

Fact Sheet:

Liquidation of the consequences of chemical extraction of uranium in Stráž pod Ralskem, Czech Republic

The uranium deposit of Stráž was created by early-cretaceous deposits, which were disturbed by volcanic processes.

At the extraction sites two aquifer collectors are developed, divided by semi-permeable lower turonian strata. The uranium deposits are situated in the lower collector. Water from lower collector was never exploited, because of their high content of natural radioactive substances. **The water from the upper collector constitute one of the most important sources of drinking water in the Czech Republic and is used in water management.**

In 1967, near the town of Stráž pod Ralskem, the simultaneous development of two exploitation methods for obtaining uranium started: classical underground mining and underground leaching "in situ" by a diluted solution of sulphuric acid.

In-situ leaching is a risk for the environment, but this was not addressed adequately by the state company DIAMO. The leaching process has been in operation from 1967 to 1996.

Principles of chemical extraction

The mine using chemical extraction occupies an area of 628 hectare. However, the surface of contamination including the area where the water quality is affected by the leaching operations reaches the size of 24 km². During the leaching process bore-holes to a depth of up to 350 m are filled by sulphuric acid. After that, the solution is pumped to the surface and uranium is chemically extracted. Approximately 8.000 bore holes were drilled in the leaching fields. In order to gain 15.000 ton uranium 400 mil. m³. leaching fluid were used.

Amount of chemicals used for leaching:

4.120.000 tons sulphuric acid, 313.000 tons nitric acid, 112.000 tons ammonium, 26.000 tons hydrofluoric acid (cleaning of bore holes)

Ecological problem:

the residual contamination from the leaching process is a risk to the mayor drinking water resource located at the site of the mine.

To prevent leaking of contaminated leaching water into the drinking water supplies, Diamo is continually - 24 hours/day - pumping leaching water from the cenomanian collector from depths reaching to 350 m.

Underground exploitation:

16.000 tons of uranium in deep mine mines reaching to 350 m.

Since the end of the exploitation of the most important deep mine Hamr I in 1993, the depression fold of the mine field was filled with 4,5 millions m³ of water originating from the second stage sludge pool of the chemical treatment plant. According to plan, this underground mining area was filled up to 2/3ds with the removed sludge water until 2003. At present the mine is further filled by natural ground water flow, which should completely fill the depression sometime between 2010 and 2020. There is no money for the clean-up and removal of the mining buildings and materials remaining above ground.

Uranium leaching:

Up till now, 15.000 tons of uranium were obtained by chemical extraction.

At present (in 2004), the cleaning of contaminated water produces annually 80 tons of uranium, 7200 tons of alum and 230.000 m³ of parent lye.

Rehabilitation technologies:

In the evaporation plant mining water is concentrated up to fivefold. During the following crystallization process alum is obtained from these concentrated solutions. The alum is further refined in the re-crystallization process. It is then processed by calcination into aluminium sulphate used in the paper industry or is directly sold on the market and added to fertilizers. The parent lye is diluted and injected through the drilling holes and into the leaching fields. One part of the pumped-up contaminated water is thus returned back to the underground, which decreases the effectiveness of the clean-up operation and only prolongs the time necessary for decontamination.

Sludge bed:

There is no functional sludge bed of the right capacity available on the premises of the mining company o.z. TUU where the contaminants could be stored during the neutralization process.

The sludge bed of the chemical treatment plant of o.z. TUU was built in two stages. The first stage was used as a storage for residual materials from uranium ore milling generated by classical deep mining. The capacity of the first stage is now filled up to 90%.

The second stage of the sludge bed is going to be used for the storage of neutralization sediments from the clean-up of the chemical extraction.

Project documentation and EIA documentation are under preparation. This latter study will assess the impact of the construction on the environment and its approval is a necessary condition for obtaining operation permission.

The state owned company Diamo is covering 31 sludge beds with a total of 820 ha. All were constructed in the years before 1989 and none of them are insulated. These sludge beds were built on different (less or more permeable) geological sub-soils. All these locations are regularly monitored. The contamination may cause exposure through the following pathways:

- ingestion of contaminated water off-stream from the storage ponds, via private wells (in the monitored community of Noviny, this water is not or seldom used as drinking water);
- transfer of radio-nuclides into plants from the soil through roots or from surface contamination,
- ingestion of fish, even if the samples did not exceed the contamination limits.

The future of the clean-up of uranium mining and processing legacies in the region of Česká Lípa water reservoir:

It is presumed, that after 2011 no substances will be injected underground any longer that originate from the acid solutions going into the evaporation plant. Parent lye will be treated to a material appropriate for storage in the current sludge bed of the chemical treatment plant of Stráž. The rehabilitation will be terminated after certain target parameters are met.

Costs & financing

The Ministry of Industry and Trade finances the decommissioning of the mine from the State budget. Annually the uranium mine receives 97 Million Euro.

It seems that this is not the end to uranium mining in Straz. The Ministry proposed to extend the decommissioning period of uranium mining for four more years with a possibility of further mining easily accessible stocks during the decommissioning process.

more info:

<http://jarmilka.s.cz/uran/>