

167**DB82.1**Projet d'exploitation éventuelle d'une
mine et d'une usine de niobium à Oka

Oka

6211-08-002

FAX

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To/À: Anne-Lyne Boutin**Date:** le 21 juin**Fax #:** 418-643-9474**Pages:** (including this one/incluant celle-
ci).
18**Subject/
Sujet:** B.A.P.E.

Comments/Commentaires:

This is the information I described in my electronic message to you dated June 21, 2002.

Sincerely,

S. Vlahovich

Boutin, Anne-Lyne

De: Slavica_Vlahovich@hc-sc.gc.ca
Envoyé: 21 juin, 2002 17:00
À: Anne-lyne.boutin@bape.gouv.qc.ca
Cc: Anar_Baweja@hc-sc.gc.ca
Objet: Request from BAPE: uranium and thorium levels in the environment

Please note that thi afternoon I will be forwarding by FAX the requested tables pertaining to levels of uranium and thorium in the environment.

Source:
Scientific Annex B. Exposures from Natural Radiation Sources
Sources and Effects of Ionizing Radiation
2000 Report to the General Assembly
United Nations Scientific Committee on the Effects of Atomic Radiation.

Information on Uranium and Thorium levels:

Table 11 provides information on natural background radiation exposure.
Table 12 shows examples of indoor absorbed dose rate from terrestrial gamma radiation.
Table 14 shows levels of uranium and thorium in air.
Table 15 provides levels in drinking water.
Table 16 provides annual doses from intake from the diet.
Table 17 provides annual doses from intake via inhalation.
Table 18 provides the total annual committed effective dose from ingestion of uranium and thorium.

Other information:

I have included some text from Section III on Enhanced Exposure from Industrial Activities. Paragraph 188 contains the remark I made concerning the potential exposure rates from industrial activities.
Table 27 provides typical concentrations of radionuclides in wastes of mineral processing.
Table 28 provides release to air and water of typical installations in mineral processing.
Table 29 provides the effective dose from such operations.

I am also supposed to send you a summary paragraph on concerning apparent threshold doses for thorium. This will be the subject of a separate message.

Sincerely,

S. Vlahovich
Medical Adviser
Radiation Protection Bureau

Boutin, Anne-Lyne

De: Slavica_Vlahovich@hc-sc.gc.ca
Envoyé: 21 juin, 2002 18:27
À: Anne-lyne.boutin@bape.gouv.qc.ca
Cc: Anar_Baweja@hc-sc.gc.ca
Objet: Request from B.A.P.E.

Comments re health effects (Bone cancer) related to thorium

NOTE: Please note that I am unable to locate the desired references to substantiate my comments with respect to a practical threshold for bone cancer following internal intake of thorium. As I am leaving for vacation and will return only on July 8, 2002 I have made a modification to my comments which I can support at this time.

Once absorbed by the body thorium accumulates in the bone and increases the risk of developing bone cancer.

An excess of bone cancer has been shown following radiation therapy or internal contamination with large amounts of radioactive materials which emit alpha particles. People who develop bone cancer in these circumstances receive doses thousands of times larger than would be received from environmental sources of radioactivity. There has been no clear excess demonstrated in humans as a result of low activities of internal radionuclides. In a study of American luminizers who were exposed chronically to radium-226 there were no bone tumours seen below 0.1 Gy (dose to the bone). UNSCEAR has concluded that the bone tumour induction data (from internal emitters) in animal studies also suggest that at low dose rates there is an effective threshold.

Much human data on thorium comes from patients who received Thorotrast by injection (thorium 232 dioxide) for diagnostic purposes. Patients have been followed to investigate the risk of bone cancer. This is because radium, a known bone-seeker is among the progeny of thorium. Because the thorotrast contained varying amounts of progeny it was more radioactive than it would have been had thorium ore been refined to yield pure thorium-232 for preparing the thorotrast. Because of its particulate nature, the thorotrast also targeted reticulo-endothelial cells (ie. liver, spleen, bone marrow). I do not have any information suggesting that this would occur with ingestion of thorium or inhalation of thorium ore dust.

References:

Annex I Epidemiological Evaluation of Radiation Induced Cancer, Sources and Effects of Ionizing Radiation, 2000 Report to the General Assembly, United Nations Scientific Committee on the Effects of Atomic Radiation, 2000

Medical Effects of Ionizing Radiation, F.A. Mettler and A.C. Upton, W.B. Saunders Co, 1995

Management of persons accidentally contaminated with radionuclides, NCRP Report No. 65, National Council on Radiation Protection and Measurements, 1980

A.G. Thomas, The US Luminizers, J. Radiological Protection, 1994 Vol 14 No 2 141-153.