

## Oral.1.2

### ECOLOGICAL AND RADIOLOGICAL CONSEQUENCES OF HALF-CENTURY OPERATION OF MONAZITE STORAGE FACILITY

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The unique storage facility of monazite concentrate is situated in the South East part of Sverdlovsk region (Russia). Since 1960 more than 82 000 ton of monazite concentrate are stored on this facility in 19 wooden warehouses (former granaries) and 4 hangars. The warehouses were built in 1940 and most of them are in the need of serious repair now. As a result there is high concern of local authorities and public about the possible influence of facility on ecological situation and the health of peoples. The special complex assessment of radiation situation both on the territory and around of monazite storage facility was conducted in 1995 – 2009.

To estimate the radioactive dust discharge from the ventilation windows the dust filter was installed on one of the open dormer window. It was shown that even from open ventilation window the annual monazite discharge is less than 2.5 mg. The total fallout of monazite dust on the territory of storage facility was assessed by the meteorological plane-tables covered by filter materials. The filters were exposed during 30 – 137 days. The thorium fallouts in close vicinity of warehouses during exposure were less than detection limits (0.18 Bq/m<sup>2</sup>). The concentrations of <sup>232</sup>Th and <sup>226</sup>Ra in the soil (26 and 52 Bq/kg respectively) on the territory of facility correspond to the average natural nuclides concentrations for the soils in this place.

There is no elevated <sup>232</sup>Th concentration in 0 – 5 cm soil layer in comparison with 5 – 10 cm layer. Only in a few points additional soil contamination by <sup>232</sup>Th in the range 27–70 Bq/kg was found. The contaminated points are randomly distributed over the studied site. It was proved that the contamination spots were developed due to occasional spill during loading and repackaging operations. The total mass of monazite spills over the storage facility site is estimated at about 500 kg.

The average <sup>220</sup>Rn concentration in the atmosphere inside of warehouses is 3.8 kBq/m<sup>3</sup> (0.3 – 14 kBq/m<sup>3</sup>). In outside atmosphere near the warehouses the average thoron concentrations are 470 Bq/m<sup>3</sup> in winter and 760 Bq/m<sup>3</sup> in summer. On the territory of facility the average <sup>220</sup>Rn concentration is ~70 Bq/m<sup>3</sup>. The average thoron equivalent equilibrium concentrations (EEC) are 350 Bq/m<sup>3</sup> inside the warehouses; 15 – 50 Bq/m<sup>3</sup> near the outside wall; 6 – 18 Bq/m<sup>3</sup> at 10 m out of warehouse and ~2 Bq/m<sup>3</sup> at 20 m out of warehouse. The thoron EEC value is strongly depending on direction and wind speed. The average <sup>222</sup>Rn concentrations are: 80 Bq/m<sup>3</sup> near the outside walls in winter and 160 Bq/m<sup>3</sup> in summer; 19 Bq/m<sup>3</sup> on the territory of facility.

It is demonstrated that outside of sanitary zone of storage facility there is no excess radiation influence both on environment and human population.