Natural Resources Canada | Ressources naturelles Canada

Le 10 avril 2007

Madame Josée Primeau
Coordonnatrice du secrétariat de la commission
Bureau d'audiences publiques sur l'environnement
Édifice Lomer-Gouin
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Objet: Projet Rabaska – Réponse de Ressources naturelles Canada à la demande de renseignements complémentaires C100 (DQ87)

Madame,

Pour faire suite à votre lettre du 8 mars dernier, veuillez trouver ci-joint, la réponse de notre ministère à la demande de renseignements complémentaires C100 (DQ87) émise dans le cadre de l'audience publique du projet Rabaska. La réponse est en anglais et nous vous ferons parvenir une version française dès qu'elle sera disponible.

Selon nos experts, il est impossible d'arriver pour l'instant à une conclusion ferme quant à la méthode utilisée par le promoteur pour évaluer les facteurs d'amplification des sols pour le site de Rabaska. Toutefois, nous reconnaissons que les conséquences sur le design des infrastructures ne sont pas suffisantes pour empêcher le projet d'aller de l'avant et que, dans son ensemble, l'analyse sismique produite pour ce projet est acceptable.

Si vous avez des questions, n'hésitez pas à communiquer avec moi au (613) 995-2848 ou par courriel à lmichaud@rncan.gc.ca.

Veuillez agréer, Madame, l'expression de mes sentiments les meilleurs.

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Projet d'implantation du terminal méthanier Rabaska et des infrastructures connexes – Réponse de Ressources naturelles Canada à la demande de renseignements complémentaires C100 (DQ87)

C100 : ***Êtes-vous satisfait de la réponse du promoteur relativement à la méthode d'évaluation des facteurs d'amplification des sols (ref : DQ58.6 ci-joint)?***

Réponse : **Issue:** NRCan was generally satisfied with the Proponent's seismic hazard assessment. The remaining point (termed technical) related to the soil amplification factors used to go from a standard "hard rock" to the "soft rock" at the Rabaska site. The proposed factors were very different from comparable factors recommended by the GSC and adopted by the Canadian National Committee for Earthquake Engineering as the basis for the 2005 National Building Code of Canada.

NRCan Response: The procedures used by the Proponent's expert, Dr. Atkinson, to determine the recommended site amplification factors are interesting, and deserve careful attention. The work on which the factors are based has been substantially published in the scientific literature, but so recently that it has not received community review and acceptance. NRCan follows along with the logic expressed by Dr. Atkinson, but is uncertain if it is complete and correct. The key is that Dr Atkinson considers that the seismograph recordings made on rock include a measure of amplification, and this amplification is largest at high frequencies. Hitherto it has been the practice to take the ground motions on rock as being the reference, unamplified earthquake motions, and then amplify them according the actual site foundations ("Class C" is the standard for the NBCC). Dr. Atkinson argues instead that since the rock motions already include some amplification, the amplification of the motions on Class C soil relative to rock is probably less than the "RGC" factors used in the basis of the National Building Code of Canada (NBCC).

Rather than perform a detailed analysis on the factors themselves, NRCan has chosen to ask whether the final numbers risk being un-conservative as a result.

To do this NRCan used values in Table 5 of the Proponent's seismic hazard assessment (Addenda I, Annex A, October 2006) which compared the Proponent's Rabaska results to the NBCC values at the 1/2500 year probability (the final design will be at 1/5000 year probability, but the comparison at 1/2500 should suffice). As the NBCC values are for Site Class C, they need to be adjusted to the "B-C boundary" site condition at Rabaska. Evaluation for the Fa and Fv factors for Classes B and C is

relatively straightforward:- given the expected ground motions they are interpolated from NBCC2005 Tables 4.1.8.4 B and C. But the code did not envisage design to other than B *or* C, so in the absence of any direction the factors for the B-C boundary were found by simple averaging of the Class B and Class C values, giving Fa=0.91 and Fv=0.825. Hence the B-C ground motions equivalent to the (Class C) NBCC values at 1 Hz and 5 Hz are 125 and 514 cm/s respectively. For comparison, the proponent's numbers are 149 and 702 cm/s. From this we conclude that even if the concern about the technical issue is valid, the end result is that the seismic hazard assessment acceptable.