

# Joint Project Workshop: Risk of lifetime extension of old NPP

## Report

Linz, 7 May 2019, 4 p. m – 6 p.m.

**Oda Becker**, an independent expert on nuclear energy and technology, presented the results of a new study by INRAG (Independent Nuclear Risk Assessment Group):

You can download the presentation at: [www.joint-project.org/upload/file/Oda\\_Becker\\_risk\\_of\\_lifetime\\_extension\\_of\\_old\\_NPP\\_JP\\_7May2019.pdf](http://www.joint-project.org/upload/file/Oda_Becker_risk_of_lifetime_extension_of_old_NPP_JP_7May2019.pdf)

### Key points of the presentation:

- The term “lifetime extension” (LTE) should be used, not “long-term operation” (LTO): Long-term operation disguises the fact that nuclear power plants (NPP) were designed for a lifetime of 30 or 40 years, and that extending their planned lifetime goes hand in hand with increasing their risk. The term long-term operation is mainly used by nuclear industry and operators.
- Ageing is a combination of physical ageing and technological/conceptual obsolescence – both together increase the risk of a NPP.
- Improved safety concepts cannot be implemented in old plants if there is not enough space to physically separate equipment of redundant safety systems. Examples: In the reactor type VVER-440/V-213, all pipelines are placed in the same room and next to each other. Another issue are the low protection against external hazards: The VVER-1000 has containment walls of 1m thickness, now 2m are state-of-the-art. There is no possibility for improving these old designs. The VVER-440/V-213 has even walls of less than 1 m concrete.
- The recent comprehensive backfitting the pipes in Dukovany was only necessary to keep the plant in the status it should be in and not to increase safety.
- Backfitting measures are postponed for decades in most NPPs, the work is done during refuelling, so often it takes 10-20 years to complete a measure.
- Old NPPs are not designed to cope with core-melt accident because in earlier times a core-melt accident was excluded because of its low probability. New NPP designs have added core catchers, which try to cope with core melt accident.
- Most old NPP wouldn't be licensed today any more.
- According to the 2014 EURATOM safety directive early and large releases should be practically eliminated. However, for old NPP (and NPP under construction) reasonably practical safety improvements suffice. The nuclear authority and the operator together (without the public) discuss what “reasonable practical” by avoiding necessary and possible but expensive backfitting measures.
- It is important to talk about the risk of an old NPP and not only about the safety.

## **Discussion (moderated by Patricia Lorenz):**

### **Environmental impact assessment (EIA)**

Almost no country conducts an EIA for lifetime extension of their old NPP. But has an EIA ever stopped an NPP? This is not the aim of an EIA – the aim is to improve the plant.

Why is it so dangerous to allow an EIA? Nuclear states do not have enough agencies to produce the amounts of papers...

Most countries do not have a limited lifetime. The Espoo decision on the EIA for the PLEX of Rivne was based on the fact that the Russians had constructed Rivne for 30 years. In the Espoo Ad-hoc Group it is discussed what could be used to mark the point when an EIA should be conducted (major changes like power upgrades? Changes of components/systems).

### **Risk and safety**

The idea of a risk report (additional to a safety report) is to inform people about the (increased) risk of old NPP. The idea is if people would know about the risk they would not favour lifetime extensions. It is the opinion of INRAG that a risk report to inform the public is needed, but also EIA for lifetime extensions.

What about the Gen III or III+ reactors? They are designed for 60a and could be extended up to 80a.

You cannot be sure if the improvements are really improvements. It is also a problem to implement safety concepts into new plants...

Economic pressure: UK, CZ: they have not invested in other energy, so they are forced to lifetime extension

### **But what can we do?**

Inform about the risk, consulting, taking part in participation procedures

Example “ENSREG Topical Peer Review on Ageing Management” (TPR): ENSREG chair was astonished about the low public interest in the TPR. This peer review is about Ageing Management Programmes (AMP). But AMP are the theory, people are interested in the practice, in the NPPs nearby and their risk.

However, there some important information in the TPR reports:

The TPR resulted in a table on AMP for each country (not reactors) – this table can be found in Oda Becker’s presentation or at the ENSREG website<sup>1</sup>. The assessment “Afl = area for improvement” is important, it means that there are problems in the AMP. In the table it can be seen that there are a lot of “Afl”, especially in the category of the delayed NPP projects.

See more of the results of the TPR here: <http://ensreg.eu/eu-topical-peer-review>

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<sup>1</sup>[http://www.ensreg.eu/sites/default/files/attachments/hlg\\_p2018-37\\_161\\_1st\\_tpr\\_country\\_findings.pdf](http://www.ensreg.eu/sites/default/files/attachments/hlg_p2018-37_161_1st_tpr_country_findings.pdf)

### **Delayed reactor projects**

Will Belene be another Mochovce? Currently it seems yes, when looking into the tender documents, where they intend to complete the originally ordered reactor including the parts already delivered to Belene site.

The reactor design is of importance, not only the components.

Most important question: Will Belene be declared a new or an old project? Construction started 30a before. They make a tender which will be open for 90 days for a strategic investor.

Two medium large Russian ships have brought reactor parts to the construction site, possibly all parts (those paid with the penalty) have been delivered by now.

### **Technical questions**

Are there problems connected with the change in fuel type? Germany has problem with bending fuel, and oxidation outside. The safety analyses have not predicted it, thus all the safety analyses are wrong?

German operators have deal with regulator to keep quiet for the last years of operation (3.5 years).

What is the impact of load following on ageing?

Load following increases the risk, but only slightly, more stress in nearly all parts – you have more steam, higher temperature, increased ageing of components.

Rosatom advertises with load following as can be seen in its advertising brochures.

### **Problems of lifetime extension:**

At the last ENEF, Oda Becker asked the chair of ENSREG three questions:

- 1) Are AMP effective? The answer is no.
- 2) Why are the backfitting programmes so delayed? The industry can't deliver. Chair's answer: the plants have to cope with more important issues, e. g. fire protection....
- 3) Why did public not participate in TPR? Answer Oda Becker: because it has nothing to do with real problems.

Oda Becker invites us to take part in this discussion.

SUMMARY: The Ageing Management Programmes are not effective. They as well as the upgrade programmes don't increase safety, but serve to fix problems which have been there since the plant operation started. Ageing and safety programmes are delayed, because industry cannot deliver. While EIA hardly will stop an NPP or PLEX, it is the only tool we have to inform people about the project and the risks involved.

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