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Date: 08/17/2007 12:21:44 PM
Subject: Information Request on Palisades Nuclear Plant License Amendment Request for Alternative Source Term

In response to an August 16, 2007, NRC question concerning the amount of cesium hydroxide (CsOH) released to the containment sump water following a LOCA, the following information is provided. The 329.65 g-mole CsOH number discussed below can be calculated (to within the accuracy of the Request for Additional (RAI) Response) from the June 15, 2007, response to RAI #2 of the December 5, 2006, RAI (i.e., 407.6 g-mole cesium - (82.1 g-mole iodine X 0.95 cesium iodine) = 329.6)

Cesium Hydroxide from Core Inventory:

Cesium hydroxide is formed by the release of cesium from the reactor core and its absorption in the sump water.

Per Regulatory Guide 1.183, Table 1, 5% of the cesium core inventory is released into containment during the Gap Release Phase and an additional 25% of the cesium core inventory is released into containment during the Early In-Vessel (EIV) Phase. This occurs during the first 1.8 hours of the LOCA. The Gap Release Phase has an onset of 30 seconds and duration of 30 minutes and is followed by the EIV phase with duration of 78 minutes per Table 4 of Regulatory Guide 1.183.

The reactor core inventory of cesium, the Gap Phase cesium release, and the EIV Phase cesium release are determined from the activities of cesium radio-nuclides in NAI-1149-001 Revision 2, Source Terms for Palisades Dose Calculations. NAI-1149-001 rev. 2 was provided to the NRC on a compact disc with the September 25, 2006 License Amendment Request for the Alternative Source Term.

The core inventories of cesium radio-nuclides were determined from this input similar to the determination for iodine, by converting activities to mass. This input did not include Cs-133 which is a stable isotope. Exclusion of Cs-133 is conservative because it leads to a lower amount of cesium hydroxide and a lower pH in the containment sump.

The core cesium inventory is 1,358.7 g-mole. The amount of this inventory released in containment during the LOCA is a total of 407.60 g-mole.

Cesium released in the form of cesium iodide does not contribute to formation of cesium hydroxide. The quantity of cesium iodide is 77.95 g-mole (95% of the molar quantity of iodine released) consistent with the determination of hydriodic acid production. The amount of cesium as cesium iodide is subtracted from the cesium release to obtain the quantity of cesium hydroxide in the post-LOCA sump water. The cesium release that forms cesium hydroxide is 329.65 g-mole. Considering the above, the amount of cesium used in this calculation is 407.6 g-mole released in containment.

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Subject: Information Request on Palisades Nuclear Plant License Amendment
Request for Alternative Source Term
Creation Date 08/17/2007 12:21:24 PM
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Mime.822	11621	

Options

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Priority: Standard
ReplyRequested: No
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Junk Mail settings when this message was delivered

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Junk Mail handling disabled by Administrator
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