate for these exemptions and still achieve the intent of the standard.

The following paragraphs describe the exemptions we are requesting for the types B and C local leak rate tests:

Exemption 1 - Reactor Instrument Penetration Valves

Discussion - Reactor instrument penetration (RIP) valves are installed at a point just outboard of the containment penetration in instrument lines which connect to the reactor coolant pressure boundary. Their function is to provide automatic isolation of the instrument lines outboard of the valves in the event of a line break outboard of the valves. They are not closed automatically or manually in response to a loss-of-coolant accident (LOCA). In fact, they are required to remain open to monitor critical functions after the LOCA.

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Exemption - That type C tests not be performed on the RIP valves which connect with the reactor coolant pressure boundary.

Justification - These valves are not designed as containment isolation valves. Their function is individual line isolation in the event of a line break outside the primary containment. In most other plants, this function is performed by excess flow check valves which are not leak testable. They have no isolation function in a LOCA and, in fact, are required to be open post-LOCA to monitor critical functions. These lines will be water filled in all post-LOCA conditions.

Exemption 2 - Lines Which are Submerged Below Minimum Torus Level

Discussion - Numerous lines penetrate the torus portion of the primary containment and communicate with the containment at a point below the minimum torus level. These penetrations include the following:

Penetration No.	Function
X-225A/B	RHR Pump Suction
X-210A/B	HPCI/RCIC/RHR Pump Test and Minimum Flow Line
X-227A/B	Core Spray Pump Suction
X-223A/B	Core Spray Pump Test Line
X-224	RCIC Pump Suction
X-212	RCIC Turbine Exhaust
X-221	RCIC Barometric Condenser Drain
X-214	HPCI Turbine Exhaust
X-222	HPCI Turbine Drain Line
X-226	HPCI Pump Suction
X-206DD/CD/DD/DC	Torus Level Instrument, Lower Leg
X-231	Torus Drain Line

Exemption - That lines and between-valve spaces associated with the above-listed penetrations not be required to be drained but instead be allowed to be tested with water against the isolation valves being tested.

Justification - All of the lines which pass through the above-listed penetrations have their inboard ends open to the containment at points below the minimum level of the torus. The torus level is controlled by the plant technical specifications to ensure that it will not fall below the open end of any of these lines under any operating or post-accident conditions. Therefore, any leakage that will occur in the containment isolation valves will be water leakage. There can, under no circumstances, be leakage of the containment atmosphere through these valves. Testing under these conditions would therefore represent most realistically the post-accident conditions.

The following exemptions are requested for the type A integrated leak rate test:

Exemption 3 - System Draining and Venting

Discussion - Appendix J requires that "portions of closed systems inside containment that penetrate containment and rupture as a result of a loss-of-coolant accident shall be vented to the containment atmosphere." It

also requires that these systems be drained. BSEP has three such systems--the Reactor Building Closed Cooling Water System (RBCCW), which provides cooling water to the drywell coolers and other heat loads; the Drywell Drains System; and the Traversing Incore Probe System (TIP).

Exemption - That the RBCCW System and the Drywell Drains System not be vented and drained. The TIP System will be vented.

Justification - The RBCCW System is required to operate during the test to control the containment atmosphere. The Drywell Drains System must be kept in service to pump the drywell sump and drain tank in the event of internal water leakage during the test. For both these systems, the type C test results will be added to the type A test results to account for their leakage.

Other systems penetrate the containment and will be vented to the containment in a post-LOCA condition but are designed to survive a LOCA and are always filled and operated in a post-accident condition. These systems include the Core Spray System, the RHR pump discharge connections to the reactor coolant pressure boundary, the CRD System, the Recirculation System seal water lines, and all the instrument lines which connect with the reactor coolant pressure boundaries. These systems will be vented to the containment for the test but not drained. No exemption is requested, and no penalty will be added to the type A results for these systems since they fulfill the allowances of Appendix J.

Still other systems penetrate the containment, are vented to the containment in a post-LOCA condition, are designed to survive a LOCA, but the extent to which they remain filled under certain LOCA conditions is not known. These include the Feedwater System, the RHR pump suction connection to the reactor coolant pressure boundary, the HPCI System, the RCIC System, the RWCU System, and the sample line off the Reactor Recirculation System. These systems will be handled as follows: The Feedwater System, HPCI System, RCIC System, and the portion of the RWCU System which connects with the Feedwater System will be drained and vented for the test or, if not drained and vented, their type C leakage rate added to the type A test results. The sample line off the Reactor Recirculation System, the RHR pump suction line, and the portion of the RWCU System connected to the Reactor Recirculation System must be kept filled for the test in order to maintain the plant in a safe condition. Their type C test results will be added to the type A results.

Exemption 4 - Instrument Air Inleakage

Discussion - The present plant configuration does not allow isolation of instrument air valves RNA-V101 and RNA-V103 for the test. Since the Instrument Air System must remain pressurized during the test to maintain the plant in a safe condition, there is the potential that leakage through these valves could reduce the measured type A test results.

Exemption - That instrument air valves RNA-V101 and RNA-V103 not be depressurized for the test, their measured type C leakage rate be added to the type A results and, further, that they be hand torqued closed for the type A test to ensure that no inleakage will occur during the test.

Justification - The actions described above will compensate for the leakages of the valves and will ensure that inleakage will not compromise the type A test results. These steps are conservative since the Instrument Air System is a noninterruptible system that will remain in operation post-LOCA at a pressure greater than LOCA pressure. Therefore, there can actually be no loss of containment atmosphere through these valves.

It is the intent of CP&L to modify the system design to allow isolation and depressurization of these valves for type A testing. Until such time, we feel that the above-described exemption is conservative and accounts for measured leakages.

On the question of system conditions outside the containment, specifically venting and draining, CP&L's position is in accordance with all applicable standards, including Appendix J, and is consistent with the accident analysis scenarios that have been promulgated by our FSAR and accepted by the Nuclear Regulatory Commission. The following paragraphs describe this position in detail.

Appendix J requires venting and draining of systems inside primary containment that are considered to rupture as a result of a loss-of-coolant accident. We concur with this and are fulfilling these requirements as described in the preceding paragraphs. However, Appendix J specifically singles out "portions of closed systems inside containment ... that rupture as a result of a loss-of-coolant accident." The key words are "portions inside." There is no mention in Appendix J or any other applicable standard which addresses portions of systems outside containment except the phrase in Appendix J "... to assure they (the isolation valves) will be subjected to the post-accident differential pressure." This phrase implies the condition outside the containment isolation valves, but what it implies is the point over which CP&L and the NRC have different interpretations.

Recent NRC interpretation of this last phrase has been to require venting and draining of systems outside the boundary valves. This conforms with an interpretation of post-accident differential pressure to mean peak LOCA pressure inside and ambient atmospheric pressure outside. CP&L contends that this is not realistic and is not the actual "post-accident differential pressure." CP&L interprets the phrase to mean the differential pressure that would actually exist across the containment isolation valves in a post-accident condition, i.e., LOCA pressure (49 psig) on the inside and static system pressure on the outside.

Our position is based on the following rationale: No systems outside the containment, whether safety related or non-safety related, seismically or nonseismically qualified, will have their physical integrity affected by the LOCA. Even nonseismically qualified systems will not be affected since, consistent with all other accident scenarios for the plant, a seismic event and a LOCA occurring simultaneously are not considered to be credible. The nonseismic, nonsafety systems may cease to function in their normal manner due to loss of power, but they will always remain physically intact for all post-LOCA conditions; and, unless their volume is very small compared to the credible leakage they may have, such as packing leaks, etc., they will remain

filled with fluid for the entire post-LOCA time when containment integrity is required. Any significant leakage these systems may have in normal operation, except for the Drywell Drains and Reactor Sampling Systems, will physically require the plant to be shut down, in which condition the DBA LOCA can no longer occur. For the Drywell Drains and Reactor Sampling Systems, we are adding their type C leakage rates to the type A results. Therefore, their filled or nonfilled condition is not relevant.

The testing required by Appendix J is extremely conservative in that it requires the measured leakage to be less than 3/4 the limit of .5 percent a day of the contained mass. The test is performed at 49 psig for 24 hours--another element of conservatism. In reality, the maximum credible accident produces this pressure for only a matter of seconds and they decays off to a fraction of this value. These conditions cannot practically be simulated, so we test for 24 hours at peak pressure. This is reasonable conservatism that we must accept. Indescriminate draining of the systems outside the containment is additional conservatism that is neither realistic nor required by Appendix J and is not dictated by practical testing limitations as is the case in the requirement for peak pressure for 24 hours.

We therefore intend to leave all systems normally filled outside the containment boundaries filled for testing. We also intend to vent these systems to ensure that they do not unrealistically impede the leakage that might occur through the containment isolation valves. We are not requesting an exemption and will not apply any penalty to our results for these systems since we are violating neither the letter nor the intent of the Appendix J requirements.

Systems to which the above discussion applies include the following:

<u>Safety Related and/or Seismically Designed</u>

1. Core Spray System
2. HPCI System
3. RCIC System
4. Control Rod Drive System
5. Torus Drains System

<u>Non-Safety Related and/or Nonseismically Designed</u>

1. Reactor Feedwater System
2. Reactor Water Cleanup System
3. Reactor Building Closed Cooling Water System
4. Main Steam System

This letter is being written to ensure that there is a clear understanding of our position on these critical questions. We are fully committed to performing this extremely important testing in a manner which is in accordance with the applicable requirements; is consistent with our FSAR and technical specification commitments; and is reasonable, conservative, and realistic in its representation of the accident condition it is intended to simulate. However, we recognize two very important factors: (1) Although the concept of containment isolation is very simple, the many facets of the execution of this concept make it extremely complex; and (2) the basic standard, Appendix J, does not address itself to many of these facets and leaves much to the

interpretation of the reader. We believe that the interpretations of the questionable areas cannot be made arbitrarily and then be expected to be applicable for all plants and conditions. Instead, they must be addressed on a plant-specific, system-specific basis. We have done this in the positions stated in this letter.

If you have any questions or desire further clarification of our position, please do not hesitate to contact me.

Very truly yours,

R. Ellerson for

C. R. Dietz, General Manager
Brunswick Steam Electric Plant

DP/jro

cc: Mr. J. P. O'Reilly
Mr. J. A. Van Vliet