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1st ADDENDUM to the COMMENTS on the

ENVIRONMENTAL IMPACT ASSESSMENT IMPLEMENTATION OF NEW NUCLEAR POWER PLANT UNITS AT THE PAKS SITE made by MVM Paks II Zrt

by

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20 October 2015

EIA hearing in Paks, 7 May 2015

This first addendum to the comments made earlier in the EIA public participation procedure for the Paks II nuclear project follows on the submission by MVM Paks II Zrt of missing information based on the order Ref. No- 558-37/2015 from the responsible authority for the EIA procedure, as well as the public hearing in Vienna on 23 September 2015.

This addendum does not replace the earlier made submission made by me on request of Greenpeace Hungary and Greenpeace in Central and Eastern Europe, nor does it replace viewpoints, concerns, opinions and questions brought forward in the public hearings in Paks on 7 May 2015 and Vienna on 23 September 2015, or any other submissions made by any Greenpeace organisation, but is in addition to those. I have continued the numbering from my earlier submission.

Also these comments are on personal title, and my opinion – though partly based on my experience within Greenpeace and benefiting from input from other Greenpeace colleagues and experts – does not necessarily coincide with the opinion of Greenpeace as organisation.

The analysis in this addition has the following parts:

- erratum in the original submission
- Document DdKTF 3. hiánypótlás _EN.pdf
- issues remaining from the public hearing in Vienna

I have used the English versions of documentation, and the pages refer to the .pdf page counting of each document.

Gdansk, 20 October 2015

ERRATUM

139. In my earlier submission “COMMENTS on the ENVIRONMENTAL IMPACT ASSESSMENT of the IMPLEMENTATION OF NEW NUCLEAR POWER PLANT UNITS AT THE PAKS SITE made by MVM Paks II Zrt” by Ir. Jan Haverkamp for Greenpeace in Central and Eastern Europe on 11 June 2015, I have to correct one sentence, which otherwise could lead to confusion:

    page 13, point 34 - "with six in the last 60 years" - has to be "with five in the last 60 years".

COMMENTS on Document DdKTF 3. hiánypótlás _EN.pdf

140. The responsible authority for the EIA procedure requested after the public hearing in Paks on 7 May additional information from MVM Paks II Zrt., which for that reason was not included in my earlier submission from 11 June 2015. These comments only cover the document DdKTF 3. hiánpypótlás _EN.pdf. I may add more comments on this document as well as other later delivered documents in a later stage.
    The page numbering follows the .pdf-page numbering of the document.

141. Page 26 – **Source terms for the chosen BDAs**
    The BDAs have been chosen in such a way that they do not yield source terms that can be characterised as *severe accidents with a substantial emission of the radioactive content*. This is due to the fact that the TAK1 and TAK2 accident scenarios were chosen on the basis of PRA[1] accident sequences with a frequency larger than 10^{-6}.
    The choice of **accident scenarios should not only be done on the basis of PRA, but also on a deterministic basis**, independent from PRA. These could include sabotage, terrorist attack and acts of war, next to extreme natural events and human failure or a combination of those.

142. **Analysed accident scenarios** should also include (common cause or accidental) multi-unit accidents.

143. These scenarios should include **source terms in the magnitude of 8 to 50% of the Cs-, Sr-, and I-content** – comparable with source terms we have seen in Fukushima and Chernobyl respectively.

144. Emission points should be determined that are related to the chosen accident scenarios, and not only the smoke-stack and a hole on the 35 meter level.

145. Concerning the source terms that were analysed in this additional information, it is not clear on what basis the two pathways of the smoke stack and a hole on the 35 meter level have been chosen. This should be explained in more detail.

146. Page 27 – Table 1-5 – it would be good when it would be indicated which percentage of the total I- and Cs-inventory of the power station is emitted, as well as include Sr-emissions.

147. Page 28 – It is unclear what the maps and the dose-rates are indicating. Is this on the basis of one day of particular weather circumstances? If so, what weather circumstances are these

1 I want to remind the reader that where the authors from MVM Paks II use the slightly misleading term PSA (Probabilistic Safety Analysis), I use the more adequate term PRA (Probabilistic Risk Analysis), because this reflects better the subject of analysis, which is risk and not safety. For the use in these comments they are synonym.

(dates)? Or is it a stochastic risk level? If so, how is that calculated? And what are the respective dose-limits under the ICRP limits of 1 mSv/yr and 20 mSv/yr or any more stringent limits in Hungarian law?

148. It would in general be advisable to give separate spreading maps for a statistically sufficiently significant amount of different real time weather circumstances indicating:
    - the deposition of radioactive Caesium isotopes;
    - the effective dose due to radioactive Caesium exposure for adults for an exposure time of 7 days after the accident, 30 days, 1 year and 50 years;
    - the effective dose due to radioactive Caesium exposure for infants for an exposure time of 7 days after the accident, 30 days, 1 year and 50 years;
    - the thyroid dose for adults due to radioactive Iodine exposure for an exposure time of 7 and 30 days after the accident;
    - the thyroid dose for infants due to radioactive Iodine exposure for an exposure time of 7 and 30 days after the accident.

149. A possibility that would enable comparison also with other nuclear power projects in Europe, both existing and planned, would be to engage the Department of Meteorology and Geophysics of the University of Vienna, Austria and the University of Natural Resources and Life Sciences, Vienna, Department of Water, Atmosphere and Environment, Institute of Safety and Risk Sciences, who have extensive experience in the calculation of source terms and related meteorological spreading of radioactive substances, as published in the so-called FLEXRisk project.

150. The explanation of the modelling leading to the dose-rate tables and maps given in this document as well as those given in the chapter on potential transboundary impacts is highly insufficient. It is impossible to interpret what the rates and maps are signifying. A more detailed explanation should be given.

151. It would be advisable to give dose-rates given in mSv instead of nSv as has happened in this document, enabling faster comparison with international norms (incl. the ICRP norms) that are usually given in mSv.

152. Why are there no maps to show the spreading under different weather circumstances. It would be good to deliver maps that can be compared with the outcomes of the FLEXRisk model as developed by the BOKU University in Vienna.

153. Page 28: *"When calculating the radiation protection consequences of incidents beyond the design base..."* - this should be "When calculating the radiation protection consequences of the **presumed** incidents beyond the design base", as only two possible scenarios with low source terms were chosen. **It is important to realise that this does not represent all BDAs.**

154. Why are in the document only Iodine-related dose-rates given and not the Caesium / Strontium-related ones? Or is this an accumulative dose-rate? It would be helpful to separate the two, also because of the large difference in half-times.

155. Page 33: **The conclusions are unacceptable.** The legally prescribed dose limitation are confused with the real situation on the ground. For this reason, the project promoter has chosen source terms which deliver a structurally low exposure. This has happened on the basis of the limitation of the assessment to BDAs with a frequency below 10^{-6} on the basis of the PRA. It is unacceptable only to consider accident scenarios on the basis of the PRA, because this tool is

not developed for the purpose of prediction. Next to probabilistic, also deterministic accident assessment needs to be carried out, including situations in which a part of the radioactive inventory can pass the containment structures – irrespective of the cause. This would be several to several tens of percents of the radioactive Iodine and Caesium/Strontium inventory. These would most definitely lead to completely different conclusions.

156. It is unacceptable that the study basically comes to the conclusion that the entire **fifth level of defence in depth from the IAEA safety guidelines** (including among others off-site emergency response measures) are not needed. This is a fundamental break with radiosafety practice in the nuclear industry.

157. Page 33: *"The establishment license from the Nuclear Safety Directorate in the Hungarian Atomic Energy Authority is granted only when the design of the power plant ensures meeting of these requirements."*
The need for the fifth level of defence in depth is not based on "these requirements", but on the deterministic possibility of higher source terms. It is for that reason that an analysis of spread of emissions from a higher source term needs to be included in the EIA report. We demand for that reason an analysis on the basis of higher source terms from deterministically assessed severe accident situations. These should be worked out in a way that shows the real need for off-site emergency preparedness and response, including for response to radioactive Iodine exposure and well as exposure to radioactive Caesium and Strontium, in line with the IAEA fifth level of defence in depth.

158. Page 33: *"It is therefore suggested that the 800 metres radius circle around the reactor site be considered as the impact area."* This suggestion needs to be dismissed as **insufficient and irresponsible**. The potential impact area of the project is for severe accidents with a substantial emission of radioactive substances far larger – up to hundreds or even thousands of kilometres air-way and hundreds of kilometres down-river.

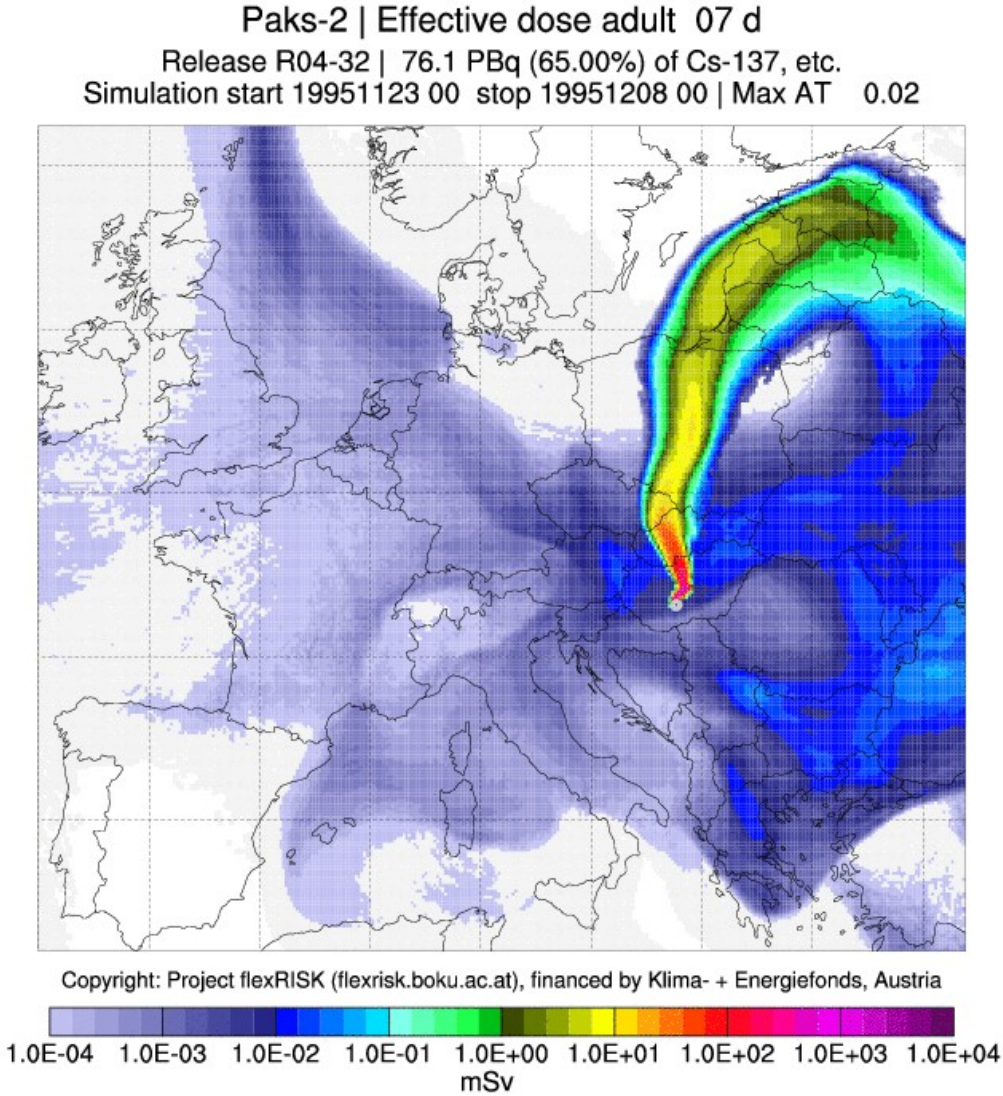
159. Page 34 – The fact that the responsible authority only maximises the BDA levels to TAK2 is irresponsible and based on false premisses. One of the most important lessons from the Fukushima Daiichi nuclear accident in March 2011 is that for nuclear installations one has to **"think the unthinkable"**. For that reason not only probabilistically determined accidents need to be assessed but also deterministically assessed accident situations. It is simply not acceptable that both the authority and the project promoter refuse to take such accident situations seriously, and with that potentially expose the population to large harm.

160. Page 34 – *"A separate study will be prepared at a later stage of the licensing procedure to assess the radiological impacts of the two new units to be established within the common site on the existing four units and the ISSNF."*
Also this is unacceptable. This should be part of the EIA documentation. Inter-installation impacts of incidents and accidents as well as impacts of multi-installation incidents and accidents are a serious risk that can lead to emissions of radioactive substances.

161. Page 34 – *"A separate study will be prepared at a later stage of the licensing procedure to assess the radiological impacts of the two new units to be established within the common site on the existing four units and the ISSNF. The EIS contains all data available from the designer in the current design phase. The detailed data will be generated during the currently ongoing design operations and will be available at a later stage, thus they may be provided in the course of the establishment licensing procedure constituting a part of the nuclear licensing process".*

This would mean that these studies would not be part of the public participation as defined under the Aarhus Convention, which would be in non-compliance with this convention. These are vital data to establish what the risk of the proposed installations can be to environment and health and should therefore be made available in this stage of the procedure already.

162. **Why is there no assessment of the potential impact of an accident in one or more units of the existing nuclear power station at the same site on the proposed project?** As an example: What can happen to the proposed prosed reactors when there is an accident with the release of 65% of the Cs-137 content in unit 2 of the existing Paks nuclear power station in weather circumstances as on 23 November 1995? As the graph, calculated with the FlexRISK model from the BOKU University of Vienna[2] shows, this would result in a 7 day exposure of people in and around the proposed nuclear power station in the order of magnitude of Sieverts,



and even to exposures between 100 mSv and Sieverts in the capital Budapest. This means that operators in the new power station would be suffering from direct radiation illness, that vital services on-site and from the town of Paks will not be available, and that vital services in the capital Budapest would have to be evacuated. This will have consequences for the operation of the new nuclear power station as proposed in this project. One can imagine that this could lead

2 http://flexrisk.boku.ac.at/en/evaluation.phtml#form

to operational problems that could indeed lead to severe impacts also from the proposed project, increasing the impact of the accident in unit 2.

163. Page 35 - *"in line with the nationwide accident relief operations."* Why are international emergency response measures not mentioned?

164. Page 36 – Which of the listed active safety systems has "four parallel branches" and which have less? How is the independence of each branch guaranteed under accident scenarios?

165. Page 40 – *"therefore in this stage the data otherwise necessary for the establishment licensing procedure are not or only partially available,"* The problem with this is that once the reactor is started, the requested environmentally relevant problems exist and there is no "zero option" possible any longer. For that reason, these data need to be provided now, according Aarhus art. 6(4), when all options, including the zero-option – also of decommissioning and waste management – are still open. We demand that the authority demands this information before a final environmental permission is considered and submits them to public consultation in line with the Aarhus Convention art. 6(4).

166. Table 1-14 – I suppose "holding time" means time after shut-down?

167. It is said that these are preliminary data. What is the range of uncertainty for each of the given amounts? The same for the following table (unnumbered), table 1-15 (not figure!) and the data given in the text for the vessel and other internal equipment.

168. Page 42 and further – Waste management descriptions for the different decommissioning strategies fail to mention how and where final deposition of the waste will take place and for which times this is necessary for each category of waste. It also fails to describe how it can be guaranteed that this waste will over the necessary times not return into the environment.

ADDITIONAL ISSUES AND CONCERNS

169. From the delivered documentation it does not become clear whether the proposed design of the nuclear reactors includes the presence of **filtered venting systems** from the containment system. If these do not exist, how can this be argued after the experience in Fukushima and the tendency in all modern designs to provide for such systems? If they do exist, which systems are installed and where? What is their efficiency in filtering radioactive substances from vented air?

170. There is no information in the EIA documentation about **on- and off-site emergency preparedness and response and preparations for post-emergency situations**. The Three-Miles Island, Chernobyl and Fukushima accidents have shown that a lack of preparedness for the post-accident phase leads to risky situations and further contamination. Also in the additional documentation that claims to include potential impacts of accident induced emissions in Hungary does not address this issue.
    We demand that, learning lessons from the Fukushima catastrophe, the following elements are examined:
    - Off-site emergency preparedness and response after severe accidents with a substantial emission of radioactive substances;
    - The availability of advanced computer modelling methods for prediction and other assessments during accident situations and in post-accident situations – a list of the foreseen modelling tools;

- The availability of support for independent radiation monitoring by the population;
- On-site emergency preparedness, including
    - Radioactive water management after accident situations;
    - The availability of robots for assessment and cleaning work in post-accident situations.