To the Ministry of Environment for Estonia
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Proposals of the Estonian Greens
for rejecting and amending EIA Report of the New Ignalina NPP Project.

Following comments concerning environmental mpact assessment report of the new nuclear power plant in Lithuania of Lietuvos Energia AB (Document labeled Consortium Pöyry Energy Oy Lithuanian Energy Institute, EIA Report, new Nuclear Power Plant in Lithuania, August 27th 2008) are proposed:

Estonian Greens propose that EIA report of New Nuclear Power Plant (NNPP) in Lithuania has to be sent back to impact assessor (consultant) and amended prior new hearings and possible adoption, as it is too general and poor in several parts. EIA report does not provide sufficient evidence and/or arguments for conclusions made in the report and lacks impact assessment in many aspects of the NNPP project. Particularly EIA report does not meet objectives of Law of Environmental Impact Assessment of the Proposed Economic Activity (Article 4 of the Law) to identify, characterize and assess potential, direct and indirect impacts of the proposed economic activity on human beings, fauna and flora, soil, surface and entrails of the earth; air, water, climate, landscape and biodiversity; material assets and the immovable cultural heritage, and interaction among these factors. Also report neglects objective from same article to reduce or avoid negative impacts of the proposed economic activity on human beings and other components of the environment, because it does not assess impact and compare properly different reactor types and their impacts to the environment and humans.

The environmental impact assessment (EIA) provides an interesting account of the history of nuclear technology but gives no tangible information whatsoever on the differences of reactor types and does not conclude what type of reactor is recommended to be built as having smallest impact. 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! Comparing data of

As there is stated by the report itself (page 29, chapter Waste) that environment impact of spent nuclear fuels is not properly assessed and as nuclear wastes impacts are neglected and different reactor types are not assessed according to impact in Waste chapter of the report (Chapter 6, pages 116-134), despite differences in volumes of radioactive wastes by using different reactor-types vary significantly e.g. volumes of solid nuclear wastes differ 6 times, liquid radioactive wastes volumes differ 8 times, spent nuclear fuel volumes differ 7 times.
EIA report neglects the long-term health and environmental hazards caused by long-lived high-level nuclear waste are among the most severe and profound environmental impacts of a nuclear power plant. These impacts and their mitigation are fully omitted from the EIA report which can not be acceptable under any circumstances. Production of high-

level waste is an integral part of the project and it cannot be separated into a separate EIA process, because the potential impacts of the waste need to inform the decision on whether or not building this nuclear power plant is justifiable. Furthermore, management and especially long-term deposition of nuclear waste can entail substantial costs that can affect the economic viability of the whole project. It would be irresponsible for the environmental authorities to grant an environmental permit to a facility that does not have a plan on, a commitment to, a credible estimate of the costs of or demonstrated financial means for management of its own waste. The omission of high-level waste management from the EIA report is another demonstration of utter disregard for the EIA process.

Based on this, one can consider that consultant has failed to provide proper assessment and report has to be amended in great extent, on comparison of impacts of different reactor types and particularly on their waste properties, volumes and impacts, in order to provide necessary level assessment to decision maker prior issuing consent and/or conditions to the construction of NNPP.

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 making fun of the whole EIA process. There needs to be a design-by-design analysis of main environmental impacts and nuclear safety measures.

Besides those basic gaps in the EIA Report, described above, report is poor and/or misleading in several other aspects of NNPP project.

The claim in the report that a major inflow of migrant workers would entail significant positive regional spillovers is not justified by experience. Tax inflow and demand for local goods and services is minimal, whereas burden on local public services, infrastructure and law enforcement can be substantial.

Ruling out renewable energy and energy efficiency measures is not justifiable and the assumption that in the absence of new nuclear reactors, electricity would be produced almost solely with fossil fuels is not sensible. As is imminent from the EIA report itself, the potential impact of the project on Lithuanian electricity market is so large, that limiting the analysis to measures that can be implemented by the company is not justifiable. The assumption of increased reliance on fossil fuels is arbitrary and, as a bare minimum, a sensitivity analysis should be provided. Furthermore, emissions from electricity production in Lithuania are bound by the Emissions Trading System of the European Union and most likely also by a new commitment period of the Kyoto protocol under negotiation at the moment. Therefore the emission targets will need to be met regardless of whether new nuclear capacity is added, ruling out the option of increased use of fossil fuels.

According to the EIA report, tens of thousands of people live within a 5-20 km radius prom the nuclear power plant. A few authoritative and well substantiated studies have recently found an alarming link between incidence of cancer, especially childhood

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

The evaluation of a nuclear accident in the EIA report is based on a 0,1 PBq emission of caesium-137 and a 1,0 PBq emission of iodine-131. Thus the total radioactivity of the evaluated emissions would only amount to less than 10PBq, which is less than 1/10000 of the radioactivity contained in a modern reactor [[1]]. This presupposes that only 0.015 percent of the cesium, for instance, and 0.03 percent of the iodine contained in an European Pressurized Reactor would be released into the environment [[2]]. This does not correspond to a serious nuclear accident. Analyses made on the international level typically suppose that between 10 and 50 percent of cesium and at least one percent of iodine is emitted in a nuclear accident [[3],[4].]

The total radioactive emission of the Chernobyl disaster was approximately 12 000 PBq, i. e. a thousand times that used in the EIA estimates [5], although compared to the Chernobyl facility, the planned NNPP would be many times larger and its fuel burnup drastically higher. The estimates of cesium release fraction, for example, in the Chernobyl accident vary from 20 to 80 percent[6]. The radioactivity of cesium in an EPR, for example, is approximately 700 PBq, that is 2,5 times that in the Chernobyl reactor.

The high fuel burnup 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 [3] by John Large, one of the world's leading advisors 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 propose that consultant, while amending EIA Report concludes modeling of a nuclear accident, based on the quantity of radioactive materials contained in a modern nuclear reactor with a high fuel burnup 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

[1] 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.
[2] Bouteille, François & al. 2006: The EPR overall approach for severe accident mitigation. Nuclear Engineering and Design 236 (2006), p. 1464 – 1470.
[3] Large & Associates 2007: Assessments of the radiological consequences of releases from proposed EPR/PWR nuclear power plants in France.
[4] US Nuclear Regulatory Commission 1975: Reactor Safety Study, an Assessment of Accident Risks in US Commercial Nuclear Power Plants, WASH-1400.
[5] Nuclear Energy Agency 1995: Chernobyl, Ten Years On, p. 29.
[6] Sich, A. R. 1994: The Chernobyl Accident Revisited: Source Term Analysis and Reconstruction. MIT.

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 un-analysed (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.
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.

As there is so many gaps in current EIA report, Estonian Greens propose that a new, prolonged schedule should be devised in order to give enough time for the improvement of EIA report, as well as proper consultation and public participation during their preparation. EIA practice requires an optimal number of consultation events during the preparation of the EIA report, especially in the case of large scale projects with immense potential negative impacts on the environment as is the case with NPP-s.

The improved EIA would need to contain all required parts, defined by the national EIA Law, especially the concrete training, monitoring and mitigation measure plans, as well as relevant waste management plans, decommissioning, accident response plans etc.

The impact assessment should take into account the whole life-cycle of nuclear fuel usage, form mining, through fuel production and/or enrichment, transport storage, usage, waste management and disposal.

The whole life-cycle impact assessment has to be taken into account when comparing different alternatives.

There should be much more alternatives where each alternative will be assessed and compared with each other. In the current EIA document only the Yes and No (Zero) alternatives were assessed, where the both the Yes and the Zero alternative were misinterpreted. First of all, the zero alternative had to have more variants assessed. Secondly, the Yes alternative should have had integrated impacts from the whole life-cycle. Thirdly, the Yes alternative should have variants covering different reactor-types.

The current official commenting period of the current EIA has timing inadequacies: The commenting period lasts from September 2008 to early February 2009. The meetings with the public have been scheduled already for end of September, giving only three weeks to the representatives of the public to prepare for the meetings. Three weeks is not enough to prepare comments on a five hundred pages long document that has been prepared for nine months. Therefore, a second round of consultation meetings, after serious amendment to fill the gaps in EIA report, is necessary with the public, relevant authorities, institutions and international counterparts during year 2009, in order to have a meaningful and productive consultation and public participation process.

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