November 18, 2010

MEMORANDUM TO: Eileen M. McKenna, Chief
AP1000 Projects Branch 2
Division of New Reactor Licensing
Office of New Reactors

FROM: Patrick Donnelly, Project Manager ***/RA/***
AP1000 Projects Branch 2
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SUBJECT: SUMMARY OF A PUBLIC MEETING WITH WESTINGHOUSE ELECTRIC COMPANY REGARDING CHANGE NOTICE 74 AND THE AP1000 CONTAINMENT VESSEL EXTERNAL PRESSURE DESIGN

The U.S. Nuclear Regulatory Commission (NRC) held a Category I public meeting on July 23, 2010. The Office of New Reactors (NRO) met with Westinghouse Electric Company (Westinghouse) representatives to discuss a pending design change package. Specifically, the participants discussed the technical issues related to Change Notice (CN) 74 and the AP1000 containment vessel external pressure design and analysis. The meeting was held at NRC headquarters in Rockville, Maryland.

The purpose of this meeting summary is to briefly describe the meeting, its participants, and to delineate the results. There were 29 participants in attendance at the meeting location and one participant by teleconference. See Enclosure 1 for the list of attendees.

Discussion

Following the introductions of the attendees at the meeting and on the NRC telephone bridge, the NRC project manager noted and confirmed with all participants that there were members of the general public on the phone bridge. Westinghouse began the meeting by presenting prepared information, in slide format, for all to view and discuss. This presentation was supplemented by a submittal of preliminary design control document (DCD) changes earlier in the week for the staff to review in preparation for the meeting. The Westinghouse presentation and supplemental pre-meeting review package are provided in Enclosures 2 and 3, respectively. The Westinghouse technical presentation was regularly interrupted by technical questions from the NRC staff, which were discussed among the participants. A summary of the technical issues brought up by the NRC staff is listed below.

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Control Logic:

1. Draft AP1000 CN 74 contains information specifying the logic for the control of the vacuum relief valves. The draft specifies containment low pressure signal takes priority over any containment isolation signals, such as containment pressure high or high radiation in containment, from closing containment isolation valves VFS-V800A and V800B following a containment low pressure signal. An explanation for how this meets the requirements of 10 CFR 50.34(f)(2)(xiv)(A) that ensure that all non-essential systems are isolated automatically by the containment isolation system and the requirements of 10 CFR 50.34(f)(2)(xiv)(E) that automatic closing on a high radiation signal be provided for all systems that provide a path to the environment is required. In addition, see General Design Criteria 54 & 56.

Valves:

1. Draft CN 74 for the planned containment vacuum relief system includes two normally closed motor-operated butterfly valves that will be powered by the 1E battery supply, and signaled to open on a specific containment vacuum pressure. The CN should provide additional information to support the operational and sealing capability for these two motor-operated valves (MOVs). For example, the CN should address the following:

    a. butterfly valve design that provides a leak-tight seal for its containment isolation function and also maintains full closed position with design-basis differential pressure from either flow direction until signaled to open;
    b. functional design and qualification of these MOVs to satisfy their design-basis requirements for both containment isolation and vacuum relief functions;
    c. operating control method using limit switch, torque switch, or a combination of these switches to provide assurance of valve sealing capability without overstroking the valve disk through the seat;
    d. power availability to operate these MOVs for the required number of cycles considering the valve, actuator, and motor sizes, stroke time, and torque requirements to operate under their design-basis conditions using the 1E battery supply over the time period which these valves might need to function with 1E power also supplied to other plant equipment;
    e. description of plan to satisfy applicable ASME OM Code inservice testing (IST) provisions and 10 CFR Part 50, Appendix J leak-testing requirements;
    f. description of plan to satisfy 10 CFR 50.55a supplemental requirements for periodic verification of MOV design-basis capability, including application of Joint Owners Group (JOG) Program for MOV Periodic Verification with program scope to include this butterfly valve design and application;
    g. correction of valve size in draft CN table 3.9-16
    h. containment isolation closing times compliance with CSB BTP 6-4 to support chapter 15 analysis. (see NUREG-1793 chapter 6.2.4.13)

2. Draft CN 74 includes two parallel check valves in series with the butterfly valves in the planned containment vacuum relief system. The CN needs to provide additional information to support the operational and sealing capability of these two check valves. For example, the CN should address the following:

a. check valve design that provides a leak-tight seal for containment isolation function and will open at a preset containment vacuum pressure that supports the CN analysis;
b. functional design and qualification of these check valves to satisfy their design-basis requirements for both containment isolation and vacuum relief functions;
c. installation orientation for check valve that supports design assumptions for operating differential pressure and sealing capability;
d. capability for bidirectional testing of each check valve;
e. description of plan to satisfy applicable ASME OM Code IST provisions and 10 CFR Part 50, Appendix J leak-testing requirements, including appropriate provisions for vacuum relief devices in Appendix I to ASME OM Code; and
f. correction of valve size in draft CN table 3.9-16 & inclusion of set pressure (Chapter 6)

Minimum Service Metal Temperature:

1. A discussion/explanation concerning the validity of the minimum service metal analysis specified in Westinghouse Document APP-MV50-ZOC-039, as modified by Westinghouse letter dated July 9, 2010, is required. Explain why it is still valid (i.e., still bounding), and if it not valid, provide the new analysis.

Probabilistic Risk Assessment (PRA):

1. Draft CN 74 does not contain any changes to Chapter 17 or 19 despite the following points:
   a. there was a single minimum cutset for this system to fail containment, there are now nine. This may impact the Chapter 17 and possibly Tier 1 Section 3.7.
   b. of the 8 new cutsets for VFS failing, half of them increase the risk significance of one or the other of the original vent valves (VFS-V009 or VFS-V010).
   c. there appear to be two new common-cause-failures (CCF) (CCF of MOVs to open and CCF of check valves to open) that will prevent adequate venting when required (the other system failure mode).
   d. preliminary analysis may not have recognized that these failures can be latent.

General Analysis:

1. A discussion of the following is required:
   a. analysis assumptions, including a description of how the relief valves are modeled (#, set points, size, timing, etc), any sensitivity studies performed, and how initial conditions were calculated with justification for the most limiting case is required.
   b. how tech specs are tied to analysis assumptions
   c. tech spec changes incorporating changes to the containment air-only cooling calculation and <6 MWt decay heat requirement (ILO 9MWt)
   d. operator expectations for valve operation
   e. change to larger containment coolers & effect on possible negative pressure events – i.e. now possible at full power?

2. DCD change package including all relevant changes from Rev 15, and a table that includes past RAI responses & DCD changes affected by this change, is required.

3. TR-09 to be updated to include a summary of the new buckling analysis calculations & thermal profile analysis.

Following the technical discussion, Westinghouse stated that they would address the issues brought up by the staff in their forthcoming change notice report. Westinghouse stated the complete change notice is scheduled to be submitted to the NRC on July 30, 2010.

Prior to ending the meeting, the NRC project manager asked the members of the public in attendance and on the bridge if they wished to make any comments. None were provided and the meeting was adjourned.

Conclusion

In general, the staff found the meeting to be effective and necessary to understand Westinghouse's approach to resolve the issue of containment vessel external pressure relief. The changes required affect Tier 1, and Tier 2 chapters 3, 6, 7, 9 and 16 at a minimum. It is an interdependent system that will require significant NRC staff review and coordination. In conclusion, the design appeared to be sound in engineering design and has the potential to meet all applicable safety requirements and industry standards required for design certification.

Enclosed with this summary are the materials relevant to this meeting. The enclosed documents are as follows: (1) meeting attendees list, (2) Westinghouse presentation slides, (3) Westinghouse pre-meeting NRC review package.

Enclosures:
As stated

cc w/encl: See next page

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ADAMS ACCESSION No: ML102650378 **NRC-001**

OFFICE	**PM:NRO/NWE2**	**LA:NRO/NWE2**	**BC:NRO/NWE2**
NAME	PDonnelly	RButler	EMcKenna
DATE	11/15/2010	11/16/10	11/18/2010

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Meeting Attendance List

Name	Organization
Patrick Donnelly	NRC
Dave Jaffe	NRC
Michelle Hayes	NRC
Anne-Marie Grady	NRC
Pravin Patel	NRC
Sadar Ahmed	NRC
Bob Tjader	NRC
Billy Gleaves	NRC
Eileen McKenna	NRC
Malcolm Patterson	NRC
Chris Jackson	NRC
Don Lindgren	Westinghouse
Rob Sisk	Westinghouse
Kevin Moore	Westinghouse
Tom Kindred	Westinghouse
Mike Corletti	Westinghouse
Rolf Ziesing	Westinghouse
Bernd Laskewitz	Westinghouse
Drew Murphy	Westinghouse
David Kanuch	Westinghouse
Jeremy Heusberger	Westinghouse
Megan O'Keefe	Westinghouse
Mike Melton	Westinghouse
Don Peck	Westinghouse
Chuck Herbst	SNC
Amy Aughtman	SNC
Amy Monroe	SCE&G
Ken Karcher	Progress Energy
Eddie Grant	NuStart

Teleconference Attendees

Name	Organization
Allison Rogers	C. H. Guernsey & Co