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Information relative aux impacts potentiels de la mine projetée à Oka sur le niveau de radioactivité des milieux récepteurs en ce concerne la qualité de l'air, les eaux de surface et souterraines

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NIOCAN PROJECT QUESTIONS

I, along with my colleague Dr. Slavica Vlahovich, appeared before the Commission on 19 June 2002 to answer questions relating to the proposed NIOCAN Project. During the meeting, we provided oral responses to questions posed by the Commissionaires. However, the Chairman - M. Joseph Zayed - wanted written answers to some questions, which are discussed below.

1. What will be the general impacts of this Project on the Oka area environment?

On the average, the ore contains approximately 19 ppm of uranium and 160 ppm of thorium, in addition to about 0.6% niobium. This is a relatively small amount of radioactivity in the ore body. If the mining wastes are managed properly, the resulting environmental impacts will be minimal.

2. The previous mining company - St. Lawrence Columbium - had already left radioactive wastes in the area. What will be the impacts of these new and old radioactive substances on the environment?

The niobium ore was processed in the area by the St. Lawrence Columbium (SLC), leaving behind tailings and slag containing radioactive substances. The new proponent - NIOCAN Incorporated - has agreed to manage the old radioactive wastes as well as the new ones in an environmentally safe manner.

The new tailings and slags will have approximately 10 and 40 ppm of uranium, respectively. New tailings will be placed at the old site, covered with clean fill and vegetated. This will stabilize the tailings, and reduce both wind and water erosion. Also, the radiation exposure levels at the surface will be reduced significantly.

All slags, new and old left behind by the SLC, will be deposited underground in the mined-out cavity. From an environmental perspective, this is the most sound option leaving the surface environments free of all radioactivity.

3. What comments do I have on Consultant's report relating to radon levels in the environment?

The consultant - SENES Consultants Limited - has thoroughly characterized different radiological aspects of the Project. In particular, the radon sections provide useful information. From their report, it is reasonable to conclude that the radon levels will not increase significantly in the environment.

My comments on Figure 3 and radon exalation rates during winter months are as follows.

Figure 3 of the consultant's report uses the US-EPA Dispersion Model to estimate radon concentrations in the air from the NIOCAN shaft. The projections are shown up to a distance of 10 km. Experience with Saskatchewan uranium tailings has shown that there are no significant differences in radon levels from the background for distances greater than one kilometre. In the NIOCAN case, the amounts of radioactivity are much lower than in the Saskatchewan situation. Therefore, we would surmise that the distances involved would be even shorter than 1 km. where the Project could affect radon levels in the environment.

In winter months, the tailings will be covered with snow. Due to a very short half life of radon of 3.85 days, the radon molecules will decay before they could escape from the tailings into the atmosphere. Hence, there will be very little additional radon due to the Project during several months in the winter.

4. Why is thorium not as critical as uranium in the environmental assessments?

Chemically, thorium is very insoluble, and hence does not have the same environmental mobility compared to uranium.

5. What will be the impact of mine water discharge on surface water quality?

The mine water will be discharged at a rate of approximately 2 500 m^3/day. According to the proponent's submission, this water will be impounded before discharge into surface waters. During impoundment, the solids will settle out. As a general rule, the solids generally have a higher radioactivity concentrations than the liquid phase. Hence, the mine water that will be released to surface waters will have less radioactivity. Nonetheless, the release of mine water to the environment will depend upon the concentration of radionuclides, and will have to follow the provincial limits.

6. During mining a large amount of water will be pumped out. The water table will be lowered in the vicinity of mining operations forming a cone. Will it affect soil moisture content in cultivated soils?

Physical properties, such as pore space and hydraulic conductivity, are variable depending upon the geology of the strata. At greater depths, both pore space and hydraulic conductivity are decreased.

Soils are usually 40 to 100 cm deep, and are generally not connected with sub-surface

geological strata. Mining will be carried out several hundred metres below the surface; hence, it is not likely to affect the moisture content of surface soils.

7. Radon will be released during mining operations. After its radioactive decay, solid particulates will be deposited on cultivated lands nearby. Will it increase radiation levels in soils, affecting cultivated crops adversely?

The amount of radon released by the mining operations is not estimated to be high. Also, not all radon will be decaying in the vicinity of the mine. Thus, there will be only a very small amount of solid particulates settling out on soils, not affecting quality of cultivated crops adversely.

8. During mining of ore, water will be pumped out creating a depleted cone of empty pore spaces. These pores will be filled with air, including the released radon from the ore and mining cavity walls. Will this situation create a «piston effect» on exalation of radon during atmospheric pressure changes?

Radon in the depleted pore spaces of the postulated cone will exist with other soil air. In addition, the depleted zone will be created slowly upon depletion of water in the pore spaces of the cone. Hence, due to decay of radon gas and lack of connectivity of pore spaces, the «piston effect» will be minimal due to changes in atmospheric pressure.

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