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January 17, 2005
GO2-05-010

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397; ENERGY NORTHWEST RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING ONE-TIME EXTENSION OF CONTAINMENT LEAK RATE TEST INTERVAL**

Reference: Letter dated August 5, 2004, RL Webring (Energy Northwest) to NRC, "Request for Amendment to Technical Specifications for One-time Extension of Containment Leak Rate Test Interval"

Dear Sir or Madam:

In the referenced letter, Energy Northwest submitted a request for amendment to the Columbia Generating Station Technical Specifications for a one-time extension of the plants containment leak rate test interval. An NRC staff request for additional information regarding this submittal was provided to Energy Northwest by the NRC Licensing Project Manager for Columbia Generating Station. The specific questions and Energy Northwest's response to the questions are attached.

If you have any questions or require additional information regarding this matter, please contact Mr. GV Cullen, Licensing Supervisor, at (509) 377-6105.

Respectfully,

WS Oxenford
Vice President, Nuclear Generation
Mail Drop PE04

Attachments:
1. Response to Request for Additional Information Regarding Columbia Generating Station One-time Extension of Containment Leak Rate Test Interval
2. Columbia Type B Penetrations Tested in Accordance with 10 CFR 50, Appendix J, Option B

cc: BS Mallett - NRC - RIV
BJ Benney - NRC - NRR
JO Luce - EFSEC
RR Cowley - WDOH
NRC Sr. Resident Inspector - 988C
RN Sherman - BPA/1399
TC Poindexter - Winston & Strawn

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In Section 4.4 and 4.5 of Attachment 1 of the Reference, the licensee provides a description of its Containment Inservice Program. The following request for additional information is to seek clarification of some of the program elements discussed, as well as other issues related to the requested extension of the containment test interval.

1. *In Section 4.5 (Attachment 1 of the Reference), you state, "There are no programs that monitor the condition of the inaccessible areas of the containment shell directly. However, leak tightness of containment shell is assessed periodically by measuring humidity in the sand-pocket drains located at the base of the containment vessel." In this context please provide the following information:*

    a. *How the measurement of humidity in the sand-pocket area provides information regarding leak tightness of the bottom head.*
    b. *Provide a brief description of the provisions made to ensure that the water ingress from the reactor well pool cavity to the space between the containment shell and the biological shield wall would not corrode the containment shell.*
    c. *Please provide a summary of the operating experience related to the bottom head shell in the sand-pocket area, and the drainage condition of the sand-pocket area.*

    Response:

    a. The sand pocket area is located outside the primary containment between the 443 and 446 foot elevations (see Columbia Final Safety Analysis Report Figure 3.8-37). The inside portion of the containment shell below elevation 446 foot (bottom head) and the outside portion below elevation 443 foot is encased in concrete. This portion of the containment metal shell is not directly or indirectly accessible for inspection.

    The containment shell between elevation 443 and 446 foot is bounded by concrete on the inside and bounded by the sand pocket area on the outside. Therefore, the sand pockets will capture any potential water leakage through the annulus between the containment shell and the biological shield wall above elevation 443 foot. The outer portion of the containment shell exposed to the sand pocket area has been found to be especially susceptible to corrosion at other plants if the sand pocket area is not maintained in a relatively dry condition (reference NRC Information Notice 86-99, Degradation of Steel Containments).

    The humidity in the sand pocket area is measured prior to reactor cavity flood-up and after reactor cavity drain-down. This is to ensure that water has not been introduced into the sand pocket area during refueling activities.

Measurement of sand pocket area humidity provides no information regarding leak-tightness of the portion of the containment bottom head below elevation 443 foot. Measurement of sand pocket area humidity does provide assurance that water is not accumulating in the sand pocket area which could cause corrosion of the outer containment shell between the 443 and 446 foot elevations. See Columbia Final Safety Analysis Report Figures 3.8-17 and 3.8-37 for details regarding the bottom head portion of the containment structure.

b. Columbia utilizes an inner and outer drywell refueling bellows seal assembly to prevent water from flowing out of the reactor well pool cavity when the reactor well pool cavity is filled with water. The inner refueling bellows seal, which is welded to both the reactor vessel and the bulkhead plate, serves to seal the gap between the reactor vessel and the primary containment vessel. The outer refueling bellows seal is welded between the primary containment vessel and the biological shield wall and seals the space between the primary containment vessel and the biological shield wall.

The outer drywell refueling bellows seal has six 4-inch seal rupture drains and two 2-inch liner drains on the non-immersed (dry) side of the seal. These drain lines drain to a common header. The common header is opened before the reactor well pool cavity is filled with water. The cumulative drain line flow is monitored and flow in excess of one gallon per minute through the drain lines causes an alarm in the control room. This ensures that potential leakage through the bellows seal is collected and measured prior to leaking into the space between the primary containment and the sacrificial shield wall. A review of plant operating logs for the period between 1996 and the end of 2004 found no documented cases where a valid alarm was received.

Plant Procedure Manual (PPM) 10.24.206, "Containment Annulus Sand Pocket Humidity Measurement," describes methods to be employed for determining the relative humidity of air drawn from within the containment annulus sand-pocket region. Due to the possibility of containment shell degradation due to corrosion induced by a moist environment in the sand-pocket region, Columbia Generating Station measures humidity levels in the sand-pocket area prior to and after each refueling outage. An abnormally high humidity level change in the sand-pocket area might indicate that water has drained through the annulus between the containment and biological shield wall into the sand pocket area from a leak in the outer refueling bellows seal, drain lines from the reactor well pool cavity or a through-wall leak in the containment shell below the suppression pool water level. (Note: The annulus between the primary containment vessel and the biological shield wall is constructed of compressible material. The method of construction is described in Columbia FSAR Section 3.8.2.1 (pages 3.8-8 through 3.8-10) and shown in FSAR Figure 3.8-6. This method of construction would at least inhibit, and at most prevent, the free flow of moisture to the sand pocket drains.)

The sand-pocket drains are also visually checked for the presence of water. The frequency of this visual check has varied in the past from monthly to semi-annually. The frequency is currently monthly.

The results of visual checks and humidity measurements in the sand pocket region combined with no known cases of leakage through the bellows seals provides a reasonable assurance that there has been no water ingress from the reactor pool cavity during past refueling outages. This provides a reasonable confidence that there has been no corrosion of the containment shell due to water ingress between the containment shell and the biological shield wall.

c. A review of the associated completed work order notes associated with the visual sand-pocket drain inspections was performed dating back to July 1995. There was no information indicating the presence of water in the sand-pocket drains.

   A review of PPM 10.24.206, "Containment Annulus Sand Pocket Humidity Measurement," results for Columbia refueling outages in 1998, 1999, 2001, and 2003 was performed. The results of these measurements indicate that humidity levels in the sand-pocket drains are low enough so that water condensation will not occur on the outer containment shell in this region. From the data reviewed, the worst case (maximum) dew point temperature of the sand pocket air was about 54 degrees Fahrenheit. The temperature of the containment shell in the sand pocket area is essentially the same temperature as the suppression pool water. The suppression pool water temperature is normally maintained above 54 degrees Fahrenheit.

2. *For the examination of seals and gaskets, and examination and testing of bolts associated with the primary containment pressure boundary (Examination Categories E-D, and E-G), you had requested relief from the requirements of the Code. As an alternative, you plan to examine these items during the leak rate testing of the primary containment. With the flexibility provided in Option B of Appendix J for Type B and Type C testing (as per NEI 94-01 and RG 1.163), and the extension requested in this amendment for Type A testing, please provide your schedule for examination and testing of seals, gaskets, and bolts that provides assurance regarding the integrity of the containment pressure boundary. This request pertains to the mechanical and electrical penetrations other than the penetrations and openings which are leak rate tested during each outage (i.e., drywell head, equipment hatches, and air-locks).*

Response:

In addition to the Type B penetrations which are opened and leak rate tested each refueling outage, Columbia has 67 Type B penetrations which are tested in accordance with 10 CFR 50, Appendix J, Option B, which is the approved alternative for Category E-D and E-G examinations (seals, gaskets, and bolting). Attachment 2 provides a description of the 67 Type B penetrations, and the next scheduled or required test date.

All Type B penetrations on the attached list have been tested at least once since 1999 except one, which was last tested in 1998.

Type B penetrations on the 120-month testing interval are tested on staggered frequencies to normalize outage testing work load and to monitor generic design leakage performance. Based on this scheduling methodology, Type B penetration leakage testing is commonly performed more frequently than the required 10 year interval. A typical refueling outage at Columbia includes about 30% of the Type B penetrations which are on the 120 month testing interval. Currently, 22 of these 67 Type B penetrations are planned and scheduled to be performed during Columbia's R17 Refueling Outage in 2005.

3. *The stainless steel bellows have been found to be susceptible to trans-granular stress corrosion cracking, and the leakages through them are not readily detectable by Type B testing (see IN 92-20). The staff notes that the plant does not have any bellows described in the information notice. For other pressure retaining bellows (if any), please provide information regarding inspection, testing, and operating experience of the containment pressure retaining bellows.*

Response:

The Columbia primary containment utilizes no bellows type assemblies for containment pressure retaining purposes.

Columbia does utilize an inner and outer drywell refueling bellows seal assembly to prevent water from flowing out of the reactor well pool cavity when the reactor well pool cavity is filled with water. These bellows seal assemblies are not used for containment pressure retaining purposes. The inner refueling bellows seal, which is welded to both the reactor vessel and the bulkhead plate, serves to seal the gap between the reactor vessel and the primary containment vessel. The outer refueling bellows seal is welded between the primary containment vessel and the biological shield wall which seals the space between the primary containment vessel and the biological shield wall. The bellows are 0.062 inches thick and constructed of SA 240-T304 Stainless Steel. The bellows are not of two-ply construction.

COLUMBIA TYPE B PENETRATIONS TESTED IN ACCORDANCE WITH 10 CFR 50, APPENDIX J, OPTION B

Item No.	Penetration Number	Description	Next Scheduled Test Date
1	X-1A	Inspection Port	2011 or before
2	X-1B	Inspection Port	2011 or before
3	X-1C	Inspection Port	2011 or before
4	X-1D	Inspection Port	2011 or before
5	X-1E	Inspection Port	2013 or before
6	X-1F	Inspection Port	2013 or before
7	X-1G	Inspection Port	2013 or before
8	X-1H	Inspection Port	2013 or before
9	X-3-5	CEP-V-2A Containment Side Flange	2009 or before
10	X-27A-1	Tip Drive Flange and Bulkhead Union	2013 or before
11	X-27B-1	Tip Drive Flange and Bulkhead Union	2013 or before
12	X-27C-1	Tip Drive Flange and Bulkhead Union	2013 or before
13	X-27D-1	Tip Drive Flange and Bulkhead Union	2013 or before
14	X-27E-1	Tip Drive Flange and Bulkhead Union	2013 or before
15	X-27F-1	Tip Purge Flange	2013 or before
16	X-28	CRD Removal Hatch	2005 Refueling Outage (R17)
17	X-47-1	2" Blind Flange - Abandoned Drain	2009 or before
18	X-47-2	8" Flange - RHR-TSPA-1	2005 Refueling Outage (R17)
19	X-48-1	2" Blind Flange - Abandoned Drain	2009 or before
20	X-53-5	CSP-V-2 Containment - Side Flange	2005 Refueling Outage (R17)
21	X-66-5	CSP-V-4 Containment - Side Flange	2005 Refueling Outage (R17)
22	X-66-6	CSP-V-5 Containment - Side Flange	2005 Refueling Outage (R17)
23	X-67-5	CSP-V-4A Containment - Side Flange	2009 or before

Item No.	Penetration Number	Description	Next Scheduled Test Date
24	X-67-6	CSP-V-6 Containment - Side Flange	2009 or before
25	X-100A	Electrical Penetration - Neutron Monitoring	2013 or before
26	X-100B	Electrical Penetration - Neutron Monitoring	2013 or before
27	X-100C	Electrical Penetration - Neutron Monitoring	2011 or before
28	X-100D	Electrical Penetration - Neutron Monitoring	2013 or before
29	X-101A	Electrical Penetration - Neutron Monitoring	2013 or before
30	X-101B	Electrical Penetration - Neutron Monitoring	2013 or before
31	X-101C	Electrical Penetration - Control Rod Position Indicator	2013 or before
32	X-101D	Electrical Penetration - Thermocouple and RTD	2011 or before
33	X-102A	Electrical Penetration - Thermocouple and RTD	2011 or before
34	X-102B	Electrical Penetration - Thermocouple and RTD	2013 or before
35	X-103A	Electrical Penetration - Medium Voltage Power	2005 Refueling Outage (R17)
36	X-103B	Electrical Penetration - Medium Voltage Power	2011 or before
37	X-103C	Electrical Penetration - Medium Voltage Power	2013 or before
38	X-103D	Electrical Penetration - Medium Voltage Power	2013 or before
39	X-104A	Electrical Penetration - Low Voltage Power	2011 or before
40	X-104B	Electrical Penetration - Low Voltage Power	2011 or before
41	X-104C	Electrical Penetration - Low Voltage Power	2005 Refueling Outage (R17)
42	X-104D	Electrical Penetration - Low Voltage Power	2013 or before
43	X-105A	Electrical Penetration - Control and Indication	2011 or before
44	X-105B	Electrical Penetration - Control and Indication	2011 or before
45	X-105C	Electrical Penetration - Control and Indication	2011 or before
46	X-105D	Electrical Penetration - Control and Indication	2013 or before

Item No.	Penetration Number	Description	Next Scheduled Test Date
47	X-106C	Electrical Penetration - Wide Range Neutron Monitoring System	2011 or before
48	X-106D	Electrical Penetration - Wide Range Neutron Monitoring System	2013 or before
49	X-107A	Electrical Penetration - Low Voltage Power and Control Ind.	2011 or before
50	X-107B	Electrical Penetration - Low Voltage Power and Control Indication	2013 or before
51	X-117-1	RHR/CAC Drain Line Weld Neck Flange (A)	2005 Refueling Outage (R17)
52	X-118-1	RHR/CAC Drain Line Weld Neck Flange (B)	2009 or before
53	X-119-5	CSP-V-9 Containment Side Flange	2009 or before
54	X-26-RV-1	RHR-RV-25C Discharge Flange	2005 Refueling Outage (R17)
55	X-26-RV-2	RHR-RV-88C Discharge Flange	2005 Refueling Outage (R17)
56	X-47-RV-2	RHR-RV-25A Discharge Flange	2005 Refueling Outage (R17)
57	X-47-RV-3	RHR-RV-88A Discharge Flange	2005 Refueling Outage (R17)
58	X-48-RV-2	RHR-RV-5 Discharge Flange	2005 Refueling Outage (R17)
59	X-48-RV-3	RHR-RV-25B Discharge Flange	2005 Refueling Outage (R17)
60	X-48-RV-4	RHR-RV-88B Discharge Flange	2005 Refueling Outage (R17)
61	X-49-RV-1	HPCS-RV-14 Discharge Flange	2005 Refueling Outage (R17)
62	X-49-RV-2	HPCS-RV-35 Discharge Flange	2005 Refueling Outage (R17)
63	X-63-RV-1	LPCS-RV-18 Discharge Flange	2005 Refueling Outage (R17)
64	X-63-RV-2	LPCS-RV-31 Discharge Flange	2005 Refueling Outage (R17)
65	X-117-RV-1	RHR-RV-1A Discharge Flange	2005 Refueling Outage (R17)
66	X-118-RV-1	RHR-RV-1B Discharge Flange	2005 Refueling Outage (R17)
67	X-118-RV-2	RHR-RV-30 Discharge Flange	2005 Refueling Outage (R17)