ArevaEPRDCPEm Resource

From: Snyder, Amy
Sent: Tuesday, March 12, 2013 11:57 AM
To: usepr@areva.com
Cc: Grady, Anne-Marie; McKirgan, John; Gleaves, Bill; Segala, John
Subject: U.S. EPR Design Certification Application FINAL RAI No. 574, FSAR Ch. 6
Attachments: FINAL RAI_SCVB_574_7018.doc

Attached please find the subject request for additional information (RAI). An advanced RAI was provided to you on February 5, 2013, and discussed with your staff on March 1, 2013 and March 11, 2013. Advanced RAI Question 06.02.05-33
was modified as a result of those discussions. On March 11, 2013 you informed us that the RAI does not contain AREVA Proprietary information and that the advanced RAI with the modifications is clear and no further clarification is needed. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAI or April 12, 2013. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30-day period so that the staff can assess how this information will impact the published schedule.

Thank You,

Amy

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Final Request for Additional Information 574

Issue Date: 3/12/13
Application Title: U. S. EPR Standard Design Certification - Docket Number 52-020
Operating Company: AREVA NP Inc.
Docket No. 52-020
Review Section: 06.02.05 - Combustible Gas Control in Containment
Application Section: 6.2.5

QUESTIONS

06.02.05-33

This is a follow up to RAI #540, question 06.02.05-30
OPEN ITEM
In order to evaluate the performance of the selected PAR design in the severe accident environment described in the US EPR FSAR, Tier 2, sections 6.2.5 and 19.2, staff needs to review the analyses or the experimental test results which would verify PAR performance, considering the impact of the PAR capability, during and following operational vibrations and loads occurring during earthquakes.

The regulatory basis of this requirement can be found in 10 CFR 50.44, Supplementary Information, VII. Section-by-Section Analysis of Substantive Changes, Paragraph (c)(2)…"Equipment survivability expectations under severe accident conditions should consider circumstances of applicable initiating events (such as SBO or earthquakes)…and the environment in which the equipment is relied upon to function." Refer to Federal Register/Vol. 68, No. 179/16 Sept. 2003.

AREVA responded to RAI 540 question 6.2.5-30 which requested this information by referring to ANP-10322P, Revision 0, "Qualification and Testing of the U. S. EPR Passive Autocatalytic Recombiner", section 10.0, PAR Load Analysis. This section of the report describes a general approach to a structural analysis including seismic for the PAR and provides representative results for a European EPR reactor.

The NRC has reviewed the document ANP-10322P, Rev. 0, and has the following observations:

- the analysis described does not include the catalytic plates, the catalytic material, or the configuration of the plates in the PAR, all of which are essential to the successful functionality of the PARs, and,
- the analysis does not include the standard plant design values for the SSE for the U. S. EPR.

Staff requests a detailed analysis to be provided by AREVA for the entire PAR structure which includes the modeling of the actual catalytic plates and their configuration. The analysis should reflect the instructure response spectra for the SSE and should include any mounting details or restraints. The PARs must be shown to remain functional during and beyond a design basis accident, including seismic, by demonstrating that the entire structure, including the catalytic plates, maintain their geometrical integrity to support their functioning.
Alternatively, if instead AREVA elects to test the PAR under seismic conditions, staff requests the results be available for audit and AREVA revise the PAR Qualification report to reflect the US EPR design specific analysis or test results.

06.02.05-34

This is a follow up question to RAI #540, question 06.02.05-30
OPEN ITEM

In order to evaluate the performance of the selected PAR design in the severe accident environment described in the US EPR FSAR, Tier 2, sections 6.2.5 and 19.2, staff needs to review the analyses or the experimental test results which would verify PAR performance, after prior loading through hydrogen ignition at the PAR.
Staff has requested test results which demonstrated the PARs' functionality after prior loading through H2 deflagration. AREVA's response indicated that ANP-10322P, Rev. 0 "Qualification and Testing of the U. S. EPR Passive Autocatalytic Recombiner Technical Report", Section 6.0, discussed the PAR performance after loading through H2 deflagrations, and AREVA stated that no influence on the functional PAR behavior had been observed in these tests. ANP-10322P, Figure 6-2 provides the result of a single test on a single PAR, post ignition.
EPRI Technical Report, TR-107517, "Generic Tests of Passive Autocatalytic Recombiners (PARs) for Combustible Gas Control in Nuclear Power Plants," provides experimental evidence on PAR performance, including H2 ignition tests. EPRI TR-107517, Volume 3 presents the test results for FR90/1-150 PARs (Siemens' PARs, aka AREVA PARs).
The H2 ignition tests were designed to investigate the possibility of ignition under different conditions of H2 and steam concentrations. EPRI TR-107517, vol. 3 documented the results of tests showing that all the PARs when subjected to concentrations of H2 greater than 7% ignited and burned. The EPRI report, section 10, Table 4, description of ignitions with Siemens PARs, indicates that all 5 tests where ignition occurred for H2 concentrations greater than 7%, the PARs "were no longer functioning". These test results could indicate that a deflagration at or within a PAR could disable that PAR.

When compared with the EPRI conclusions above, staff finds the results of a single test of post H2 ignition performance inconclusive for demonstrating PAR performance post ignition. Staff therefore requests AREVA provide additional test results for the AREVA PAR performance post H2 ignition for staff review.
Revise the PAR Qualification report to reflect the US EPR design specific test results.