

The Shameful Nuclear Power with extensive environmental threats and a waste lacking adequate long-term safety

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All parts of the nuclear power chain pose serious threats to environment and human health. The quarrying of uranium has a shameful history, which should be remembered and reviewed today when there are forces working for intensified uranium mining, not least in Finland. The fabrication of nuclear fuel is not without contamination problems (even in Sweden, we note “an increase of uranium in the lungs and urea of the workers”, 1980). The nuclear power plants are all potential centres for mega-disasters like that of Chernobyl – the reason for why we speak up this very day, 20 years after the disaster, in honour of all dead and wounded, and with the clear message “may it never happen again” and the demand of a general winding up instead of building out. Recently, we have even come to understand that a close vicinity to a nuclear power station (about 5 km) may lead to increased health problems. The transport over land and water of nuclear waste is, of course, linked to threats. The handling of the waste is another shameful issue. The Baltic has already become the most radioactively contaminated sea in the world. The so-called low- and medium-level waste is handled rather with the expectation of getting it out of sight than taking care of it in a wise way with respect to environmental concern. For the highly toxic high-level waste there is not even a prospect of a safe solution. This waste needs to be protected from the biosphere for at least 100,000 years.

Without a solution of the handling of the high-level nuclear waste, there should, in fact, be no nuclear power allowed. For the expansion of the nuclear power production, it is even more important to, at least, pretend that this handling can be done in a safe way. In Sweden and Finland, the nuclear power industry, therefore, claim that the nuclear waste can be placed underground in a KBS-3 repository and that this repository will be fully safe for at least 100,000 years. This is, of course, nonsense and sheer disinformation. Let me review the situation.

1. The idea of a “final deposition”

One would have assumed that the handling of the nuclear waste deposition would have been characterized by free search for “the best available method”. This was never the case. The idea of a “final deposition” came out of an utterly wrong and old geological picture of the late 1970ies. At that time, the concept of “stability” still remained; today demolished and gone. Today, we know for sure that there is no “safety” to lean on in the future perspective of 100,000 years or so. On the opposite, we now know that Fennoscandia was a high-seismic area after the Ice Age, with fault displacements, bedrock fracturing and methane explosions. Therefore, all talk about a long-term safety of a KBS-3 repository is nothing but nonsense and disinformation. This calls for quite a different handling of the nuclear waste.

2. The Earthquake scenario

The understanding of Fennoscandian paleoseismicity has undergone a revolution in the last decades. Numerous faults of postglacial age are recorded, some even cutting right across old “bedrock blocks” surrounded by weak zones and hence claimed to be totally stable over time. In Sweden, there is a paleoseismic catalogue including 58 high-magnitude events, with several events reaching above 8 on the Richter scale.

In such a seismic environment, a KBS-3 repository cannot be assumed to be left intact and undamaged; on the contrary, serious damage is to be expected

3. The talk about a safe "respect distance"

In order to be able to find room enough to locate a KBS-3 repository in the bedrock, it was claimed that the canisters could be placed "50-100 m from a regional fault line". This is a quite remarkable statement (in fact, "a geological insult") that has no validity. Observational facts would rather call for a distance of 50-100 km (i.e. a 1000-time difference).

With a realistic "respect distance", there is no longer space enough for bedrock repositories of KBS-3 type.

4. Methane explosions

In my book "*Paleoseismicity of Sweden – a novel paradigm*" (2003), I was able to show that the Fennoscandian bedrock, indeed, had experienced several explosions in the past when methane ice (in voids, hollows and fractures) transformed into gas when rock pressure decreased (with the land uplift) and temperature rose (after the Ice Age) or the pressure was suddenly altered in association with earthquake events. The last event occurred 2000 BP and set up a tsunami wave of 20 m.

This novel factor is not yet considered in the nuclear waste handling programs. Still, it effectively invalidates all talk about a safe long-term deposition.

Conclusions

- There is no adequate long-term safety if one considers real facts and observations.
- The "earthquake scenario" used bears no relation to modern findings.
- The "respect distance" used is completely wrong and seriously misleading.
- Explosive methane venting is a novel factor invalidating "final" bedrock repositories.

All this implies that the KBS-3 method is no longer an adequate method for a safe handling. Instead, a dry deposition, the DRD method, is advocated, because it gives freedom of action. In a DRD-repository, the waste is controllable, retrievable, repairable, usable, and moveable. Besides, this method is much cheaper. It is not considered to be a solution allowing extended nuclear production, just "to do the best" of the waste produced.

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