PMSTPCOL PEmails

From: Tai, Tom
Sent: Wednesday, April 13, 2011 3:50 PM
To: Price, John E
Cc: STPCOL
Attachments: Questions from March audit 3.8.doc

John,

Attached is the file with the two new issues from Chapter 3.8.

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Hearing Identifier: SouthTexas34Public_EX
Email Number: 2763

Mail Envelope Properties (0A64B42AAA8FD4418CE1EB5240A6FED125D515490F)

Subject:
Sent Date: 4/13/2011 3:50:15 PM
Received Date: 4/13/2011 3:50:17 PM
From: Tai, Tom

Created By: Tom.Tai@nrc.gov

Recipients:
"STPCOL" <STP.COL@nrc.gov>
Tracking Status: None
"Price, John E" <jeprice@STPEGS.COM>
Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	148	4/13/2011 3:50:17 PM
Questions from March audit 3.8.doc	31738	

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Priority: Standard
Return Notification: No
Reply Requested: No
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Issue 1 (New): Calc Report, U7-YARD-S-CALC-DESN-6001, Rev. E: "Basic Structural Design of Diesel Generator Fuel Oil Storage Vaults"

The seismic design of the DGFOSV is performed with equivalent static forces, whereby the inertial forces are computed as products of masses and accelerations. The accelerations are taken from the corresponding SSI analyses as to envelope all soil conditions, design parameters, and seismic input motions. The masses are determined form the building drawings and specific weights for concrete, oil, steel and soil. The SAP structural model is divided into regions, and constant average acceleration values are applied to each region, simulating the absolute acceleration distribution of the SSI model. These inertial forces are applied in global X, Y and Z direction as external static loading to the nodes and elements of the SAP model. The response quantities, i.e. internal forces, displacements, etc., resulting from each earthquake component are combined by the SRSS rule. As a verification of the equivalent static procedure, the resultant base shear, total vertical base force and overturning moments obtained from the SAP model are compared to the corresponding values of the SSI (SASSI) model. If required, adjustment factors are applied to the input acceleration components in SAP as to provide base forces and moments which envelope the corresponding SSI base values. The maximum resultant SSI absolute acceleration values are approximately: X=0.31g; Y=0.31g and Z=0.33g. The equivalent horizontal acceleration values obtained from the SAP analysis are: X=0.33g and Y=0.32g and therefore match closely the SSI accelerations. The equivalent vertical acceleration in the SAP analysis however, had to be amplified by a factor of about 1.27 to yield Z=0.42g, in order to meet the total base forces and moments from the SSI analysis. As both, the SASSI and the SAP models, should be based on the same geometry and total weight and are subject to the same absolute accelerations, it is not apparent why an additional, relatively large amplification would be needed in vertical direction to obtain comparable total base seismic loads. Therefore, the applicant is requested to provide a justification regarding the different behavior of both structural models.

Issue 2 (New): MACTEC Presentation on Friction and Cohesion Values used in Stability Evaluation of R/B

Lateral sliding stability against seismic loads is based on soil resistance at the foundation-soil interface (friction/ cohesion), and on lateral earth pressures acting on the embedded basement walls. Based on analyses and testing, dynamic friction and cohesion values are typically lower than the corresponding static values. Thus, for the STP units, static cohesion values are reduced 20% to account for dynamic soil behavior. The applicant's justification for this reduction is based on a publication by Makdisi and Seed from July 1978, which states that in most cases cyclic yield strength of clayey material appears to be 80% of the static undrained strength for typical shear strains obtained from earthquake soil response analyses. According to the above reference, the dynamic reduction of cohesion strength is shown to be significantly affected by the strain level present

in the soil layers during a seismic event. Therefore, the applicant is requested to provide a comparison between the strain ranges assumed in the above reference and the strain values expected beneath the foundation of Cat I buildings of Units 3&4.