SET 5

Paks NPP Lifetime Extension

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Paks Lifetime Extension

The four units of NPP Paks were originally built for a lifetime of 30 years.

Paks Unit No.	End of original lifetime
Unit 1	2012
Unit 2	2014
Unit 3	2016
Unit 4	2017

NPP Paks' operator wants to extend their lifetime for another 20 years. For this purpose three types of licenses are needed:

- nuclear license
- environmental license
- water license

Hungary is the first case where for a plant lifetime extension an environmental impact assessment (EIA) is required. Hungarian NGOs had the possibility to participate in the EIA process, and they participated from the beginning. Austria and later also Romania stated their interest to participate according to the ESPOO-Convention.

Environmental License

Timetable:

2002	The licensing process for the environmental license started.
5.4.2004	The Preliminary Environmental Study from Paks NPP was delivered to the environmental authority ADUKÖFE, and ADUKÖFE wanted some supplements.
3.5.2005	Ruling of ADUKÖFE, in which the creation of a detailed Environmental Impact Study was ordered until 2007 (this EIA study was completed in March 2006). After that the Preliminary Environmental Study was published. Authorities of neighbouring countries, citizens and NGOs had the possibility to make their comments.
Sept 2005	Austria sent a Statement based on an expert analysis ("Report to the Austrian Government") to the Hungarian authorities. In this report comments and questions concerning the Preliminary Environmental Study are summarized. Also Hungarian, Romanian and Austrian NGOs and citizens made their statements.
March 2006	The Environmental Impact Study by Paks NPP was published, authorities of neighbouring countries, citizens and NGOs had the possibility to make their comments. Hungary also submitted to Austria the "Answers of NPP Paks to the Austrian Report and to some statements of other Austrian institutions"
28.4.2006	Hungarian hearing in Budapest
6.6.2006	Austrian hearing in Mattersburg
Summer 2006	Bilateral exchange of questions and answers between Hungary and Austria
Nov 2006	Hungary issued the environmental license for Paks lifetime extension.

The **"Report to the Austrian Government"** from Sept. 2005 is published at http://www.umweltbundesamt.at under uvp/sup/emas, espoo, Hungary.

This report includes legal and technical comments. Austria took the position to be significantly affected by the planned lifetime extension. Arguments for this position are listed in the executive summary of the report:

1. The case of the extension of the operating time of the nuclear power plant Paks is covered by the application scope of the EIA-Directive of the EU respectively the ESPOO-Convention.

2. The position of the Hungarian authorities on to the question of whether their neighbouring states are likely to be significantly affected, which only takes into account the probability of the occurrence of accidents while at the same time excluding severe accidents (beyond design basis accidents) is not in line with the ESPOO-Convention and the EIA-Directive.

Austria stated that this exclusion of severe accidents (beyond design basis accidents) in the preliminary study was neither in line with the ESPOO-Convention nor with the EIA-Directive. Therefore a detailed analysis of beyond design basis accidents and their potential effects should be included in the EIA-Documentation.

The technical evaluation results in a list of missing or incomplete issues that are seen as relevant for neighbouring countries. The detailed elaboration of the following issues in the EIA-Documentation is therefore requested:

(1) The overall treatment of ageing in an NPP is of importance for the risk of extended plant operation. Of particular importance and safety significance is the ageing of the reactor pressure vessel, the steam generators, and the confinement system.

(2) Reliable data on the original state of the pressure vessel, the composition of the materials, the embrittlement surveillance program, the thermo-shock analyses performed etc. should be presented in the documentation.

(3) Also treated in some detail should be the corrosion of steam generators and the option of steam generator exchange; as well as the connection between steam generator corrosion and fuel element contamination.

(4) The long-term behaviour of the confinement system (steel liner, barbotage system etc.) should be discussed in the documentation.

(5) Furthermore, the ageing of many other systems, structures and components can also be of safety significance. A comprehensive ageing management program is required and should be presented in the documentation.

(6) The effects on the safety margins of the plant related to ageing in connection with power uprating should be presented in the documentation, including the specifications and effects of the new type of fuel to be used.

(7) The issue of seismic hazards (including both site seismicity and seismic design) will have to be presented and discussed in a comprehensive manner in order to permit the assessment to which extent appropriate, state-of-the art data and methods have been applied and which additional analyses might be required.

(8) The issue of terror attacks and sabotage can and should be discussed without disclosing sensitive information.

(9) A comprehensive discussion of DBA and BDBA scenarios and severe accident management measures, including the results of safety analyses concerning BDBA (initiating events, scenarios, source terms) is required to assess the potential risk for the Austrian population in greater detail.

For further details see:
http://www.umweltbundesamt.at/umweltschutz/uvpsupemas/espooverfahren/ungarn/

Parts of the EIA procedure were **two hearings:** one in Hungary (28.4.2006) and the other in Mattersburg, Austria (6.6.2006).

1. The Hungarian NGO Energia Klub criticized in its report about the Hungarian hearing that on behalf of the authority no independent experts participated in the hearing, all experts who answered questions belonged to the crew of Paks NPP. There was no time for clarifying questions after a question was answered once, even if the answer was not satisfying. Several topics were not dealt with at all (e.g. HLW).

See also Energy Club (2006): Report from the Hearing in Hungary 28.4.2006, published at www.nuclear-waste-watch.org.

2. At the Austrian hearing open questions from the Austrian side were presented, and also statements of the Hungarian side. See the presentations at: http://www.umweltbundesamt.at/umweltschutz/uvpsupemas/espooverfahren/ungarn/uvpkkwpaks/mattersburg/

The questions of Austria that were summarized in the "Report to the Austrian Government" from Sept. 2005 were answered by Paks NPP. These answers together with the Ruling from May 2005, the Environmental Impact Study from 2006 and the results of the Austrian hearing were used for **revising the "Report to the Austrian Government"** (revised version see www.umweltbundesamt.at).

In this revised report the following assessments were made. Generally it can be stated that the information that was asked for in the first Austrian report were not answered satisfyingly.

(1) In the Environmental Impact Study a high seismic risk for NPP Paks was estimated (CMF[1] 2,58 10^{-4} per year and unit). At the hearing in Mattersburg it became clear that this problem has been realized by the NPP and the Hungarian nuclear authority announced a seismic improvement (reduction to 6,6 10^{-5} per year and unit).

(2) From the discussions with the Hungarian side it became clear that beyond design base accidents couldn't be excluded from the debate. A release of radioactivity can affect regions in a distance of several 100 km from Paks.

(3) Ageing Management Program: Considerable changes and developments were announced at the Austrian Hearing as part of the Ageing Management Program of Paks NPP during the next years. Further information on this process is of high importance for assessment of severe accident risk. In particular, further observation should permit to ascertain that the new approach to in-service-inspections to be introduced at Paks, which is to include reductions in inspection

1 CMF = core melt frequency

efforts without a decrease of the safety level, indeed does not lead to any safety level decreases.

(4) Reactor Pressure Vessel (RPV) Ageing: The safety assessment of the Paks reactor pressure vessels, in connection with lifetime extension, is in an early stage. The Austrian Government stated its interest in an information exchange on the further development of RPV ageing management and its results.

(5) Steam Generator Ageing: The safety assessment of the Paks steam generators, in connection with lifetime extension, is still in an early stage. The inspection system is still under development. Observation of the further development of in-service-inspections is required, particularly because of possible modifications of the practice in the coming years (longer inspection intervals).

(6) Confinement Ageing and Capability: The confinement system is important for plant safety, especially the ageing of the barbotage condenser system, the backfitting measures which were performed in the last years, or are planned for the immediate future, and the behavior of the confinement system in case of a severe accident (as well as for variations of certain DBAs[2]), including a discussion of safety reserves and of capabilities for accident mitigation, should be provided, as well as the consequences of the leak rate for the timing and extent of releases during beyond design base accidents.

As far as can be concluded from the available literature, there have been no comprehensive and systematic tests and investigations (such as have been performed for DBAs) into the capabilities of the confinement in case of beyond design basis events. In particular, it appears that no investigations have been performed regarding the behavior of the bubble condenser, which constitutes the critical part of the confinement system.

(7) Seismic Hazard: Seismic hazards contribute considerably to the overall risk at Paks. Therefore it is necessary to get more information about the current state of seismic backfitting, further backfitting activities and all new investigations and assessments of seismic hazards that will be performed in the next years.

(8) Terror Attack: Paks life extension is the first licensing procedure for a VVER 440/213 reactor since the attacks of September 11, 2001. The issue of terror attacks is discussed worldwide and should be discussed also in the procedure of Paks lifetime extension. Vulnerabilities, attack scenarios and potential consequences can and should be discussed in an appropriate general manner, and in an appropriate setting. Regarding public debates, the criterion applied should be that it would be pointless to attempt to keep secret information, which a competent group of attackers can easily acquire.

(9) Power Uprating: Life Extension of NPPs is often connected with power uprate. In Paks this power uprate will be performed as usually in several stages. The first stage concerns the enhancement of the efficiency of turbine and generator. This is of low safety relevance compared to the second stage when changes in the reactor core and the fuel cycle are intended. These activities can substantially

[2] DBA = design basis accident, BDBA = beyond design basis accident

reduce the safety margins of the plant. NPP Paks is planning two phases of fuel development; of particular interest is the schedule of the second phase, when a higher burn-up which will be achieved then and its possible effect on source terms for DBAs and BDBAs. As an important first step, provision of the related part of the Safety Report would be helpful for the clarification of the open questions.

(10) Spent Fuel Storage: The fuel storage facility at the Paks site already contains a large amount of radioactive materials, which will grow considerably in the coming decades if lifetime extension is implemented. The storage concept employed appears to be more vulnerable to external impacts and terror attacks than the cask storage concept. Furthermore, it is likely that it will pose more problems in case of contamination of the store through a reactor accident.

There are indications that the planned storage duration (50 years) is likely to be exceeded, more information about it is necessary.

In November 2006 Hungary issued the **environmental license** for Paks lifetime extension. A German translation is available at www.umweltbundesamt.at.

The main problem with the licensing procedure is that the EIA, the one with the most opportunities for participation of the public is the first to be finished. Only after that the nuclear (operational) licensing process can start, on the other hand the operational constraints issued by the nuclear regulatory authority are not known at the time of the issue of the environmental license. The content of the nuclear license is not part of the EIA. But locally there are neighbouring villages (and inhabitants) that have to be parties in the nuclear licensing procedure.

NGOs could use all opportunities due to the Aarhus Convention to get information about the process.

The Government of Austria has a bilateral information agreement with Hungary concerning all nuclear issues. Under this information agreement the development of the licensing process of Paks LTE, the progress of work and the experiences will be discussed between Austrian and Hungarian experts.

Operational License

The first operational license has to be acquired four years before lifetime extension starts. This is a "theoretical license", meaning that there has to be another operational license to be issued at the year of the start of lifetime extension. Paks Unit 1 needs its first operational license in 2008, the second one in 2012.