From: Pickett, Douglas
Sent: Monday, July 30, 2012 3:43 PM
To: jweaver@nrdc.org
Cc: Russell, Andrea; Wilson, George; Lubinski, John
Subject: NRC Petition Review Board Initial Recommendation on NRDC 2.206 Petition

Mr. Weaver –

As we just discussed, the initial recommendation of the NRC's Petition Review Board (PRB) is to reject the NRDC petition of April 16, 2012, based on the finding that (1) the petitioner raises issues that have already been the subject of NRC staff review and evaluation either on that facility, other similar facilities, or on a generic basis, for which a resolution has been achieved, the issues have been resolved, and the resolution is applicable to the facility in question and (2) the request addresses deficiencies within existing NRC rules.

In accordance with NRC's Management Directive 8.11, you have the opportunity to address the PRB to comment on the initial recommendation. This can be conducted by either a public meeting in Rockville, MD, or by telephone conference call. If you choose not to address the PRB, the initial recommendation will become final and we will prepare a closeout letter documenting our decision making.

Finally, as you requested, the following information was taken from our internal deliberations and may prove beneficial in your decision whether to address the PRB.

SUMMARY OF REQUEST:

The Petitioner requested that the NRC take enforcement action by ordering the licensee for Indian Point Nuclear Generating Unit No. 2 (IP2) to remove the passive autocatalytic recombiners (PARs) from the Indian Point containment building because the PAR system could have unintended ignitions in the event of a severe accident, which, in turn, could cause a hydrogen detonation and ultimate failure of the containment structure.

The Petitioner did not request immediate action.

BASIS FOR THE REQUEST

Briefly stated, the Petitioner postulates a seismic event beyond the design basis due to the proximity of the Indian Point site to the Ramapo seismic zone. The seismic event results in a severe reactor accident generating significant amounts of hydrogen gas. The PARs become overwhelmed by the hydrogen gas and the concentration of hydrogen gas in containment approaches 8-10%. Finally, the PARs act as ignition sources generating a detonation. The petitioner states the following:

- IP2 was built close to the Ramapo seismic zone. The IP2 facility is constructed to withstand a magnitude 6.0 earthquake but the site may be susceptible to a magnitude 7.0 earthquake. A major earthquake could result in a severe reactor accident, one that exceeds the design basis, at IP2. (page 5)
- The PAR systems are simple devices consisting of catalyst surfaces where spontaneous catalytic reactions occur in the presence of hydrogen. PARs do not need external power or operator action to function. In addition, control room operators cannot deactivate them. (pages 6, 7)

- It is reasonable to assume one or two hydrogen recombiners could remove hydrogen produced during a design basis accident. Hydrogen generation during a design basis accident as 0.001 to 0.05 kg/sec and the hydrogen removal capacity per PAR unit is "several grams per second of H_2." (page 8)
- The Petitioner cites reports of hydrogen generation of 0.1 to 10 kg per second during a severe reactor accident. PWRs would need 30 to 60 hydrogen recombiners in containment to mitigate hydrogen production. (pages 10, 11)
- The PARs would be overwhelmed by the production of hydrogen in a severe accident and a detonation could occur at IP2. (page 12)
- IP2 containment design pressure is 47 psig and a PRA study predicts containment failure at 126 psig. (page 13) The Petitioner further references studies of 75% and 100% core metal-water reaction with peak containment pressures approaching the failure limits. (pages 13, 14)
- The Petitioner references experimental data where unintended ignitions occurred with PARs when elevated hydrogen concentrations (8-10% and higher) were present. (pages 16, 17)
- The Petitioner links local elevated concentrations of hydrogen gas, unintended ignitions by PARs, and predicted detonations. (pages 18-19)
- The Petitioner cites a number of studies describing the risks and difficulties of using igniters for hydrogen control in containment. The Petitioner links the risks of igniters with PARs. (pages 20, 21)

The Petitioner, along with Mr. Mark Leyse, spoke to the PRB on June 14, 2012. The Petitioner provided additional clarification that their concerns focus on severe reactor accidents and not on the NRC's design basis accident that IP2 is designed for.

Management Directive 8.11 specifies criterion for rejecting a petition from the 2.206 review process. Your petition is being rejected for the following:

1. The petitioner raises issues that have already been the subject of NRC staff review and evaluation either on that facility, other similar facilities, or on a generic basis, for which a resolution has been achieved, the issues have been resolved, and the resolution is applicable to the facility in question.

   YES. The NRC staff has evaluated combustible gas generated from design-basis accidents and concluded that it is not risk-significant for any containment type, given intrinsic design capabilities or installed mitigative features. The staff further concluded that combustible gas generated from severe accidents was not risk significant for large, dry containments, similar to IP2, because the large volume, high failure pressures, and likelihood of random ignition help prevent the build-up of hydrogen concentrations. This work has been extensively supported through the following:

   - The resolution of Generic Safety Issue 121, "Hydrogen Control for Large, Dry PWR Containments," documented in NUREG-1150, "Severe Accident Risks: An Assessment of five U.S. Nuclear Power Plants," provided the risk insights to evaluate the existing requirements in 10 CFR 50.44.

- The issuance of SECY-00-0198, “Status Report on Study of Risk-Informed Changes to the Technical Requirements of 10 CFR Part 50 (Option 3) and Recommendations on Risk-Informed Changes to 10 CFR 50.44 (Combustible Gas Control),” where the staff recommended changes to the regulations.
- The revision to 10 CFR 50.44, “Combustible gas control for nuclear power reactors,” in 2002 that led to the removal of technical specification requirements for hydrogen recombiners in large dry PWR containments.

2. The request addresses deficiencies within existing NRC rules.

YES. It is clear, from both the petition and the Petitioner’s presentation before the PRB, that the Petitioner has no concerns regarding combustible gas control under the NRC’s design basis accident. The Petitioner questions the adequacy of combustible gas control at IP2 following a severe, or a beyond-design-basis reactor accident.

Regulatory Guide (RG) 1.7, “Control of Combustible Gas Concentrations in Containment,” describes methods acceptable to the NRC staff for implementing 10 CFR 50.44, “Combustible gas control for nuclear power plants.” RG 1.7 states that “Section 50.44 provides requirements for the mitigation of combustible gas generated by a beyond-design-basis accident.” Section 50.44 is applicable to all operating reactors and only includes additional requirements for BWRs and PWRs with ice condenser containments. Finally, RG 1.7 states “The staff considers that the combustible gas control systems installed and approved by the NRC as of October 3, 2003, are acceptable without modification.”

In summary, the Commission’s regulations address combustible gas control following a severe reactor accident and IP2 meets the regulations. Therefore, the Petitioner has identified an alleged deficiency within the regulations which should be addressed in a petition for rulemaking. However, as discussed under Criterion 2 above, the NRC has considered the Petitioner’s issues and the petition provides no additional information that would cause the staff to revise its generic conclusions in GSI-121, SECY-00-198, and the 2002 revision to 10 CFR 50.44, “Combustible gas control for nuclear power reactors.” Accordingly, the NRC will not further evaluate the petition as a petition for rulemaking under 10 CFR 2.802.

Please let me know within the next week of your decision whether to address the PRB. If you need additional time, please contact me.

Doug

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