SUBMISSION ON THE

auditor assessment of the EIA REPORT for a new nuclear source on the locality Temelín

Environmental Impact Assessment Report, as required by Czech law 100/2001 Sb.

by
Ir. Jan Haverkamp

GREENPEACE

Jan Haverkamp – Expert consultant on nuclear energy
Greenpeace
Nad Bořislavkou 515/58, CZ – 160 00 Prague 6, Czech Republic
t: +420 603 569 243 e: jan.haverkamp@greenpeace.org
www.greenpeace.org

GREENPEACE International

Introduction

My name is Jan Haverkamp. I have an academic engineering degree (Ir. - equivalent with a Masters degree) in Environmental Hygiene from the Agricultural University in Wageningen as well as a candidate (equivalent with Bachelors) degree in Biochemistry from the State University in Leiden, both in the Netherlands. I have studied also nuclear physics and energy policy at the State University in Leiden.

I work as an independent expert in energy issues with specialisation in nuclear energy issues for the global environmental organisation Greenpeace and work since 1987 in Central Europe. I have participated in the previous round of this Environmental Impact Assessment with a submission written on 6 August 2010.

I have been asked by Greenpeace International to comment the auditors assessment of the Temelín 3,4 EIA report and submissions. I write these comments on personal title and my opinion – though based on my experience within Greenpeace and benefiting from input from colleagues and experts – does not necessarily coincide with the opinion of Greenpeace as organisation.

Greenpeace as organisation does, however, still endorse my recommendation **that the report Environmental Impact Assessment for a 3rd and 4th unit at the Temelín nuclear power station should be dismissed as insufficient and inadequate and that ČEZ be required to re-do the entire procedure on a sufficient level of quality.**

The Czech authorities repeated giving the public the far too short time of 30 days for the assessment of the EIA report, which together with the annexes comprises over 2000 pages of material. Just as during the public consultation for the EIA report, this is in flagrant breach with international legislation guaranteeing the public sufficient time for analysis of material. The legally prescribed term of 30 days may be sufficient for, say, the project of a small gas-fired co-generation plant with 300 pages of report, it is definitely not sufficient for this project. In the allowed time, I had to refrain from detail analysis and only could give input on the reactions of the auditor on my earlier submissions. I give my detail legal argumentation here-under, but it needs to be noted that also the Czech Republic is obliged to adhere to ratified international law, even if this is badly or insufficiently transposed into national law.

Another complication that has not been taken into account is that in the one-and-a-half-year that the audit of the EIA and submissions took place (a period that is in stark contrast with the lack of time granted to the public!), the world was confronted with the second worst accident in a nuclear power station in history, the Fukushima Daiichi nuclear power plant. During the auditor assessment, nuclear operators, nuclear regulators, the European Commission and the public were intensively analysing lessons learned from this accident for the operation of nuclear power in general. That process has not ended yet. In contrary, the start-up of that process, consisting of the so called European "nuclear stress tests", as ordered by the European Council on 25 March 2011 in the wake of the catastrophe, is currently in its last phase, but not yet finished.
It is shocking to notice that the EIA of the Temelín 3rd and 4th block has not been suspended to take these lessons into account. Being based on outdated information from before the Fukushima catastrophe, the whole exercise is becoming a bureaucratic game and not a process of public participation in order to "enhance the quality of decisions", as defined in the Aarhus Convention.

I am in general extremely disappointed by the defensive and negative approach of the auditor team. Public input should fundamentally be taken as constructive criticism. There are no "irrelevant" concerns! The auditors have clearly not been willing to take any of the (from my side constructive) submissions into due account as prescribed by art. 6(8) of the Aarhus Convention. They have only

looked to divert attention from the substance of the submissions in order to prevent any change to the report. It is not the task of the auditor team to defend the project. Its task is, as mentioned above, to take submissions into due account on their merit. With their principally defensive behaviour, the auditors have proven not to be fit for their task.

In my comments on the reaction of the auditor team, I will use their page and remark numbering. This means that I am mainly reacting on Chapter V of the assessment, pages 87 to 134, under the title "Greenpeace, Jan Haverkamp - vyjádření ze dne 6.8. 2010".

I am giving my remarks (again) in the English language on the basis of the right to be able to participate in the procedure without discrimination on the basis citizenship or nationality (Aarhus Convention art. 3(9)). Although I speak and understand the Czech language, I am not sufficiently fluent to be able to participate in the procedure on a level comparable with Czech citizens when I would be forced to use the Czech language for my reactions. The given insufficient time of 30 days makes it impossible for me to provide the Czech authorities with a translation.

Prague, 2 April 2012
jan.haverkamp@greenpeace.org – tel.: +420 602 569 243

GENERAL COMMENTS

Auditor assessment page 87, a) (our submission 1).

The auditors give an unjustified defensive reaction.
The auditors imply that a general conclusion cannot be factual. That is a fundamental mistake. I have given arguments in this submission, as well as further in the text, why the EIA report does not contain sufficient information to function as a basis for the justification of the potential environmental impacts of the project. I also gave a factual argumentation why this information needs to be contained in an EIA report. The fact that the auditors only formally refer to the Czech EIA law and not to the reason of existence of the EIA legislation illustrates my inference that the EIA is only carried out as a fulfilment of a bureaucratic obligation (an exercise for the sake of the exercise) and not to come to an enhanced quality of decisions. This formalistic approach of the auditors makes public participation and the EIA procedure a mockery.
The argument that the EIA documentation is comparable with other comparable EIA procedures in the EU does not hold either. First of all, several of the omissions in this EIA report do not occur in other EIA reports. As illustration, the EIA report on the Visaginas nuclear power project in Lithuania contains modelling calculations on the spread of radioactive substances (be it with a too low source term, as criticised by this author in his submission on that EIA report and confirmed by the Austrian submission on that report). Such calculations are not taken up in the EIA report for Temelín 3,4. Secondly, the insufficiency of comparable EIA reports in the EU is severely challenged exactly on the basis of the arguments I gave in my submission, but has so far never been tested in court. The argument that "we are allowed to deliver insufficient quality because others also do it" is qualitatively unholdable. The authors do in no way explain how a proper justification judgement can be made on the basis of the limited information given in the EIA report. Their reaction tries to divert the attention from the factual issues raised in my submissions.

The auditors write that *"Konstatování, že tento projekt nebude mít na životní prostředí žádný vliv, nevyplývá z posuzované dokumentace."* [The conclusion, that this project will not have any influence on the environment does not come forward from the documentation; translation JH]. It is shocking to see that the auditors obviously did not read the EIA documentation. I quote from page 521 from the Czech version of the EIA report the last sentence: *"Vlivem záměru tedy nedojde k poškozování životního prostředí ani veřejného zdraví."* [The influence of the project therefore does not lead to damage to the environment nor to the health of the general public; translation JH]. Instead of falling in a state of denial in reaction to constructive critique, the auditors should have reacted on the facts brought forward in my submission.

My conclusion therefore remains:

1. **By not providing all necessary information and coming to misleading conclusions, the report proves to be an insufficient basis for public participation as prescribed under the Aarhus Convention.**

Process

Auditor assessment page 88, b) (our submission 2).

The conclusion from the auditors that our submission is irrelevant is irrelevant in its content. Apart from the fact that in public participation, there are fundamentally no irrelevant concerns from the public.
The auditors confirm the facts given in our submission. Our conclusions that the prescribed way of publication of materials is a barrier rather than a support for public participation should be taken as

serious constructive input into the process. Falling back to bureaucratic procedural talk is not helpful to facilitate public participation and leaves the impression that the auditors are not interested in public participation but rather in fulfilling a bureaucratic exercise, as already stated in my submission number 1. I therefore remain with my conclusion that the presentation of material is procedural insufficient for a proper public participation procedure.

2. **Accessibility of the EIA documentation** – The EIA documentation was not easily available.

Auditor assessment page 88, c) (our submission 3).

If the auditors want to imply that the fact that German is one of the official languages of the EU means that the material should be translated in all 23 official languages of the EU, I would remark that that is a bit overdone. It is sufficient when the material is available in the own language, the languages explicitly requested by potentially affected countries under the Espoo Convention and the *de facto lingua franca* in the EU, English as the language on the basis of which also other citizens can participate in the process. The fact that only Austria and the Federal Republic of Germany expressed interest in participation in the EIA procedure does not exclude the right of other potentially impacted citizens in other countries to participate in the procedure as well. Both the Aarhus Convention and the Espoo Convention are very clear that discrimination on the basis of nationality, place of residence or citizenship is not allowed. For that reason, the use of the *de facto lingua franca* English in the EU is a logical demand. Translation into German was likewise logical, seen the large interest from Germany and Austria, but it is not, as the auditors claim, sufficient.

I therefore remain with my conclusion:

3. **Language** - the availability of an English version of all materials should be taken as a standard procedure.

Auditor assessment page 89, d) (our submission 4).

When the Czech law, as the auditors illustrate, is in breach with international law, it is international law that is decisive. There is no way that it can be made rationally acceptable to declare the in Czech law prescribed time of 30 days as sufficient, as required under the Aarhus Convention, for ordinary citizens to assess 24 kg of material, not even to assess the hundreds of pages of material that form the report itself.
However, as the auditors acknowledge, although in substance being in breach with the Aarhus Convention, even the Czech law opens the possibility to prolong the response time, as it says: *"K vyjádřením zaslaným po lhůtě **nemusí** úřad přihlížet."* [The authority **does not have to** take into account submissions that are received after the deadline; translation and highlighting by me, JH]. "Does not have to" (nemusí) does not explicitly exclude that the authority *can* take these submissions into account. This means that even under Czech law, there is no reason to refuse giving a longer response time to the public and with that bring the practice in line with the Aarhus Convention. The question is why the authority insisted and in this round of public consultation again insists in its communication on the 30 day deadline and does not explicitly make clear that submissions that are given later (and to which date) will also be taken into account – thus giving citizens a form of guarantee that their efforts to constructively participate in the procedure will not be in vain. It would have been more constructive, if the auditors had recommended a longer response time, for instance for this audit report, as well as steps to bring Czech legislation further in line with the Aarhus Convention.

Our conclusions therefore remain standing:

4. **Period for comments** – Public participation procedures shall include reasonable time-frames. The minimal time of 30 days is not a reasonable time. **We demand for this round of public consultation that lessons are learned from the earlier round and a minimum response time of 3 months will be granted to citizens for submissions on the auditor report.** We furthermore conclude that public participation in the earlier round was insufficient and in breach with the Aarhus Convention.

Content

Auditor assessment page 89, e) (our submission 5).

The auditors show here they have no idea what the word “transparency” means. Transparency does not mean “trust us that we have done our homework well” - and that is exactly what the auditors try to convince us of in their comment on our submission. What we argued is that it is impossible to find out which data come from which sources. Transparency means that citizens can see where specific information comes from and judge whether the sources are of sufficient quality and after that comparison can also add to the knowledge base with alternative sources and information.
For that, sources need to be indicated *in* the report with concrete foot- and/or end-notes, indicating the source including page and place.
The lack of understanding of the auditor team – and the consultant making the original report – what transparency means, makes our submission extremely relevant.

Our conclusion concerning sourcing of data therefore remains standing:

5. **Sources of data** – The report is sloppy in indicating the sources of data. Serious review by the public is hampered by this omission.

Auditor assessment page 89, f) (our submission 6).

The auditors refuse to take our submission seriously. Our submission gave more details under point 18 (point 6 being a more general conclusion), where we have brought forward concrete examples of sophisticated scenarios that show that realistic alternatives based on energy efficiency and renewable energy development are existing. In our point 6, we argued that the Czech energy strategy and the work of the Pačes Commission willingly excluded this option and that therefore no proper comparison is delivered concerning potential environmental impacts. The under point 18 mentioned studies show that a development away from nuclear power – i.e. a development without Temelín units 3 and 4 – is not only possible, but even in the middle long and long term cheaper, delivering more of the economic goals that the Czech government wants to reach (growth, employment, innovation, energy independence), and doing so faster than when Temelín units 3 and 4 are built.
Non-inclusion of these alternatives in the EIA therefore turn the report into a political document and not in a full set of information on the basis of which the quality of the decision concerning the construction of Temelín units 3 and 4 can be enhanced, or a justification can be made for environmental impacts including the project's emission foot-print (incl. CO_2), operational emissions of radioactive substances into the environment, the production of low-, mid- and high-level radioactive waste, the chance on emissions of large amounts of radioactive substances into the environment after a beyond-design accident, the influence on the hydrological situation in the surroundings, etc.. The claim that Temelín 3 and 4 will have less impact on the environment than alternatives cannot be substantiated, because a serious analysis of these alternatives is missing.

Our conclusion therefore remains standing:

6. **Alternatives to the project** – Although the report describes alternatives to the project by referring to the Czech energy strategy and the Pačes Commission, realistic alternatives focusing on energy efficiency and renewable energy development are missing.

Auditor assessment page 90, g) (our submission 7).

The authors again fall back on bureaucratic formalities to prevent having to take a submission into due account. They do not deliver any other arguments than a law-text and appear not to understand that public participation is not done to fulfil the law, but to enhance the quality of decisions (see the Aarhus Convention). Laws are instruments to help this process to take place. The legalistic formalistic approach of the auditors makes them unsuitable for auditing a process in which submissions from the public have to be taken into due account (according to Aarhus Convention art. 6(8)). It is furthermore already international practice that siting alternatives have to be taken into account in the Environmental Assessments, as is illustrated by the EIA for the Visaginas nuclear power station in Lithuania and the Strategic Environmental Assessment for the Polish Nuclear Energy Programme.

Therefore our conclusion remains standing:

7. **Alternative sites** – The report excludes any alternative siting of the project. By excluding these alternatives, it becomes impossible to judge whether the Temelín site is indeed the most optimal one.

Auditor assessment page 90, h) (our submission 8).

The auditors seem not to understand that each of the mentioned reactor designs has its own characteristics concerning the criteria mentioned in our submissions. Each of these differences will lead to impacts on the environment, e.g. concerning operational emissions of radioactive substances, potential source terms for different isotopes during a large beyond-design accident, but also different isotope-mixes in spent nuclear fuel and radioactive waste. On top of that, each of the designs has different safety characteristics that make different reactions necessary in emergency situations. Until today, none of the proposed designs is in operation anywhere in the world and all of them face specific regulatory challenges, which have even increased after the Fukushima catastrophe.
The auditors say only in general terms that extra information has been added in the annexes of the auditors report, but (typically!) refuse or forget to give a reference. For completeness sake, let's inform the auditors, that this information can be found in Annex 2.

Because there is insufficient time given to the public to react on the auditors report, we could not submit the claim from the auditors that in their report sufficient information has been provided to independent experts for counter-analysis. We therefore demand more time and also financial means for such an independent expertise. As things are standing now, the public has no possibility to analyse whether the claims of the auditors can stand up to scrutiny.

Because emissions in the case of a beyond-design accident have historically appeared to have severe consequences for the environment (see among others the accidents in Mayak, Windscale, Chernobyl, Fukushima), it is insufficient that a more detailed analysis is shifted to a later date when not all options for alternatives will be any longer open. Public participation to enhance the quality of decisions, according to the Aarhus Convention, has to take place in an early stage when all options are still open (art. 6(4)). It is not sufficient when this information is only given to the licensing and regulatory authorities without any form of public participation.

The lack of this type of information and the lack of time given to the public to analyse the available information furthermore stress the need for comparison with all relevant alternatives for the project. When those alternatives appear to be able to fulfil all the goals set for the project without this uncertainty, the relevant authorities should logically decide for the alternatives. We believe that this is the case for this project.

The conclusion from the auditors that the influence of the different types of reactors on the environment is positive is simply ridiculous and can not even be made on the basis of the insufficient information given in the EIA report. This includes the fact that alternatives have not been properly analysed as well as the fact that detail information from the different designs is lacking, respectively cannot be sufficiently analysed by the public because of lack of time.

Therefore, our conclusion on this issue is:

8. **Alternative designs** – The amount of information available from the designs in consideration appears to be to date insufficient to enable proper analysis. We demand more time to analyse the claim from the auditors that now sufficient information is available in the annexes of the auditors report (e.g. Annex 2) and to deliver input on these issues. In case it appears that the given information is not sufficient in detail, more information will have to be given to the public for consultation before the EIA can be closed.

INTERMEZZO: Now, on less than a fifth of the analysis of the auditor's reaction on our submissions, I am getting increasingly angry on the lack of competence on the side of the auditors in handling input from the public. My intermediate conclusion on this moment is that both the original consultants as well as the auditors try to create a smoke-screen with an over-dose of irrelevant or only half-relevant data in order to hide the fundamental holes in this entire EIA exercise: the lack of focus on issues that really have an impact on the environment and public health, the lack of useful comparison with alternatives in order to create the basis of enhanced quality decisions, and the complete lack of reverence for the public in this public consultation, i.e. an unacceptable tone of arrogance.

Auditor assessment page 91, i) (our submission 9).

The auditors appear not to understand the meaning of the phrase “when all options are open” in article 6(4) of the Aarhus Convention. When a decision is taken for the construction and operation of Temelín units 3 and 4, this means an irreversible decision for the mining of uranium, the production of fuel, the production of radioactive waste, and the future decommissioning of the installations. There will be no way back. Therefore the decision for the construction of Temelín units 3 and 4 inevitably and irreversibly also will lead to the environmental impacts in the front- and back-end.
Ergo, when public participation is to enhance the quality of the decisions relating to the potential environmental impacts, comparison needs to be made from the full chain with alternatives. Compartimentalisation as practised by the consultants responsible for the EIA report and defended by the auditors obscures this. Exclusion of these effects form partly the basis for the ridiculous final conclusion of the consultants and auditors that Temelín would have a relatively positive influence on the environment. We argue that this is fundamentally untrue, and we demand the promoter (ČEZ) and its consultants to deliver the information basis within the EIA to prove us wrong if they really believe we are. But the auditors accept the misleading strategy of compartimentalisation used by the consultants! With this they make themselves complicit to formalistic manipulation in order to reach a positive decision for the promoter in spite of a wealth of contrary information. They make from public participation not a tool to enhance the quality of decision making – as prescribed by the Aarhus

Convention, but a smoke-screen to hide interest-based instead of argument-based decision making. The emperor – the auditors – has no clothes!

Uranium mining: Only an uninformed child could think that if Temelín is built, this would not have effect for concrete uranium mining sites because the uranium is bought on the world market (some children believe that milk comes from a factory). The uranium on the market does not fall from the sky, but comes from concrete mines and there is sufficiently known about different prospects in uranium mining to make a basic analysis of environmental impacts. As one illustration out of many, one of these analyses has been made by the Dutch researcher Jan Willem Storm van Leeuwen[1], who comes to the conclusion that because of the decreasing availability of high-grade ore, CO_2 emissions of nuclear energy will soon start to sharply rise. This paper does not want to support Storm van Leeuwen's analyses in detail, but we want to point out that neither the consultants nor the auditors deliver any data or argumentation to start that debate for the Temelín project, even though uranium mining will be inevitably and irreversibly necessary when Temelín will be constructed.
The argumentation from the auditors that uranium mining should not be part of the EIA therefore is fundamentally flawed and is in our view only used to support the strategy of compartimentalisation of the EIA in order to avoid any reasonable comparison with reasonable alternatives.
The tactic of diversion by referring to an EIA for an oil-refinery is also flawed, because in case of construction of an oil-refinery today, availability of oil, sources and environmental footprint of the sourced oil would definitely have to be part of the EIA. For the same reason, the environmental footprint of nuclear fuel should be be part of the EIA for a nuclear power station.

Decommissioning: We want to thank the auditors of finally giving a halfway understandable reference to the EIA material. But the auditors do not seem to understand that the information given in the referred chapters is incomplete. For a considerable part of the radioactive waste produced during decommissioning, no solution is available and risk-reduction methods are currently only speculative. A qualitative and quantitative analysis of this situation should be included in the EIA in order to enable, for instance, comparison with the decommissioning impacts on the environment of a mix of energy efficiency and renewable energy methods delivering the same services.
The choice to use the law to argue for compartimentalisation of this part can only be conscious one, made in order to obscure open debate about full-chain comparison with reasonable alternatives. The law leaves sufficient space for interpretation, and on the basis of the Aarhus Convention, which gives as the ultimate goal of public participation the enhancement of quality of decisions, a comprehensive analysis instead of several compartimentalised ones, would be the logical interpretation. The insistence on compartimentalisation on the side of the auditors gives the impression that the auditors are not independent, but try to prevent at all cost that the project is compared to reasonable alternatives – thus undermining the goal of public participation as defined by the Aarhus Convention.

Spent fuel management: It is refreshing to see that the auditors finally have taken the effort to react on content. However, they are not able to come with a proper analysis, because they base their argumentation on pure speculation. They present a national plan for radioactive waste, that is not worked out for new radioactive waste, but for existing waste. This plan is based on technologies that have not been used anywhere in the world, are still in development (in Sweden, Finland, France and to a certain extent in Belgium and Switzerland), and whose actual functioning is still purely speculative. Then the auditors present a potential alternative in the form of fast breeder reactors, which is, given the state of development of fourth generation reactors, even more speculative. As a third alternative, they mention transmutation – we see a ladder of increasing technological speculation. I think it is sufficient to point out that Jules Verne had more engineering basis for the success of his speculative inventions than the auditors have for their current speculations. Yet, this extreme level of speculation is not acknowledged in their text! What they basically are saying is that Temelín 3 and 4 will produce

1 Among others: Storm van Leeuwen, Jan Willem, and Philip Smith, *Can Nuclear Power provide Energy for the Future; would it solve the CO_2-problem?* Delft (2004) publication by the author; http://www.stormsmith.nl

an extremely dangerous form of waste, for which it is not sure at all that a sufficient form of containment can be found to keep it sufficiently long out of the environment. It is one of the central qualitative questions of this EIA, whether the production of such waste should be allowed or not when there are viable and reasonable alternatives. For any other technology (the use of dangerous technologies or of toxic substances, for instance) the answer would be a resounding “NO!”

The argumentation that spent nuclear fuel (SNF) should not be considered as waste is a reprehensible diversion tactic. A tiny part of the SNF may be re-used in other applications (either as MOX or twice-through enriched uranium or in speculative new technologies) after reprocessing in extremely polluting and dangerous industrial processes. Fact is, that the uttermost majority of radiation content after use in Temelín units 3 and 4 remains in the form of high radioactive waste for which there is currently no solution nor any operational form of risk-reduction.
It is interesting to see that the auditors take several paragraphs to describe re-processing, but do not spend a single word on the environmental impacts of the re-processing process. They seem to be preoccupied with the glitzy technology in la Hague and Sellafield (and not with that in Krasnoyarsk and Mayak? Why?), but blind for the dirty side of those installations.
The auditors furthermore make the mistake of mixing legal prescriptions with reality on the ground. A legal prescription for risk-reduction of radioactive waste is a wish, not an engineering reality. However, when Temelín 3 and 4 produce radioactive waste, this waste *is* an engineering reality and something needs to be done with it, no matter what, for the time that it is needed – or rather, for the time that there will be control over it. For low- and mid-level radioactive waste, control and guarding are necessary for around 300 years. Even the auditors should know that it is impossible to guarantee this. For high-level waste we talk about periods of hundreds of thousands of years...
Short: law is a wish, reality is inevitable and on such long time-scales inevitably messy. The use of law-texts as argumentation therefore is fatally irrelevant.
The most beautiful illustration of this is probably the sentence: *“S veškerým vyhořelým jaderným palivem a radioaktivními odpady bude zacházeno v rámci platné legislativy a činnost bude kontrolována dozornými orgány.”* [All spent nuclear fuel and radioactive waste will be managed in the framework of the valid legislation and this will be overseen by the regulatory authorities; translation JH]. Looking at Czech history, this would be an interesting statement for an activity that would span one or two decades. But if we compare this sentence with the need for implied political, legal and regulatory stability for 300 or even 300 000 years, it is easy to see that the auditors are completely out of touch with reality.

The reference to WIPP is irrelevant. WIPP is a tiny installation in comparison with what will be needed for the high-level waste coming from Temelín units 3 and 4, and it is built for waste with a completely different constitution. Apart from that, there is very little known in public about the facility, as it is a military one.

It is factually wrong to state that Finland, Japan, the USA, France and Switzerland have operating deep storage places, and for Germany and Sweden, this is only true for low-level and to some degree for mid-level waste. The Swedish project is in an early stage, and the experiences with the German facilities (Asse II and Morsleben) are far from hope-giving. Both facilities have to be saved from collapse and most likely all stored waste has to be completely recuperated at the cost of many Billions to potentially tens of Billions of Euros and alternative storage needs to be found. If we talk about high-level waste, no country has any final storage facility. Finland, Sweden and France target to bring such a facility into operation before 2025, but are all currently facing regulatory and safety hurdles that may well appear unsolvable. Betting on these technologies therefore is nothing less than speculation, as already pointed out above.

Mentioning temporary storage is a diversion from the issue brought forward in our submission. Temporary storage is based on hope – hope that next generations will find a way to deal with a problem we caused – or in the case of Temelín units 3 and 4 are now deciding to cause or not – and

for which we are unable to find a solution. It is simply a disgusting way of saddling next generations with a deadly legacy.

Storage. Until a final risk-reduction method has been found, spent nuclear fuel will be stored in a new storage on the Temelín site. It is striking to see that – as far as the limited time to go through the audit-material allowed me to conclude – no lessons from Fukushima, nor from 9/11 have been learned for this issue in the Temelín project. I see no analysis of whether the temporary storage will be able to withstand malevolent attack, including with a large passenger airplane, charged heads and military explosives. I see no analysis whether the temporary storage will be able to withstand freak-weather and other natural disasters. I see insufficient analysis of seismic resistance.
Storage for 10 years in wet pools should after Fukushima be reconsidered and plans should be developed to reduce that time and bring SNF faster into dry storage. Fukushima clearly defined the need for active cooling as a large risk.

The fact that in Finland and Lithuania the EIAs also don't address these issues sufficiently, is no excuse for making the same mistakes here. If your neighbour steals, it does not give you permission to steal. For me it is sufficient to say that Greenpeace has highlighted the same critique at least in Lithuania and Finland.

Concluding, our submission is still standing:

9. **Lack of analysis of full chain impacts** – The lack of detail information about the environmental impacts of the front-end (uranium mining, fuel production) and back-end (waste processing and decommissioning) is unacceptable. Compartimentalisation is likewise unacceptable.

Auditor assessment page 96, i) (our submission 10).

The auditors divert from the submission. On top of that, also Fukushima has shown that we do have to count with source terms that are higher than foreseen, and that the impacts are concrete and considerable. Whether there were lessons learned from Chernobyl or not, whether the far too optimistic analyses stipulate that a melt-down resulting in release of part of the radioactive content can only happen once every 10.000 (reactor!) years or once every 100.000, reality is that we currently have had one such an accident every decade – that is with the current amount of reactor years roughly a factor 10 more often than predicted. And the results of each melt-down are devastating the lives and livelihoods of far too many people. That neither the promoter, nor the consultants, nor the auditors want to face these facts virtually disqualifies them from the debate about potential environmental impacts of a new nuclear power project.
The statement from the auditor that the in the report indicated dose-rate-limits will not be breached even in the case of the crash of a large passenger airplane are on engineering grounds as credible as the statement from TEPCO that a large tsunami could never hit Fukushima Daiichi or Fukushima Daini. Nuclear engineering analyst John Large made for Greenpeace an analysis of the potential effects of a large airplane crash on an EPR design reactor, which defies the claim from both the consultants and the auditors.[2]
We therefore contest the competence of the auditor to judge whether the given source term estimates are conservative or not. For more detail analysis on this issue, we refer to the submissions from the Federal Republic of Austria.

2 Large, John, Demarche de Dimensionnement des Ouvrages EPR Vis-À-Vis du Risque lie aux Chutes d'Avions Civils - Assessment of the Operational Risks and Hazards of the EPR when Subject to Aircraft Crash, London (2006) Joh Large and Associates / Greenpeace International; http://www.greenpeace.org/international/Global/international/planet-2/report/2006/6/assessment-of-the-operational.pdf

We therefore maintain that our conclusions is still standing:

10. Source term beyond design accident underestimated

Auditor assessment page 98, k) (our submission 11).

The translation of this paragraph is poor. “Hollow” does not mean “false”, but rather that there is no argumentative basis for it.
The auditors again hide themselves behind bureaucratic formalism and refuse to assess the submission on its content merit. The law does not exclude the possibility to include the economic factor in the assessment and for the enhancement of the quality of the upcoming decision, as well as for the question of justification of environmental impacts, we have argued that the economic factor is of crucial importance. Indeed, without including the economic factor, the entire EIA lacks crucial information for any meaningful quality decision and becomes an empty bureaucratic exercise for the sake of itself. Which is maybe what both the consultants and the auditors wish they were doing, but it is in breach with the Aarhus Convention and the spirit of the EU EIA Directive and the Czech EIA law.
The parts from the EIA report quoted by the auditors illustrate in themselves the complete inadequacy of the economic analysis given and need no further comment from this side. Suffice to remind that under normal economic (liberalised market) circumstances the last nuclear power construction projects started in Europe would have been impossible (Temelín units 1 and 2, Olkiluoto 3 and Flamanville 3). Furthermore, recently, the majority of the most progressed plans for new nuclear power stations collapsed under the economic pressure (Belene, Borssele 2, the Horizon projects in the UK), face ongoing delays (Cernavoda 3,4, Visaginas), or are vying for unprecedented financial support measures that will seriously distort the electricity market (the UK's EdF projects).

Our conclusion therefore remains standing:

11. **Cost and economy** – The report does not include any information on costs and economic parameters that would enable proper comparison between different alternatives.

Auditor assessment page 99, l) (our submission 12).

Translation again is poor: *reálný* is not the same as *realistický*.

It completely boggles me how the auditors can seriously write that according to the law, the EIA needs to provide the information for the [investment] decision on the basis of which it can lead to sustainable development of society, and then conclude that therefore the economic side of the project does not have to be analysed. Maybe the auditors should be advised to take a beginners course in sustainable development at the Charles University or the Masaryk University.
Apart from this, nuclear power, because of its unsolvable waste problem, it's multi-generation threatening rest-risk, its potential for proliferation of nuclear weapons, its environmentally devastating mining practices and many other reasons, does per definition not belong to sustainable development of society.
It is refreshing to see, that the auditors confirm our conclusions, that it is possible (and given the experiences of other projects mentioned by us before, we argue that it is even likely) that prices and construction times will increase.

Our conclusions therefore remains:

12. **Realism of the project** – The report does not analyse whether the project is at all realistic.

Auditor assessment page 99, m) (our submission 13).

The formalistic approach of the auditors seems to have made them blind for the gap that exists between the legal requirement of the use of ALARA as basis for safety-in-depth and the claim from the nuclear industry and the European Union[3] to target for the highest level of safety. The fact that the legal use of BAT explicitly excludes radioactive risks (thanks for researching this!) illustrates this intolerable exclusive position of nuclear power in the social-political debate. The nuclear industry allows itself lee-way with multi-generation threatening radioactive risks that are not acceptable in the chemical industry or civil engineering.
The claim that the proposed reactor designs pose BAT is only true in the limited scope of the promoter and the auditors, but not on the level of the overall project, which is to provide the Czech Republic (or given the large likelihood of export of a large part of the electricity, the EU) with energy services. Best Available Technology for that purpose has to be found in a combination of sustainable energy technologies like energy efficiency, renewable energy generation resources and intelligent grid-solutions.
We thank the auditors for their honesty in stating that also the modern BWR designs have a higher nuclear risk. We will pass this information to the Lithuanian authorities, who have recently chosen the Hitachi – GE ABWR design.

Nevertheless, our conclusions concerning the dangers of basing nuclear development on ALARA remains standing:

13. **ALARA** – The use of ALARA, and especially the use of the word "reasonable" is contested because it opens the door to cutting edges where nuclear safety is concerned on the basis of costs. In other fields, especially chemistry, the Precautionary Principle and the principles of Best Available Technology (BAT) and Best Regulatory Practice (BRP) are used. On the basis of these principles, the project would look completely different.

Auditor assessment page 100, n) (our submission 14).

The auditors refer to the insufficient attention given to airplane crash, when we were talking about malevolent attack. It has to be made clear, that malevolent attacks can have a myriad of forms, including the use of aircraft, but also the use of weapons (charged heads, bunker-busters), internal sabotage, cyber-attacks, etc. The report should at least explicitly mention that nuclear power stations are vulnerable to malevolent attack, and that large emissions of radioactivity, comparable to what we have seen in Chernobyl and Fukushima, cannot be excluded for that reason. This conclusion was clearly drawn in the consensus report of the German Ethics Commission – a panel of experts spanning the full spectrum from pro- to anti-nuclear.[4] On that basis, a comparison should be made with realistic alternatives like an energy policy based on energy efficiency and renewable energy sources.

With their response, the auditors confirm our conclusion:

3 European Council, Conclusions 24/25 March 2011; www.consilium.europa.eu/uedocs/cms_data/docs/.../120296.pdf

4 Ethics Commission for a Safe Energy Supply, *Germany's energy transition - A collective project for the future*, Berlin (2011) Bundesministerium für Umweltschutz; http://www.bmu.de/english/transformation_of_the_energy_system/doc/48311.php

14. **Malevolent attack** – The authors refuse to properly address the issue of malevolent attack on the reactors as well as on high-level radioactive waste and spent nuclear fuel storage, transports and management facilities.

Auditor assessment page 101, o) (our submission 15).

The fact that there are also other formal procedures that need to be fulfilled before the construction of Temelín units 3 and 4 start is no argument for delivering insufficient information in the EIA procedure.

Under the Aarhus Convention, potential complex causes for emergency situations need to be part of the public participation procedure, because these could result in large emissions of radioactive substances. In the Czech Republic, only the EIA procedure gives all potentially impacted citizens the right to be consulted, and therefore these complex causes need to be part of the assessment.

Given the fact that the operator of Temelín ČEZ[5] and the Czech nuclear regulator SÚJB[6] were not even capable of considering multi-installation failure within their post-Fukushima stress tests, we do not expect this omission to be repaired in procedures described by the auditors.

Our conclusion therefore remains:

15. The report does not analyse the additional risks to the operation of Temelin 1 and 2 during construction of the new blocks, nor the additional risks to the operation of Temelin 3 and 4 during decommissioning of Temelin 1 and 2.

Auditor assessment page 102, p) (our submission 16).

We thank the auditors for conceding that the influence of accidents on personnel is not considered in the report. Given the fact that the influence of large accidents on workers and personnel in the plant can have large consequences for potential emissions of radioactive substances into the environment, this issue should, according the Aarhus Convention, be included in public participation in an early stage when all options are open. The only such public consultation in the Czech Republic takes place within the EIA procedure, ergo, this information should be included in this report and not in a later procedure.

We therefore remain with our conclusion:

16. There is no description whatsoever of the effects of a design based or beyond design accident on the personnel of the power station.

5 ČEZ, *Stress tests of nuclear power plants – ČEZ, a.s. Evaluation of Nuclear Safety and Safety Margins of Temelín NPP (on the background of events at the Fukushima NPP)*, Prague (2011); http://www.cez.cz/edee/content/file/pro-media-2012/02-unor/final-report-st-ete.pdf

6 SÚJB, National Report on „Stress Tests“ - NPP Dukovany and NPP Temelín - Czech Republic - Evaluation of Safety and Safety Margins in the light of the accident of the NPP Fukushima, Prague (2012); http://www.ensreg.eu/node/369

CONLCUSION

On the basis of the defensive and low-quality assessment made by the auditors SOM s.r.o and Eco-Envi Consult, there is no reason for me to change my final conclusion:

Concluding, I strongly recommend that the EIA report be dismissed by the Czech Ministry of Environment as insufficient and inadequate and that ČEZ be ordered to carry out a new EIA of sufficient quality.

In case this recommendation is not followed, it is very likely that I will recommend Greenpeace to take legal steps against a final approval of the EIA report, in which we will seek annulment of such a decision. This right that is guaranteed under the Aarhus Convention article 9.

DETAIL COMMENTS

As the time for commenting the auditing report is far too little, I am not in the position to comment all auditor reactions in sufficient detail. I am willing to do so, when the response time will be, like legally required, extended to a reasonable period of minimally 3 months.

It is sufficient to conclude here, that the quality of the auditor responses on our detail submissions is not any higher than on the more general remarks and that for that reason our conclusions remain standing. Concerning information sources, the auditors repeat the behaviour of the consultants by cherry-picking information that fits in their world view (cheap nuclear, sufficient uranium resources, low safety risk), and omit a broader assessment of literature, including more critical assessments. We have brought forward such sources, but the auditors continue the trend of dismissing them.

Also in response to our detail submissions, the auditors hide behind irrelevant bureaucratic formalities in order to avoid having to respond to genuine concerns. They dismiss factual submissions as “subjective”, in the mean time not being open about their own bias against any critique on the Temelín project. The use of the clearly pejoratively used term “subjective” can only be characterised as an unsubstantiated attempt to marginalise public input. The abuse of the term “irrelevant” appears in the same way. It has to made clear: there are no irrelevant concerns in a public participation exercise, there are only irrelevant responses, and these can be found throughout the auditors' assessment.

Important is also to conclude, that the auditors, like the consultants writing the EIA report, refuse to take important relevant alternatives to the project into account and with that break the requirement that public participation has to take place in an early stage when all options are open – and this should include the zero-option for the project. Dismissing concrete and in detail prepared alternatives to the project as “irrelevant to the EIA process”[7] disqualifies the auditors as either incompetent or biased.
A final remark from the auditors that over a 100 experts have worked on the EIA report, shows that the auditors do not understand the dynamic of public participation. On the basis of the data available in this audit, I estimate that over 10 000 people must have been involved in commenting the EIA report, and the very large majority of them critically. The auditors, however, instead of giving an independent assessment of these submissions, chose to side with the consultants and promoter and with that delivered an arrogant and completely biased result.

7 Page 104 of the auditors report

To put the facts stated by the auditors concerning the nuclear developments in Europe into perspective, it is important to notice that Bulgaria recently cancelled its planned nuclear project (Belene), that RWE and E.On withdrew their interest from the Horizon consortium that was to be responsible for half of the planned new nuclear projects in the UK, that Romania had to prolong the tender for strategic investor for the Cernavoda 3,4 project because it could not find any investors and that Lithuania indeed signed a contract with Hitachi-GE, without, however, gotten anywhere nearer to finding strategic investors itself.

Concerning the qualification of the promoter of the project (auditor report page 110 point bb), our submission 27), I want to rectify the statement from the auditor. The Czech court system has not been involved in assessing the mentioned case of an alleged illegal welding repair in Temelín unit 1. It has merely been involved in the request for access to information to report 15/2001, which allegedly confirms the claim of a whistleblower in this case. Unfortunately, the public has not been granted access to this information, even though this refusal of access is in breach with the Aarhus Convention because of the public interest involved.
On top of that, none of the published information by SÚJB, including that mentioned by the auditors, deals with the by the whistleblower indicated weld 1-4-5, with the exception of one mentioning in a table of surface measurements. This case clearly illustrates the lack of qualification of both the promoter ČEZ, as also the Czech regulatory system to adequately deal with issues involving nuclear safety when large economic interests are at stake.

For completeness sake, I have added our detail concerns in an attachment to this reaction on the auditors. As the auditors have not been able to address them satisfactorily, they are to be taken into due account, following art. 6(8) of the Aarhus Convention.

ANNEX I – Detail Comments on the EIA report

Detail comments use the page numbering of the Czech version of the EIA report.

17. Page 80: The project is characterised as an ecologically clean form of electricity production. This is factually wrong. Nuclear power creates highly dangerous wastes that have to be kept out of the environment for periods of up to a million years and no technologies currently have been proven to be able to meet that challenge. Decommissioning of nuclear installations has to be done not by the generation benefiting from its output but by a next generation. Nuclear reactors all have a rest-risk on a large beyond design accident with ecologically catastrophic consequences. Nuclear power needs nuclear fuel derived from uranium mining – a highly polluting activity, as a recent Greenpeace study on uranium mining in Niger is amply illustrating.[8] The huge legacy passed to next generations excludes nuclear power from falling under any definition of sustainability.[9]
    The above mentioned remarks show that the authors have insufficient knowledge about potential negative effects of nuclear power generation on the environment. This fundamentally disqualifies them from carrying out an Environmental Impact Assessment.

18. The authors claim that other sources, including renewable energy sources, cannot cover the demand for electricity in the Czech Republic. They do so without any reference to proper analysis. In contrary, several recent scenario's show that it is possible to cover almost the entire energy demand in the EU, including the Czech Republic, in 2050 with renewable energy sources, and as part of that 100% of the electricity demand. One of them, with lead consultancy McKinsey[10], prepared for the European Climate Foundation (ECF), was even prepared in cooperation with the promoter of Temelín, ČEZ! Recent studies from Price-Waterhouse-Coopers[11], and Greenpeace and the European Renewable Energy Council (EREC)[12] illustrate that the 100% renewable pathway is indeed possible and from economic and environmental point of view the most beneficial one. Another study by the Stockholm Environment Institute[13] shows that an EU climate target of 40% emission reductions for 2020 – the year that Temelin 3,4 should deliver electricity to the grid – can be reached without new nuclear being installed. A coalition of Czech NGOs

8 Andrea A. Dixon (ed.), *Left in the dust; AREVA's radioactive legacy in the desert towns of Niger,* Amsterdam (2010) Greenpeace; http://www.greenpeace.org/international/en/publications/reports/Left-in-the-dust/

9 The widest used definition of sustainability comes from the World Commission on Environment and Development in its 1987 report "Our Common Future", also knows as the Brundtland Report: *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"*. It is widely accepted that the large economic and possibly environmental impact of decommissioning and radioactive waste management for future generations negatively impacts their ability to meet their own needs.

10 McKinsey & Company, KEMA, The Energy Futures Lab at Imperial College London, Oxford Economics and the ECF, *Roadmap 2050 - a practical guide to a prosperous, low-carbon Europe,* Berlin (2010) European Climate Foundation; http://www.roadmap2050.eu/downloads

11 Price-Waterhouse-Coopers, PIK, IIASA, ECF, *100% renewable electricity; A roadmap to 2050 for Europe and North Africa*, London (2010) Price-Waterhouse-Coopers; http://www.pwc.co.uk/eng/publications/100_percent_renewable_electricity.html

12 Sven Teske (ed.), *energy [r]evolution - towards a fully renewable energy supply in the EU 27*, Brussels (2010) Greenpeace / EREC; http://www.greenpeace.org/eu-unit/press-centre/reports/EU-Energy-%28R%29-evolution-scenario

13 Charles Heaps, Peter Erickson, Sivan Kartha, Eric Kemp-Benedict, *Europe's Share of the Climate Challenge - Domestic Actions and International Obligations to Protect the Planet*, Stockholm (2009) Stockholm Environment Institute; http://www.sei-international.org/publications?pid=1318

commissioned in 2009 the German Wuppertal Institute with a study that shows that the Czech Republic falls completely within this trend.[14]

19. The authors quote an electricity demand in the Czech Republic for 2009 of 69 TWh. They predict a demand of 96 TWh/yr in 2030.
The authors do not give the source of their numbers. The prediction for 2030 has to be characterised as on the very high side.
The European grid regulator entso-e gives for 2009 other numbers.[15] Consumption for the Czech Republic was in that year 61,6 TWh. But next to that, the authors fail to mention that electricity production in the Czech Republic in 2009 was according to entso-e 76 TWh. The Czech Republic exported according entso-e in 2009 a total of 13,6 TWh! This is more than the total output of the Temelín units 1 and 2 in 2009, which reached a record level of 13,3 TWh.[16] This illustrates that Temelín is not necessary to cover Czech demand, but rather to enable ČEZ to export electricity to a market that can easily do without, as already explained above.

20. The points above mean that the whole premise for justification of this ecologically dirty energy source is completely wrong. **Temelín 3 and 4 are not needed to meet future electricity demand.**

21. The authors refer to the scenarios worked out by the Pačes Commission and in their description already illustrate the largest error in the work of this Commission. The Commission excluded a scenario based on targeted energy efficiency policies and the development of renewable energy sources as described in the scenarios of Price-Waterhouse-Coopers, McKinsey, the Stockholm Environment Institute, Greenpeace / EREC and the Wuppertal Institute mentioned under point 18. This clearly demonstrated that the Pačes Commission was biased in favour of the promoter of the Temelín nuclear power station, ČEZ, and its report therefore cannot be used as sole basis for an EIA justification.

22. In its analysis on page 82 of the development of available fuels in the Czech Republic, the authors strangely enough fail to include nuclear fuel. There are widely differing estimates about the availability of uranium resources in the coming decades, but most importantly, uranium imports will make the Czech Republic depending on 1. the fuel producer and 2. the country of origin of uranium. The fuel producer will likely be linked to the constructor of the reactor, which means Areva, Westinghouse, GE / Hitachi or Rosatom / TVEL. Although uranium fuel for European reactors used to come largely from relatively stable political countries like Australia, Canada and the US (though political stability is difficult to predict over the 60 year life time of new reactors), uranium now increasingly comes from politically highly unstable countries like Kazahstan, Niger and Namibia. This trend is likely to continue. With that, uranium fuel availability is at least as complex an issue as the availability of the other fuels described, with the exception of fuel for renewable energy sources outside of biomass.

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14 Stefan Lechtenböhmer, Magdolna Prantner, Sascha Samadi, *Development of Alternative Energy & Climate Scenarios for the Czech Republic*, Wuppertal (2009) Wuppertal Institute for Climate, Environment and Energy

Karel Polanecký e.a., *Chytrá energie - Konkrétní plán ekologických organizací, jak zelené inovace a nová odvětví mohou postupně proměnit energetický metabolismus české ekonomiky – a srazit znečištění, dovoz paliv i účty za energii*, Praha (2010) Hnuti Duha, Greenpeace, Veronica, Calla, CDE
http://hnutiduha.cz/uploads/media/chytra_energie.pdf

15 https://www.entsoe.eu/index.php?id=91

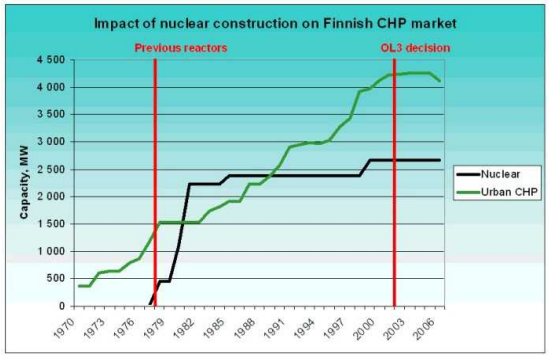
16 http://www.praguemonitor.com/2010/07/20/temel%C3%ADn-generates-100m-mwh-energy-ten-years

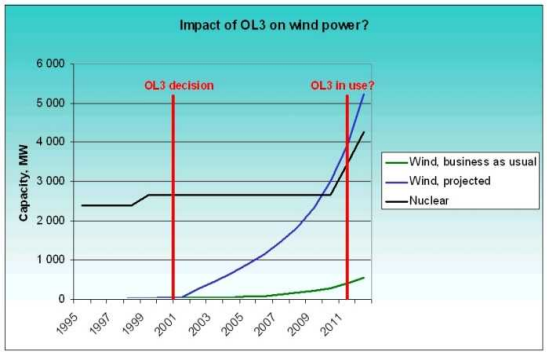
23. The authors claim to give on page 83 an international comparison of nuclear energy development, but fail to come with any. Currently, only Finland, France and Slovakia are building new nuclear reactors in the EU. Finland and France are facing enormous time and budget overruns as well as a myriad of unexpected nuclear safety related issues with their EPR reactors. Slovakia faces financing problems, and builds two completely outdated VVER 440/213 reactors in Mochovce. Over the last decade, the amount of nuclear energy in the EU 27 electricity mix has slowly but steadily decreased and it is because of high construction costs and technical problems likely that that trend continues. The plans for new nuclear power stations at Temelín go against that trend.

24. The authors claim that the construction of Temelín 3 and 4 would be in line with the European climate targets for 2020. This is not true. For the construction of these blocks, the Czech Republic will need to use an enormous amount of fossil fuels that will increase its CO_2 emissions. If all will go according to planning, and that is in the nuclear sector a very big "if", Temelín 3 and 4 might deliver their first electricity in 2020. This means, however, that Temelín 3 and 4 will have added considerably to the CO_2 emissions from the Czech Republic in the term up to 2020.
    It has to be pointed out here, that according to the International Panel on Climate Change, greenhouse gas emissions would need to peak around 2015 if we want to have a reasonable chance to maintain temperature rise this century under 2° C.
    When the Czech Republic follows a similar trend as Finland, it will see because of the construction of Temelín 3 and 4 a slump in the development of energy efficiency and of renewable energy sources that would (per kWh delivered) emit less CO_2 than Temelín.[17] Out of all options, a combination of energy efficiency and renewable energy sources is the most likely to be able to deliver the greenhouse gas emission peak in 2015.
    Depending on the development of the uranium market, the CO_2 emissions of Temelín 3 and 4 could reach after 2020 levels that could go as high as 112 gCO_2/kWh, which is a factor 2 to 5 more than renewable energy sources.[18]
    The construction of Temelín 3 and 4 therefore can in no way be seen as part of climate protection, but rather aggravates the situation. This apart from the other unsolved problems that nuclear power brings about, including nuclear waste, costs, technological and fuel dependency, ongoing radioactive emissions and rest-risk of a nuclear accident, including from terrorist threat.

25. Because the authors have not included studies based on increased energy efficiency and the development of renewable energy sources in their comparison, the given analysis of electricity prices is inadequate. The scenarios mentioned under point 18 that are based on an environmentally sustainable development of the electricity sector, all come in the long term with comparable or better final costs for the delivered services than scenarios including nuclear power.

17 Although Finland has a large potential for CHP and wind energy, investments in both have virtually halted because of the construction of new nuclear capacity in Finland. (Source: Greenpeace Finland)





18 Benjamin K. Sovacool, Valuing the greenhouse gas emissions from nuclear power: A critical survey, Energy Policy 36 (2008) 21940 – 2953, Elsevier

26. A similar error appears in the description of environmental impacts. Because an environmentally sustainable scenario is not included, the authors conclude with a self-fulling bias towards nuclear energy.

27. Page 87 – The qualification of the promoter. Greenpeace published in 2001 and 2002 findings from whistleblower information according to which a vital welding repair error in Temelín block 1 made in 1994 under responsibility of subcontractor Modranská potrubní and main contractor Škoda a.s. was hidden with support from SÚJB.[19] Greenpeace currently still has a case running for the Constitutional Court in Brno to gain access to SÚJB inspection report 15/2001 that contains the results of the inspectorate's investigation into the whistleblower allegations.
    It is not clear to Greenpeace which role the operator ČEZ has played in wiping this issue under the carpet, but its qualification to run a nuclear power plant safely cannot be fully accepted until this issue is completely clarified.

28. Page 89 – The authors claim they have looked at the experiences with reactors of Generation III that have recently been taken into operation. This only concerns the two ABWR reactors in Kashiwazaki-Kariwa, Japan and the AES-91 nuclear power station in Tianwan in China. However, these reactor types are not under consideration for Temelín. From the designs considered for Temelín, there are only projects under construction in China, Finland, France, India and Russia. From those, only the EPRs in Finland and France have a more or less similar economical, infrastructural and regulatory environment as the Czech Republic. The tiny amount of Generation III projects on their way so far make the authors' claim statistically irrelevant. It is to be expected that the promoter will face a difficult learning curve during the implementation of a similar project in the Czech Republic, including comparable time delays and budget increases as seen in Finland and France.
    It is too early to speak of construction of an AP1000 in the United States, as no final construction permit has been handed out yet.

29. The different types of reactors taken into consideration for the Temelín 3,4 project do have different characteristics that will lead in concrete cases to different influences on the environment, both in regular operation (including fuel production, operational emissions, cooling water characteristics, waste and spent nuclear fuel characteristics) as during different accident scenarios. Because none of the mentioned reactors has any operational experience, estimates of impacts on the environment are still very sketchy, as was shown during the EIA for the Visaginas NPP in Lithuania in 2008. Greenpeace stated there in its submission: *"This leads to lack of concreteness and detail throughout the report – e.g. production of high-level nuclear waste is reported as ranging from 47 to 370 tons per annum, a range of almost an order of magnitude for maybe the most serious environmental impact of the project! The same staggering lack of detail is evident in the assessment of nuclear safety. In effect, the company is asking for a* carte blanche *to build any installation they please, and in so doing devaluating the whole EIA process. There needs to be a design-by-design analysis of main environmental impacts and nuclear safety measures."*
    The same argumentation holds for this EIA report.
    It therefore must be concluded, that the law may allow for an EIA in this stage, but that the promoter is not drawing the consequence of working out a detail EIA for each of the proposed designs. **The EIA report therefore is insufficient**.

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19 Jiří Tutter, Jan Haverkamp, *Tajná oprava svaru potrubí primárního okruhu s reaktorovou nádobou na 1. bloku jaderné elektrárny Temelí*, Prague (2001) Greenpeace; http://old.greenpeace.cz/archiv/faktax.pdf

Jiří Tutter, Jan Haverkamp, *The Risks of Škoda - Unsettling facts on the Temelín Nuclear Power Plant concerning faulty welding work and documentation in Temelín block 1 - Fact sheet, version 5.02*, Prague (2006) Greenpeace; http://www.wisebrno.cz/dokument.php?id=51

30. On page 90, the authors state that whatever design is chosen, the legal limits will need to be kept. This may be true, but the fact that there are legal limits does not automatically preclude that they could be broken once a reactor is in operation, based on the realities of the design and day. The in point 27 mentioned case of the faulty Temelín block 1 welding repair illustrates how difficult it is to stop a reactor once it is build, even if legal prescriptions were broken. Secondly, an EIA report, as argued in the general part of this submission, is a tool to justify the environmental impacts of the finally chosen option. In this situation it is not only important to know whether all options fall within the legal limits. It is even more relevant to know what the differences between the various options are in order to make a proper choice. Those options need to include different alternative ways to meet the social and economic needs, different locations as well as the different designs.

31. In its description of the availability of uranium in the Czech Republic, the author does not in any way analyse the bad experiences within the Czech Republic and neighbouring Eastern Germany uranium mining. The exercise of listing resources becomes with that a distorted picture of reality. Germany had to re-cultivate the legacy of the Wismut uranium mining with a decades long effort consuming tens of Billions of Euros. The Czech Republic has not even been able to start re-cultivation properly for its historical and current uranium mining.

32. The analysis of in-country fuel supplies is very limited. The Czech Republic is part of a global market in commodities and fuel independence is not so much dictated by possible sources in the own country, which are in most cases not economically competitive anyway, certainly not when all responsibilities concerning re-cultivation would be taken seriously. Energy dependence is determined by the degree of diversification of economically viable sources and political stability in the regions from where these resources are coming. Such a market analysis is completely lacking.

    The authors' 20st century nationalist view on energy dependence is responsible for the simply ridiculous notion that coal supplies would run out earlier than uranium supplies.
    Only renewable energy sources and energy efficiency can deliver complete fuel independence, and scenarios that look more seriously at those options show that real fuel independence also goes hand in hand with significant savings in costs. The question re-appears: why did neither the Czech government, nor the Pačes Commission nor the promoter look into realistic scenarios based on a 100% renewable energy future? The conclusion from my analysis from the report of the Pačes Commission and this EIA report is that the development of nuclear energy is an ex-ante input – and absolutely not a conclusion from the analysis. I challenge the promoter to let go of this ideological paradigm and indeed include alternatives based on energy efficiency and renewable energy development into the comparison.

33. After page 103, the authors include information about nuclear energy that is diverting the attention from the project. There is no chance that Temelín will host a reactor that will use Thorium, nor is it likely that it will produce hydrogen. Apart from these techniques still being highly speculative and unproven in a functioning market environment, they divert the attention from the challenges that new reactors in Temelín are posing.

34. Page 108 – Comparison of CO_2 emissions. It is unclear what the sources are for these numbers. Based on a comparison 103 lifecycle studies, Sovacool[20] comes to a range between 1,4 gCO_2eq/kWh to 288 gCO_2eq/kWh with a mean value of 66 gCO_2eq/kWh. Can it be, that the authors have left out higher ranges of data?

35. Zero option. The authors do not take into account that the formerly for two more blocks foreseen space in Temelín in the mean time has gotten a new function as recreational and nature area. Nor

20 Benjamin K. Sovacool, Valuing the greenhouse gas emissions from nuclear power: A critical survey, Energy Policy 36 (2008) 21940 – 2953, Elsevier

do they acknowledge that these areas had an agricultural and village function before Temelín was chosen by the former regime as location for large industrial development. In describing the zero variant, these issues should also be taken into account. Temelín has a history[21], and it has a today.

36. On page 109, the authors state: *"Vlivy dalších zdrojů, které by zajišťovaly náhradní výkon za záměr, však zachází za rámec této dokumentace a jsou diskutovány pouze obecně."* This is not sufficient. The EIA is not there to dish up 24 kilograms of description for the sake of description, but in order to give a justification for the impacts on the environment caused by the planned project. This justification can only be made when a serious comparison is made with alternative options. As we have argued above, the authors, as well as previous Czech governments and the Pačes Commission have left out important alternatives, which cause an ideologically based bias in the decision process towards nuclear energy and coal. Without an in-depth comparison between the impacts of the planned project and the potential impacts of a zero-variant with other options to meet the service demands, the EIA looses its sense. We therefore call for a more in-depth comparison of scenarios including the planned project with scenarios excluding it – including a scenario based on development of energy efficiency and renewable energy sources.

37. Page 129 – **Malevolent attack**. The authors state that: *"Primární ochrana proti úmyslným útokům (nejen za použití letadla) je v odpovědnosti státu."* (The primary protection against malevolent attack (not only by the use of an aeroplane) is in the responsibility of the state). In the framework of an Environmental Impact Assessment, this is a debatable statement. In comparison with other ways to meet the demand for energy services, especially in comparison with energy efficiency and renewable energy sources, nuclear power stations add in this respect a unique risk. The possible emissions from such an event should be taken into account in the justification process for the possible environmental impacts of the project. Trying to divert the responsibility for this inherent problem with nuclear power to the state is an attempt to avoid taking this problem into account from the side of the promoter. It is the promoter who decides to develop this portfolio of generation sources, it is the promoter who has also alternatives, it is therefore the promoter who in this planning stage bears the responsibility for taking this risk or not.
    Given the fact that nuclear power carries this inherent risk with possible enormous consequences, the authors take it with an almost unscrupulous lack of seriousness. If 9/11 has shown anything, it is that no effort of security services, flight security and protection of airspace can fully exclude the possibility of malevolent attack on strategic or symbolic targets. During the investigations around 9/11 it also became clear that nuclear power stations were possible targets.
    The authors already acknowledge that risk of malevolent attack is not only confined to attacks with aircraft, but also includes internal sabotage, attacks with charged heads and others. The mentioned measures by the state could only counter all these risks, if the Czech Republic were turned into a complete police state – the so called "Atomstaat", for which the philosopher Robert Jungk already warned in 1977.[22]
    Concluding: **The risk of malevolent attack has to be taken extremely seriously and possible impacts on the environment from such an attack should be included in the Environmental Impact Assessment and compared with the possible impacts on the environment of sabotage of other alternative means to meet the demand for energy services. Without such a comparison, no proper justification can be made.**

38. Page 161 – Final storage low- and middle radioactive wastes (LRW and MRW) in Dukovany. The EIA misses a description of this storage, including the need for possible expansion in case Temelín 3 and 4 are build. The general statement that this storage space is sufficient should be argued

21 Antonín Pelíšek, *A po nás planina,* České Budejovice (2006) nakladatelství PENI; http://www.ekolist.cz/recenze.shtml?x=2054062

22 Robert Jungk, *Der Atomstaat – Vom Fortschritt in die Unmenschlichkeit*, München (1977) Kindler, ISBN 3-463-00704-5

with figures: a description of existing capacity, current use, to be expected waste streams and to be expected additional waste streams from Temelín 3 and 4.
In detail, the EIA misses clarity about the technical details of the storage of LRW and MRW. It also misses details about how it is foreseen that access to these wastes is restricted and these wastes are guarded for several hundreds of years – also in case of political instability.
The description of management of LRW and MRW is therefore insufficient.

39. The EIA does not describe what will be done in the final stages with high radioactive wastes (HRW) – it merely describes interim storage in Dukovany or in Temelín. Given the large risk that this waste poses, it is of uttermost importance for any justification of the project that all data considering final processing of this waste are available. **Without a clear solution for final HRW management, the construction of the project is irresponsible.**
It is indicated, though not explicitly mentioned, that spent nuclear fuel (SNF) will be treated as waste. Also here there are no details about the final processing. Reference to the *Koncepce nakládání s radioaktivními odpady a vyhořelým jaderným palivem v ČR* is insufficient because this concept proposes management processes that are still in the infancy of their development. No detail technique is known, no site for final storage or disposal is known. The ideas about techniques to be used are currently contested.[23]
The indicated way of dealing with radioactive wastes for these reasons goes against the basic principles of sustainability. This issue should weigh heavily in a comparison with other ways to meet the demand for energy services, especially with options focusing on energy efficiency and renewable energy sources.

40. Page 164 – **Decommissioning**. Decommissioning is treated as a separate activity. This is under the Aarhus Convention article 6(4) not acceptable. This article prescribes that public participation, i.e. the EIA procedure, shall take place when all options are open and effective public participation can take place. As soon as Temelín 3 and 4 are constructed, the option of decommissioning is no longer open, especially the zero option (no decommissioning) has been closed off.
Decommissioning also produces large amounts of wastes that need to be processed. These wastes need to be accounted for in the comparison with alternative options to meet the energy service demands, including options focusing on energy efficiency and renewable energy sources. This has not happened in the EIA and therefore a proper justification of the project's environmental impacts cannot be made on the basis of this report.
That decommissioning will fall under all prescriptions of the nuclear law is irrelevant. First of all, the nuclear law will probably look different in 70 years time when decommissioning comes on the horizon, but secondly, as long as the detail design of the project is unknown, it is also unknown whether it will be able to fulfil the prescriptions of the law. When the project is constructed, the process of decommissioning is in principle a *fait acomplis* and it is likely that when decommissioning cannot be done according to legal prescriptions, future generations responsible for the process will find themselves forced to change the prescriptions. For that reason **it is of paramount importance that decommissioning is an integral part of the current EIA process – in full detail**.

41. Risks to the population - A few authoritative and well substantiated studies have recently found an alarming link between incidence of cancer, especially childhood leukaemia, and proximity to

23 Greenpeace, *The deadly legacy of radioactive waste – wasting our time with nuclear power*, Amsterdam (2010) Greenpeace; http://www.greenpeace.org/international/en/publications/reports/deadly-legacy/

Helen Wallace, Study commissioned by Greenpeace, *No time to waste: Scientific review of existing models for long-term storage of radioactive waste [working title]*, to be published in September 2010 – available from Greenpeace from that date.

nuclear power plants.[24] There is no established explanation for these findings, but they are nevertheless very relevant for the EIA and should not be omitted.

42. Page 167 – Further use of the location. To postulate that the location will be used for further activities of ČEZ a.s. shows that the authors lack perception of reality. If the project goes ahead, decommissioning will not be finished earlier than in a century from now. Predicting the use of the location 100 years in advance is a *chotspe*. 100 years ago, the Czech Republic did not exist. Since then, two World Wars raged over the Czech lands, communist rule changed much of land use perceptions and so did the return to democracy. The word "*logicky*" does not deserve any place in this part of the EIA.
    On the basis of these paragraphs it has to be concluded that a detail work-out of decommissioning is extremely important, because the authors seem to want to prevent decommissioning (and waste) issues to be taken up into the justification process.

43. Page 191 and 192 – **Tritium emissions**. Tritium is one of the more problematic radioactive substances. Is there a reason to presume that the emissions of two blocks of the AES-2006 design (2 blocks of 1200 MW) will emit twice as much tritium into the air as two blocks EPR (2 blocks of 1700 MW)? And if so, what are the data for the other two designs?
    It is furthermore not really clear why tritium has not been included in the emissions of radioactive waste water. The measuring overviews later in different rivers do not really give much information. The overview of emissions from the existing blocks of Temelín on page 261 indicate that there are increasing tritium emissions into the waste water, as is to be expected over time. However, there is no information about possible increases and cumulative effects because of two more blocks. In the description of effects on the population on page 420 and further, the current debate about the adequateness of the dose-effect coefficient for tritium of the ICRP has not been taken into account.[25] This can mean that the effects of especially tritium emissions in the EIA have been severely underestimated.

44. Page 345 – Current influence from Temelín. It has to be remarked that the radioactive emissions in waste water are quite high and show a (to be expected) increase over the time of operation of Temelín 1 and 2. It will be important to know whether a more than doubling of capacity, as well as the use of higher burn-up of fuel and the use of MOX will not lead to values that are very close to the acceptable limits.

45. **Insufficient assessment of a serious accident**
    The evaluation of a nuclear accident in the EIA report is based on a 0,03 PBq emission of caesium-137, a 1,0 PBq emission of iodine-131 and 770 PBq of Xe-133. Thus the total radioactivity of the evaluated emissions would amount to less than 100 PBq, which is less than 1/1000 of the radioactivity contained in a modern reactor[26]. This presupposes that only 0.015 percent of the caesium, for instance, and 0.03 percent of the iodine contained in a European Pressurized Reactor would be released into the environment[27]. This does not correspond to a

24 Kaatsch P, Spix C, Schulze-Rath R, Schmiedel S, Blettner M (2008) *Leukaemia in young children living in the vicinity of German nuclear power plants*. Int J Cancer. 2008 Feb 15; 122(4) pp 721-6

25 http://livre-blanc-tritium.asn.fr/plus/telechargements.html

http://www.irsn.fr/FR/Actualites_presse/Actualites/Pages/20100709_rapports_IRSN_etat_connaissances_tritium.aspx

26 This estimate is based on the isotope distribution in a 1000 MW pressurised water reactor with a fuel burnup of 35 GWd/t. Data: Large & Associates 2007: *Assessments of the radiological consequences of releases from proposed EPR/PWR nuclear power plants in France, Annex 2*.

27 Bouteille, François & al. 2006: *The EPR overall approach for severe accident mitigation*. Nuclear Engineering and Design 236 (2006), p. 1464 – 1470.

serious nuclear accident. Analyses made on the international level typically suppose that between 10 and 50 percent of caesium and at least one percent of iodine is emitted in a nuclear accident[28,29].

The total radioactive emission of the Chernobyl disaster was approximately 12 000 PBq, i. e. a thousand times that used in the EIA estimates[30], although compared to the Chernobyl facility, the planned Temelín reactors would be larger and their fuel burn-up drastically higher. The estimates of the caesium release fraction, for example, in the Chernobyl accident vary from 20 to 80 percent[31]. The radioactivity of caesium in an EPR, for example, is approximately 700 PBq, that is 2,5 times that in the Chernobyl reactor.

The high fuel burn-up and the possible use of MOX fuel further dramatically increase the potential emission of radioactive substances.

The following illustrates one example of a sequence of events that might lead to a serious nuclear accident in a modern pressurised water reactor. This scenario was conceived by John Large, a leading advisor in nuclear safety, who has worked for decades in research projects at the British Atomic Energy Authority. Among other tasks, Mr. Large was in charge of charting the state of the sunken nuclear submarine Kursk and raising it back to the surface.

On these grounds we demand that the examination of a nuclear accident be based on the quantity of radioactive materials contained in a modern nuclear reactor with a high fuel burn-up and the supposition that a significant fraction of these materials is released into the atmosphere. The estimation of these fractions must be based on acknowledged international research and experience. All data used in evaluating these emissions must be published – currently, for example, the quantity of radioactive materials contained in a functioning EPR cannot be found in any public documents.

TIME seconds	SEQUENCE EVENT
0	The assumption is that the reactor is operating at full power when the operators take inappropriate action following what seems to have been a straightforward reactor trip triggered by, say, the loss of steamside feedwater to the steam generators.
30	Unknowingly, the operators then follow established plant procedures to restart the reactor being unaware that the plant is in fact suffering from an unanalysed (not prescribed) event such as, say a small loss of coolant incident via the RPV circuit pressuriser system. As the incident develops with the operator intervention having no effect, at about 30 seconds into the incident, the reactor alarms transmit to the control room at a rate of over 100 per minute.
480	Too many of the alarm messages are of a diversionary nature and delay the operators present moving to a correct analysis of the situation and inability be able to isolate the fault conditions then developing apace.
555	In the highly stressed environment, the operators trigger the high pressure injection pumps not knowing that this would result in a loss of the pressuriser bubble and injection of unboranated water into the core. When, at about 75 seconds. The condenser hotwell high level alarm sounds with an impending loss of condenser vacuum, the operators become preoccupied in considering the option of initiating a steam dump to atmosphere.
2055	With the operators still believing that events are on course for the reactor restart, at about 25 minutes into the incident increased neutron flux signals, caused by steam voids now forming in the MOX fuel core, prompt concern about recriticality so much so that the operators scram the reactor, turning off the primary pumps in one of the two steam generator loops to provoke flow reversal induced by continued pumping in the other loop.

28 Large & Associates 2007: *Assessments of the radiological consequences of releases from proposed EPR/PWR nuclear power plants in France.*

29 US Nuclear Regulatory Commission 1975: *Reactor Safety Study, an Assessment of Accident Risks in US Commercial Nuclear Power Plants, WASH-1400*.

30 Nuclear Energy Agency 1995: *Chernobyl, Ten Years On*, p. 29.

31 Sich, A. R. *1994: The Chernobyl Accident Revisited: Source Term Analysis and Reconstruction*. MIT.

2415	However, again unbeknown to the operators, the isolated loop has boiled dry, so flow reversal and cooling is unavailable because steam has siphon blocked the 'U' section of the primary circuit to this loop. The remaining loop pumps a two-phase mixture, flow decreases due to increasing voidage causing the pumps to trip followed by boiling in the RPV after about 6 minutes with the water level lowering to uncovered the fuel core.
3315+ say 1 hour	Within 15 minutes, the dry space above the core fills with superheated steam leading a zirconium-steam reaction with, within seconds, a hydrogen explosion sufficient to rupture the RPV and eject much of the molten fuel mass, itself leading to a series of molten fuel-water explosions sufficient to breach the reactor building containment.
14,115 say 4 hours	Incident ends, radioactive release commences through damaged secondary containment, continuing steadily for about three hours as water remaining in the containment continues to boil off incurring a series of smaller hydrogen burns and explosions.

46. Page 508 concludes: **"Podklady a informace jsou dostatečné pro vyhodnocení všech relevantních vlivů."** (The documentation and information is sufficient for the evaluation of all relevant influences). This is not true.

    1. The EIA lacks information about an alternative based on a focus on energy efficiency and renewable energy sources as described above.
    2. The lack of information about the different designs leaves a large uncertainty about basic data, especially for the estimation of design based and beyond design based accidents.
    3. There is insufficient information about the increase of risks for incidents and accidents in the blocks 1 and 2 during the construction phase of blocks 3 and 4, as well as during the decommissioning of blocks 1 and 2 during operation of blocks 3 and 4.
    4. There is completely insufficient information about the environmental impacts of the to be used fuel (from mining and fuel production of fresh fuel as well as impacts from fuel from reprocessed SNF, including the effects of higher burn-up and the use of MOX).
    5. There is completely insufficient information about the back-end of the fuel chain (limited information about amounts of different categories of waste from decommissioning, no information about spent nuclear fuel composition, no information about final storage techniques planned, insufficient information about temporary storage including risks of malevolent attack, etc.)
    6. There is no information about the risks and environmental impacts of SNF and radioactive waste storage, especially for the longer term, including risks from human interference (accidental, planned or in the form of malevolent attack, including the risk of use of plutonium for nuclear weapons in the long term).
    7. There is no information about risks because of situations of political instability, including war, and insufficient information about risks because of malevolent terrorist attack.
    8. Information is partly not based on latest scientific knowledge, e.g. the impacts of tritium and the relationship between childhood leukaemia and distance to nuclear power stations.

    Greenpeace demands that this information will be worked out and included so that a final justification of the environmental impacts can be made.

48. Page 509 states that all alternatives (meant are different designs of the nuclear reactors) are identical from the position of environmental protection. The EIA report does not investigate this, but merely states this. The data provided in this EIA concerning tritium emissions already show that this is not true. But apart from that, the different providers of these designs argue during public presentations that there are differences in safety levels and risks, which logically also translate into different impacts on the environment, especially in cases of design based and beyond design accidents. This EIA is incomplete without a proper comparison between the different designs that goes beyond mere vague descriptions. This should include detail description of the radioactive inventory of the core during operation, description of safety components, etc. Furthermore, this documentation should be submitted to public participation for a sufficient time for the public and NGOs to have it reviewed on a sufficient level of expertise. Such a period should also not be during the time of general holidays.

49. The conclusion of the EIA states: “V průběhu zpracování dokumentace nebyly zjištěny žádné skutečnosti, které by z environmentálního hlediska bránily přípravě, provádění, provozu resp. ukončení provozu posuzovaného záměru. Potenciální vlivy na veřejné zdraví a životní prostředí (ve všech jeho složkách), a to i s uvažováním spolupůsobícího účinku provozu stávající elektrárny a stávajícího pozadí, nepřekračují příslušné zákonné limity nebo (pokud nejsou limity stanoveny) akceptovatelnou míru. Vlivem záměru tedy nedojde k poškozování životního prostředí ani veřejného zdraví.” (During the processing of the documentation, no information was revealed that would prevent from an environmental viewpoint the preparation, implementation, operation, respectively decommissioning of the proposed project. The potential impacts on public health and the environment (in all its components), and that while taking into consideration possible cumulative effects because of the operation of the existing power station and the existing surroundings, do not exceed the legal limits or (in case no limits are defined) acceptable levels. The effects of the project therefore will not harm the environment or public health.)
    Greenpeace concludes that the authors in reaching this conclusion have structurally excluded information that would lead to more complex picture. An indication of information lacking is given in point 47.

50. The EIA concludes that: *“Vzhledem k tomu, že vlivy záměru se ani v dotčeném území neprojevují významným způsobem, jsou vyloučeny vlivy přesahující státní hranice.”* (Because the influences of the project are within the analysed area without consequences, cross-border influences are excluded).
    This conclusion is contradicted by the information provided in the EIA under the chapter on accidents. And this under the use of an insufficiently high source term. When a more realistic source term is used, influences comparable with those from the Chernobyl catastrophe cannot be excluded. The EIA lacks an analysis of such influences.
    It is also contradicted by the fact that the project will require the use of uranium, causing environmental impacts of uranium mining outside the country, that it will need the preparation of nuclear fuel, causing the dumping of depleted uranium and other radioactive wastes in other countries as well as radioactive emissions in other countries.
    Also the influences of risks from management of radioactive wastes and spent nuclear fuel can have cross-boundary effects that have not been analysed.
    The only possible conclusion can be that the authors have not seriously looked into the issue but have worked towards a pre-defined outcome.

51. The non-technical summary excludes too much information and is completely insufficient.