

From: Lingam, Siva
Sent: Wednesday, May 21, 2014 2:23 PM
To: Hess, Thomas A (tahess@tva.gov)
Cc: Quichocho, Jessie; McMurtry, Anthony; Hon, Andrew; Poole, Justin; Dion, Jeanne; Hoang, Dan; Cheng, Yuan
Subject: Watts Bar, Unit 1 Hydrology LAR with UFSAR Changes (TAC No. ME9130)

Per our telephone conversation yesterday, please note the following RAIs that require your responses. At your request, Andy will arrange another conference call on May 27, 2014 for further discussion.

Areas of concern to the LAR and proposed response to the RAI

The LAR (ML12236A167) and the licensee's proposed response to the RAI (ML14129A316) does not provide a sufficient dam safety factor for stability during a PMF.

- a- TVA failed to provide any analysis and calculations, or reference to industry standards (e.g. FERC, Army Corp of Engineers, and TVA River Operations), that support the UFSAR changes, that using a factor of safety greater than 1.0 for sliding, provides an adequate basis that dam structures are considered safe against failure.
- b- TVA did not describe or provide justification for the removal of factor of safety of 1.52 in the One-Half PMF on Watts Bar Dam.
- c- Under Section 2.4.1.2, "*Hydrosphere*" of the LAR, Enclosure 1, Attachment 1, TVA proposes to delete the following paragraph "*in 1982, TVA officially began a safety review of all dams. The TVA Dam safety program was designed to be consistent with the Federal Emergency Management Agency's (FEMA)...*" Under Section 2.4.4, "*Potential Dam Failures, Seismically Induced*" of the LAR, Enclosure 1, Attachment 1, 4th paragraph, it notes that: "*TVA Dam Safety Program (DSP), which is consistent with the Federal Guidelines for Dam Safety⁽³⁷⁾, conducts technical studies and engineering analyses to assess...*" (**The superscript ³⁷ represents the reference number used in the LAR, which refer to FEMA's dam safety guideline**). However, the use of 1.0 as a factor of safety is contrary to the Federal Guidelines for Dam Safety indicate a factor of safety well above 1.0 (e.g., 1.25 or greater) against dam sliding.
- d- The UFSAR notes and TVA stated that the Watts Bar Licensing Basis is based on ANSI N170-1976 and RG 1.59. The ANSI N170-1976 doesn't prescribe criteria to define the structural stability analysis. However, it indicates a higher level of conservatism should be applied as well as analysis to demonstrate acceptable safety for both sliding and overturning, in that:
 - Section 5.5... "Analyses of dam failures are complex, many failures not being completely understood..."
 - Section 5.5.4... "Mode, degree, and likelihood of dam failure from floodwater surcharge cannot be predicted with usual engineering accuracy. Mode and degree of failure should be postulated using conservative judgment based to the extent possible on stability computations..."

Without a justification to the safety factors revised in the UFSAR, TVA's "*No dam failure during the PMF event*" assumption in the PMF analysis is not supported.

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