# EIA for new NPP Dukovany

## Statement of the Joint Project – Nuclear Risk & Public Control

The company Elektrárna Dukovany II, a.s is currently planning the construction of a new nuclear power plant at the Dukovany site (CR); one or two reactors with up to 2,400 MWe. They should start operating in 2035, planned life-time of 60 years. The NPP site Dukovany is already hosting four VVER-440 reactors.

**No alternatives, no justification for the need of a new NPP**

While the scoping mentioned the new output being "up to 3,500 MWe", the EIA documentation reduced the new capacity to 2400 MWe. It's worth mentioning that the Russian reactor model currently on the market has exactly 1,200 MWe per unit; it might not be a coincidence that the Czech nuclear village has always been in favor of the Russian reactor producer Rosatom. At the same time the EIA showed that the River Jihlava certainly cannot provide the water supply needed for a higher reactor output and that the river's tritium pollution will significantly increase. The scenario calculated for a period of over 80 years is accompanied with high uncertainty; the water shortage can make itself felt much earlier and more drastically. Thus the EIA documentation is clear proof that the alternatives need to be examined.

According to the EIA Directive of the EU (Directive 2014/52/EU) an assessment of alternatives has to be made, and the decision has to be based on a comparison of the environmental impacts of the project. Such alternatives should be different options for electricity production, and also different reactor types, alternative sites, or power outputs. For the EIA Dukovany no alternatives for electricity production have been assessed in such a way that the decision for the new NPP is based on this assessment. It is argued that the decision for a new NPP was already made in the Czech Energy Strategy (2015) and the National Action Plan for the Development of the Nuclear Energy Sector in the Czech Republic (2015). But in the Energy Strategy also no alternatives have been assessed properly, and the National Action Plan has not been subjected to a SEA at all.

**Reactor types**

It is noteworthy that the information provided in the EIA documentation on possible reactors for Dukovany—in the style of an advertising brochure—which are supposedly available on the market and fulfill the high safety requirements actually are not in operation, not completed or not even ordered by anyone (Atmea), have been cancelled during construction (AP1000 V.C. Summer NPP), are not safe enough even on paper (KEPCO EU-APR), have not been licensed in the EU (VVER-1200 in Hanhikivi) or have been under construction for decades and are only getting more and more expensive (EPR in Olkiluoto und Flamanville). The VVER reactors however are not only available under different labels (1,200 MWe) but also with different safety levels and thus have to be rated as an unknown model. It is not possible to assess the safety levels: Obviously they shall remain secret in the upcoming licensing process between the operator and the nuclear regulator, completely excluding the public.

For the different reactor types it would be necessary to prove their safety relevant features, e.g. if they have enough redundancies or if they can resist seismic events that can occur at the site. It is not

enough to refer to regulatory requirements that the new reactors should fulfill defined safety margins if there is no proof that those requirements can be fulfilled at all.

The planned operation time of 60 years makes it necessary to include aging management concepts to avoid safety problems like those which already occurred both at Dukovany and Temelín (faked welding controls). These concepts are missing in the EIA document.

**Assessment of the calculated severe accident**

In the EIA document impacts of a severe accident with partial fuel meltdown are calculated. It is assumed that the containment will basically remain intact, which is an assumption without proof. For this calculation a sourceterm of 30 TBq Cs-137 and 1,000 TBq I-131 is used. (For comparison: for the planned NPP in Hanhikivi/Finland for accident assessment a sourceterm up to 500 TBq Cs-137 was used!) Under these assumptions no individual doses in 100 km or above occur that would lead to radiation protection measures, according to the EIA documents.

But the impact on agriculture could be substantial even in a distance of more than 100 km from the site (the Polish border is 118 km from Dukovany, the Hungarian border is 142 km). On p. 508 of the EIA document the maximum permitted levels of radioactive contamination of food and feed following a nuclear accident are listed (according to Council Regulation Euratom 2016/52). In Hungary and Poland, there seems to be no catalogue of countermeasures publicly accessible like in Austria[1] and Germany[2], where agricultural countermeasures are described in detail to avoid reaching these maximum food levels. Defined are measures like immediate harvesting of marketable products or putting livestock into stables. These measures have to start at the values in the following table; they are compared to the caculated contaminations of a severe accident according to the EIA document (p. 539):

| | **I-131 in Bq*h/m$^3$** | **I-131 in Bq/m$^2$** | **Cs-137 in Bq*h/m$^3$** | **Cs-137in Bq/m$^2$** |
|---|---|---|---|---|
| Value in Austria and Germany for start of agricultural countermeasures | 170 | 700 | 350 | 650 |
| Values assessed in the EIA document for 100 km (95% quantil) (p. 539) | 2,750 | 56,000 | 172 | 1,600 |

These values are exceeded for nearly all types of contamination up to 100 km, and, moreover, they could also be easily exceeded in a distance or more than 100 km!

[1] Österreich: Maßnahmenkatalog für Radiologische Notstandssituationen. Arbeitsunterlage für das Behördliche Notfallmanagement auf Bundesebene gemäß Interventionsverordnung. Version Juli 2014. Abteilung I/7 Strahlenschutz. https://www.bmlfuw.gv.at/dam/jcr:1882b9a4-e561-4b00-8e17-5aaa7442bfda/Ma%C3%9Fnahmenkatalog%202014.pdf

[2] Übersicht über Maßnahmen zur Verringerung der Strahlenexposition nach Ereignissen mit nicht unerheblichen radiologischen Auswirkungen Überarbeitung des Maßnahmenkatalogs Band 1 und 2. Empfehlung der Strahlenschutzkommission. Heft 60, SSK 2007

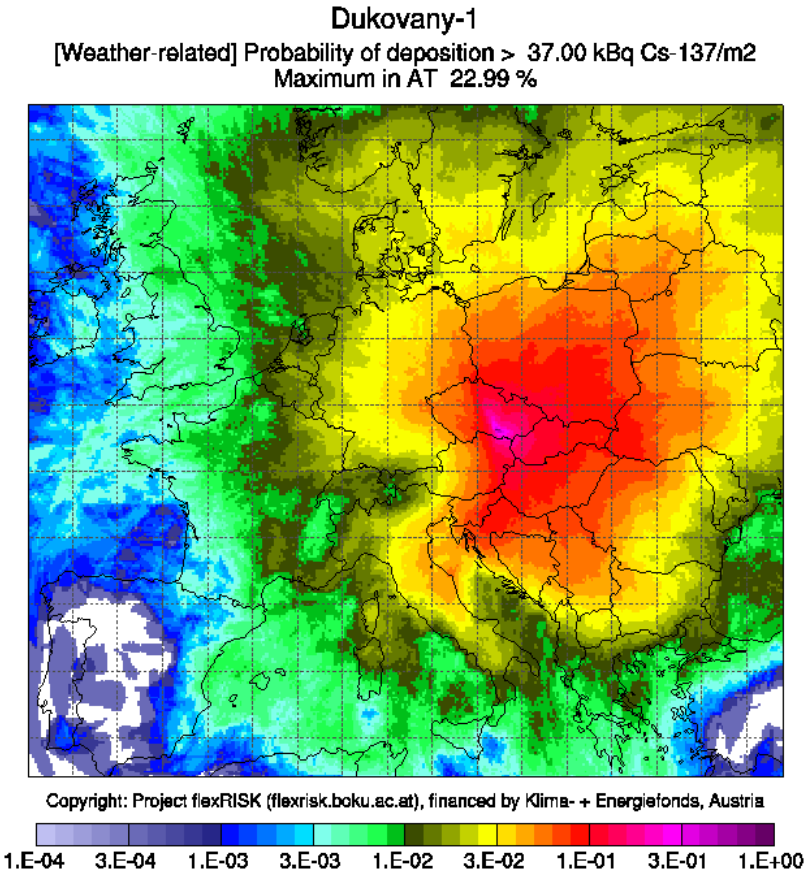
More information has to be provided about results in a distance of more than 100 km to include Poland and Hungary to be able to assess consequences on agriculture properly.

Moreover, the values of Council Regulation Euratom 2016/52 are much too high as discussed in detail in Mraz and Becker (2017)[3], especially due to the fact that for dose calculations in the food level regulation an assumption is used that only 10% of all food is contaminated up to the maximum and 1% of liquid food, respectively. This will not be true in a worst case nuclear accident in one of the EU member states and under unfavourable meteorological conditions.

**Most severe accident?**

The above discussed calculations of a severe accident are not showing the worst scenario – which would be a release of a large part of the inventory. Such a large release was modelled in the project flexRISK for a release of 76,05 PetaBecquerel Cs-137 (which is 2,500-fold the sourceterm of 30 TBq that was used in the EIA). Even if such a big release has a very low possibility it cannot be excluded totally from assessment!

flexRISK[4] shows which regions in Europe would be probably affected based on realistic European weather conditions. Even though the following example was calculated for Dukovany-1, it provides a good impression of what to expect in a worst case scenario.




[3]Mraz, G., Becker, O. (2017): Health effects of ionizing radiation and their consideration in radiation protection. Supported by Vienna Ombuds-Office for Environmental Protection

[4]flexRISK wurde aus den Mitteln des Klima- und Energiefonds gefördert und im Rahmen des Programmes "NEUE ENERGIEN 2020" durchgeführt. http://flexrisk.boku.ac.at/

The figure shows the weather-related probability to be contamiated with more than 37 kBq Cs-137 in case of a severe accident at the Dukovany site. The scale goes from 100 % probability (purple end 1.E+00) down to 0.01% (1.E-04). An accident with a very large release has impacts on all over Europe.

**Spent fuel and radioactive waste**

In the Czech Republic a national deep geological repository is planned for disposal of spent fuel and other high radioactive waste. Such a repository is planned to be in operation in 2065. Until now, seven official candidate sites are named, and non of these communities wants to host a geological repository.

The intention of building a new nuclear power plant in 2017 is utterly unacceptable when financing of the plant, the issue of water supply at the NPP site and the technology and site for the nuclear waste repository remain unsolved.

*In the Joint Project, European NGOs and research institutions cooperate since 2003 on safe and sustainable energy issues with a focus on anti-nuclear activities in Central and Eastern Europe. For more information see www.joint-project.org/.*

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