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Subject: Discussion between DG ENER and Lithuanian delegation concerning Ostrovets NPP.	
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Summary

Belarus NPP is built close to the Lithuanian border and the Lithuanian representatives presented their concerns and the relevant information concerning Belarus NPP, which is strongly opposed by the Lithuanian government.

They requested that the European Commission supports them in blocking the construction of Belarus NPP at its present site. They provided a list of political and technical reasons of which I have a copy and which they confirmed as non confidential.

The Lithuanian delegation criticized INSC for supporting the regulator in Belarus.

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Detailed Report in annex *(not to be published)*

**Expert meeting with the representatives of European Commission
on Belarusian Nuclear Power Plant (NPP)**

Tuesday, December 26, 2016
DG Move, 24, rue De Mot, Brussels
DM24 03/058
14:00 – 16:30

ROOM DOCUMENT

Introduction of issues by Lithuanian delegation and the EC

I. Foreword

- *Welcome address by the EC*
- [REDACTED] *for Radiation Safety of the Republic of Lithuania*

II. Results of the bilateral meetings between the Lithuanian and Belorussian institutions regarding the Ostrovets NPP nuclear safety issues;

III. EC mission to Belarus on 19-20 September;

IV. Results of the IAEA IRRS mission to Belarus;

V. 2017 CNS review meeting.

VI. International EIA process regarding the Ostrovets NPP, meeting of the Parties to the Espoo Convention in 2017 and its potential conclusions regarding the Ostrovets NPP case

VII. General discussion

Lithuania's position on Bilateral Lithuanian–Belarus experts' meetings on the Ostrovets Nuclear Power Plant project
21-22 June, 2016, Vilnius, and 13-14 September, 2016, Minsk

I. Agenda

Issues of the Ostrovets Nuclear Power Plant (hereinafter – NPP), opened at the meetings:

- 1) Application of the transboundary environmental impact assessment (hereinafter – EIA) procedures and decision making;
- 2) Assessment of locational alternatives for the NPP construction (including no-action alternative) and site evaluation and selection criteria (geological, seismotectonic, hydrological conditions and population density);
- 3) Seismic safety assessment and assessment of seismicity and seismic hazards of the Ostrovets and alternative sites;
- 4) IAEA's Site and External Events Design (SEED) mission and stress-tests for the Ostrovets NPP;
- 5) Assessment of impacts in case of accidents. Preparedness and response to a nuclear or radiological emergency;
- 6) Potential contamination of the river Neris (Vilija) and groundwater resources in capital Vilnius in case of major accidents in the Ostrovets NPP;
- 7) Design of the NPP;
- 8) Nuclear safety and radiation protection regulatory regime including development of the relevant legislation in Belarus;
- 9) Incidents at the construction site of the Belarusian NPP. Measures taken to control and ensure highest quality of construction works and during operation of the NPP. Prevention and management of incidents;
- 10) Spent nuclear fuel and radioactive waste management policy and plans;
- 11) *Organization of environmental monitoring (was not opened due to the lack of time).*

II. Discussions and outcomes

1. Application of the transboundary EIA procedures and decision making:

Lithuania emphasized that the Ostrovets site was chosen and the construction works were commenced before the start of the transboundary EIA, although the Espoo Convention requires to evaluate alternative sites in the process of transboundary EIA and to choose the location as a result of it. This constitutes a serious violation of the Espoo Convention. Moreover, Belarus experts directly admitted that the Ostrovets site was the only one considered in the process of the transboundary EIA. Lithuania recalled the decision of non-compliance, adopted in June 2014, by the Meeting of Parties of the Espoo Convention, regarding the transboundary EIA of the Ostrovets NPP, and urged Belarus to implement the given recommendations without any further delay. Lithuania explained that transboundary EIA procedures in line with the Espoo Convention for the Belarus NPP are still pending: Lithuanian questions remain unanswered, the revised EIA report, which would meet the requirements of the Espoo convention and Findings and Recommendations of the Implementation Committee, has not been submitted to Lithuania, the public hearings have not been arranged, experts' consultations in accordance with Article 5 of the Espoo Convention have not been completed, the final decisions in accordance with the Espoo Convention's requirements have not been adopted. Lithuania explained that formal submission of the EIA documentation (Espoo convention's Article 3, Paragraph 8) to the Affected Party does not mean that the EIA documentation comply with the Espoo Convention's requirements and the endorsed Findings and Recommendations of the Implementation Committee regarding its content and quality. The EIA documentation submitted by Belarus to Lithuania in

February 2011 and June 2013 was dated as of 6 July 2010. It means that it had already been assessed by Lithuanian experts and the Implementation Committee before the adoption of the findings and recommendations. The mentioned documentation sent in February 2011 and June 2013 did not take into account Lithuanian questions and comments and the Findings and Recommendations of the Implementation Committee. Moreover, the Presidential Decree of 15 September 2011 No. 418 which determined the Ostrovets site for the location of the NPP and required to develop the design of the NPP taking into account its particular location and the Presidential Decree of 2 November 2013 No. 499 regarding construction of the Belarussian nuclear power plant in the same site, cannot be considered as final decisions because they preceded the outcome of the transboundary EIA.

Besides, Lithuania encouraged Belarus to accept the proposal of the Implementation Committee of the Espoo Convention to establish an international experts' body modelled after the inquiry commission set in Appendix IV of the Espoo Convention for an in-depth analysis of the Ostrovets NPP case under the Espoo Convention¹. This would be good instrument to give advice of technical and scientific nature to the IC for further assessment of Belarus compliance with the Convention. However, Belarus strongly opposed it, claiming that the mentioned commission is a new unprecedented instrument and it requires additional financial resources.

Positions of Lithuanian and Belarus delegations were radically different not only on the substance and procedures of the EIA but also on obvious facts. Belarus refused to admit that the Ostrovets NPP project has been developed in non-compliance with the UN Espoo Convention, even though this fact was stated in the Meeting of the Parties to the Convention in 2014.

Belarus ignores Lithuania's requests to provide to Lithuania presentations given during the meetings of 21-22 June and 13-14 September for further analysis by Lithuanian experts by indicating that they will be provided "at the earliest convenience" even though that several months have already passed since the meetings. Such vague excuses do not contribute to open cooperation and mutual trust.

Essential Lithuanian requests to Belarus:

- 1) To accept the proposal of the Implementation Committee of the Espoo Convention to establish an international experts' body modelled after the inquiry commission set in Appendix IV of the Espoo Convention for an in-depth analysis of the Ostrovets NPP case under the Espoo Convention. This would be good instrument to give advice of technical and scientific nature to the IC for further assessment of Belarus compliance with the Convention;
- 2) To submit the revised EIA report, which would meet the requirements of the Espoo convention and Findings and Recommendations of the Implementation Committee i.e. include comprehensive information on the Ostrovets NPP, including the sites' research, evaluation and selection issues, and would address the identified inconsistencies and shortcomings. Alternatively, the mentioned information could be added in an Annex to the EIA report for further analysis by Lithuanian experts and public consultations;
- 3) To co-arrange public hearings in the territory of Lithuania;
- 4) To organise experts' consultations in accordance with Article 5 of the Espoo Convention;
- 5) To accomplish the International Atomic Energy Agency's (IAEA) Site and External Events Design (SEED) mission for the Belarus NPP in its full scope with the participation of the EU and Lithuanian experts. Belarus committed to invite the IAEA SEED mission already in 2014, however, up until now promises haven't turned into concrete actions;

¹ Letter of the Implementation Committee of the Espoo Convention dated 16 December 2015. The Implementation Committee reiterated the proposal to Belarus at its 35th session that took place on 15 March 2016 in Geneva.

- 6) To perform the stress tests of the Belarus NPP in accordance with the European specification², including the peer review, with participation of the EU and Lithuanian experts.

2. Assessment of locational alternatives for the NPP construction (including no-action alternative) and site evaluation and selection criteria (geological, seismotectonic, hydrological conditions and population density):

Lithuania repeatedly noted that criteria for prioritisation of the Ostrovets site were not explained – in the EIA report the major characteristics and prohibiting factors of the three sites for nuclear facilities (Kukshinovsk and Krasnopolyana and Ostrovets sites) were just stated, but not described and not motivated by data. In different documents submitted by Belarus earlier the information about geological, seismotectonic and hydrologic structure of the three alternative sites was inconsistent.

At the meeting of 21-22 June in Vilnius Belarus provided new information about various geological and tectonic issues of the sites (e.g. presence of the active tectonic fault penetrating the crystalline basement and sedimentary cover and differentiated vertical movements of the Earth crust of more than 10 mm per year in the Kukshinovsk site; presence of 13 inactive faults in the Ostrovets site etc.). Some of the provided geological data contradicted the information presented in the EIA report³, where it was stated that prohibiting factor for the NPP construction, such as “site is situated directly on tectonically active faults” and “territory with proved facts of modern differentiated movements of the Earth crust (vertical – with the speed of more than 10 mm per year)” are absent in all three sites and all three sites are “without active faults” and “vertical movements: with speed of less than 10 mm per year”, and, in turn, correspond to the requirements of national normative documentation (TKP-097-2007). Lithuania requested clear answers on the contradicting statements on major prohibiting factors. Belarus explained that new information about the tectonic and geological structure of the sites such as indications of the potential for suffusion-karst processes, activity of faults has been obtained as a result of the new investigations of the sites, which have been carried out after the preparation of the EIA Report: e.g. fault in Kukshinovsk site was classified as inactive in 2008, but later new data showed its activity. Thus, the data were not included into the EIA documentation. This once again proved Lithuanian concerns that the site selection process lacked detailed geological investigations and the decision to choose the Ostrovets site for the NPP construction was not supported by comprehensive factual data. In the meeting of 21-22 June, Lithuania requested Belarus to provide all the information, especially the geological, hydrological and seismological surveys, including the specific data (maps, cross-sections etc.) as a package of integrated geological data. The information, updated analysis of competing sites and its compliance with normative documentation requirements and its conclusions should be included in the EIA Report or alternatively as an Annex to it. However, Belarus refused to present the mentioned information to Lithuania. Lithuania reiterated the request at the meeting of 13-14 September; but Belarus announced that it will present the information only under the condition that Lithuania withdraws its position that the transboundary EIA procedure for the Ostrovets NPP is still open.

Lithuania reiterated that the Ostrovets site had the most unfavourable seismo-tectonic parameters in comparison to the other sites, as it is indicated by two instrumentally recorded earthquakes („on 17th October 1987 there was instrumentally recorded earthquake with epicentre located 10 km to the east from Ostrovets“, and „local earthquake on 27th February 1987 at 23:37:22 UTC time (magnitude 2.5, epicentre located 10 km to the east from Ostrovets with hypocentre at 10 km depth) recorded by three seismic stations) and one historical earthquake with intensity 5 to 6 (according to the MSK-64 scale) in 1908 in Gudogai in the Ostrovets region. The occurrence of historical earthquakes and records of recent local earthquake(s), even of small magnitude, indicate seismic activity potential for the Ashmyany fault zone near the Ostrovets site. Belarus presented a new concept of local seismicity that questioned the reliability

² http://www.ensreg.eu/sites/default/files/EU%20Stress%20tests%20specifications_1.pdf

³ Table 5. *Analysis of competing sites correspondence to normative documentation requirements* (EIA Report, page 49).

of instrumentally recorded and historic data of earthquakes adjacent to Ostrovets. They also provided information about the absence of the active faults within the Ostrovets site. Lithuania noted the importance of capability of faults as defined in the IAEA documents (IAEA safety guide NS-G-3.3 „Evaluation of Seismic Hazards for Nuclear Power Plants“ and safety guide SSG-9 „Seismic Hazards in Site Evaluation for Nuclear Installations“) in seismic hazard assessment. These safety guides provide recommendations on how to determine the ground motion hazards for a plant at a particular site, the potential for surface faulting and capability of faults. Lithuania also noted the lack of justified information on tectonic structure, particularly, on distribution of fault system in the Ostrovets site and structural relationship of these faults with capable Ashmyany fault. Belarus did not discuss the issues of capability of faults in the understanding of the IAEA documents.

In the Krasnopolyana and the Kukshinovsk sites there is a potential possibility of activation of suffusion-karst processes that is a complicating factor, as it was stated by Belarus. The absence of suffusion-karst processes is one of geological criteria that allowed for the prioritization of the Ostrovets site in comparison with the two other sites. Lithuania repeatedly claimed that clear geological information on the absence of the risk of potential activation of the suffusion-karst processes in the Ostrovets site was not provided. Belarus did not answer several requests whether „Cimmerian and Alpine complex represented by depositions of chalk, neogene and tertiary: green terrigene-glaconite phosphorite carrying formation (Albian and Cenomanian), formation of writing chalk (Cenomanian, Turonian, Maastricht) having thickness of more than 100 m“, occurred or not in the Ostrovets site, and, respectively, whether potentially possible activation of suffusion-karst processes could occur. Lithuanian delegation repeatedly requested to provide information whether suffusion-karst processes in the Ostrovets site had been studied with the same accuracy as for the alternative sites. Belarus presented a big amount of data about the geological structure of the sedimentary cover of the site with a view to explain the absence of geological conditions for activation of suffusion-karst processes at the Ostrovets site and the other major site selection characteristics; however, Lithuania explained that detailed analysis of the data is needed and that it was not possible to fulfil the analysis during the meeting.

Lithuania reiterated its position that the other sites were not equally evaluated in terms of hydrological conditions. Even though the information provided concluded that engineering-geological and hydrogeological conditions of the Kukshinovsk site were complicated and drainage of ground and surface water was relevant only at the Krasnopolyana and the Kukshinovsk sites, the EIA report proved that such phenomenon was also relevant at the Ostrovets site. The Ostrovets site was not evaluated in terms of potential risk of technogenic flooding due to artificial water-bearing infrastructure failure, groundwater flooding and pluvial flooding (not caused by natural exceedance of rivers) and possible change of soil water regime. Due to the complicated hydrological conditions in the Ostrovets site, the safety of the facility could be affected and additional measures would be needed to avoid dangerous surface and soil water factors. Belarus informed about the engineering-geological and hydrogeological conditions of the Kukshinovsk site and on the technogenic flooding of the Ostrovets site caused by the river Neris and the foreseen corresponding measures, but did not exactly answer the question raised.

Population density is another factor that must be considered in the site selection process. Belarus experts noted that population density ($\Rightarrow 100$ people/km²) could be a prohibiting factor when considering location for an NPP. However, Belarus acknowledged that only the population density in the territory of Belarus was assessed, while the situation in the neighbouring Lithuania situated only 20 km away from the Ostrovets NPP was not taken into account. It should be noted that Lithuanian capital and the biggest city Vilnius (~543 thousand residents, major business and governmental institutions) will be situated just 40 km away from the Ostrovets NPP⁴. Lithuania reminded that already in 2009 responding to the Belarusian request to submit socio-economic, health and environmental information from the municipalities next to the state border Lithuania–Belarus, which are within 30 km zone from

⁴ 40 km from the Belarus NPP to the Vilnius city boundary and 50 km to the city centre.

the proposed site for the planned nuclear power plant, Lithuanian authorities pointed out that Vilnius, the capital of Lithuania, which has ~ 550000 residents is relatively close to the proposed Ostrovec site (40 km) and the size of the proposed impact zone of the planned NPP (30 km) is not justified. Therefore, the potential environmental impact of the planned nuclear power plant should be assessed also outside 30 km zone from Ostrovec site.

Lithuanian delegation recalled the statement of Belarus during the meeting on 15 March 2016 at the 35th session of the Implementation Committee of the Espoo Convention, that information related to the site selection process was classified and, therefore, Belarus declared that it will not provide such data. Lithuania raised a question whether this restriction is reasonably grounded and requested Belarus to provide to Lithuania full information on the site selection process, including the results of analysis and investigations.

Essential Lithuanian requests to Belarus:

- 1) To provide the aforementioned specific data (geological and tectonic maps, cross-sections etc.) about the geological and seismo-tectonic structure of the sites as consistent package of integrated data and information by updating and amending the EIA report or adding it as an Annex to the EIA report;
- 2) To provide clear conclusions about the occurrence of active faults in all alternative sites. To provide justified information and data (e.g. geological and tectonic maps, cross-sections etc.) on fault system in the Ostrovets site and its structural relationship with capable Ashmyany fault or other data proving the absence of potential for surface faulting and capability of faults at the Ostrovets site;
- 3) To present specific data about the geological structure of the Ostrovets site explaining the absence of geological conditions for activation of suffusion-karst processes and other major site selection characteristics, discussed during the meeting;
- 4) Update the analysis of the sites and review its compliance with the normative documentation requirements. This should be included in the EIA report or in an Annex to the EIA report;
- 5) To provide the assessment for the Ostrovets site of potential risk of flooding due to technogenic flooding (not caused by natural exceedance of the Neris river) taking into account flood mechanisms such as flooding defence or infrastructural failure and provide descriptions of the additional measures that will be needed and available to avoid adverse consequences caused by dangerous surface and ground water events;
- 6) To re-estimate population density, taking into account population density not only in Belarus, but also in the territory of Lithuania, which is only 20 km from the Ostrovets NPP, especially taking into account that Vilnius (Lithuanian capital and biggest city (~543 thousand inhabitants)) is only 40 km away from the NPP, i.e. closer to the nuclear facility than any other Belarus city;
- 7) To provide all information related to the site selection process by reconsidering the decision to classify this information, taking into account the common practice not to apply restrictions to such type of data.

3. Seismic safety assessment and assessment of seismicity and seismic hazards of the Ostrovets and alternative sites:

Lithuania noted that probabilistic seismic hazard assessment for the Ostrovets site was carried out using „Provisional General Seismic Zoning Map OCP-97-D“ (document of the Russian Federation) with an insert of the territory of the Republic of Belarus (scale 1: 10 000 000) compiled in 1997 that was included in Belarus national regulation „*ТКП 45-3.02-108-2008 (02250)*“. This probabilistic General Seismic Zoning Map was compiled before the two earthquakes in the Kaliningrad enclave (Russian Federation, next to Lithuania) with magnitudes of M=5.0 and M=5.2 occurred in 2004. These two earthquakes affected

the territory of the Eastern part of Belarus and NPP site. **The earthquakes were very important in assessing the seismicity of the whole East Baltic region, as they had the highest magnitudes ever recorded in this region and were located in the intracratonic stable territory, where no earthquakes have been previously recorded.** Moreover, official set of maps of general seismic zoning of Russian Federation OCP-97-D does not include the territory of Belarus. In this context, Lithuania inquired:

- 1) Why seismic hazard evaluation for the NPP site with increased local seismicity (e.g. 1 historical earthquake (M=4.5; 1908) and two instrumental earthquakes (M~3.0; 1987) recorded in close vicinity of the Ostrovets site) was based on large scale (1:10 000 000) provisional general map?
- 2) Which actual data served as a basis for extrapolating the map of general seismic zoning of the Russian Federation OCP-97-D to the territory of Belarus?
- 3) Why this map has not been updated considering the two Kaliningrad earthquakes of 2004, while planning the construction of the NPP?

Having heard the explanations Lithuania concluded that direct probabilistic seismic hazard assessment, including the new data about the seismicity of the region (e.g. Kaliningrad earthquakes) that would be in line with the recommendations of the IAEA documents (Safety standards NS-R-3, NS-G-1.6 and SSG-9 (items 1.2 and 6.4.)) and would adopt these commonly accepted verified methodologies and practices, has not been carried out for the Ostrovets site.

Lithuania repeatedly asked how macroseismic intensity points of MSK-64 scale used for the deterministic and probabilistic seismic hazard assessment for the Ostrovets site were converted to peak acceleration of soil particles (Peak Ground Acceleration, PGA). In response, Belarus indicated that more than 40 explosions with magnitudes of ~ M-2.0 were carried out in and in close vicinity of the Ostrovets site, in order to establish relation between intensity points and PGA using unique methodology, developed by Ukrainian researches. Lithuania holds that this method is able to establish the relationship between magnitude of explosion and “maximum acceleration”; however, the relationship between intensity and “maximum acceleration” remains unexplained. Lithuania requested Belarus to provide detailed information with regard to the mentioned Ukrainian methodology for analysis.

Lithuania repeatedly raised the question how the Design Earthquake and Maximum Design Earthquake characteristics, used by Belarus in seismic hazard evaluation for the Ostrovets site, corresponded to the commonly accepted seismic hazard levels – SL-1 and SL-2, as defined in the IAEA documents (e.g. SSG-9 (NS-G-3.3) and NS-G-3.6) and what were the seismic hazards assessment values (SL-1 and SL-2) in terms of peak ground acceleration (PGA) for design basis.

Lithuania referred to the IAEA Safety standard NS-G-1.6, item 2.7 and emphasised that calculated peak acceleration value obtained for the Ostrovets site is less than 0.1g and does not correspond to the requirements of the aforementioned IAEA Safety standard. Moreover, Lithuania noted that the information on this parameter in different documents submitted by Belarus is contradictory and asked to present consistent final values of SL-2 and SL-1 for the Ostrovets site, and to explain if they correspond to the requirements of the IAEA document NS-G-1.6, item 2.7. Lithuania requested Belarus to provide consistent integrated information regarding seismic hazard assessment.

Lithuania noted inconsistency of deterministic seismic hazard assessment, as different assumptions and methodologies have been adopted for deterministic assessment of seismic hazards for 3 different seismogenic zones influencing the Ostrovets site. Item 4.12 of the IAEA document SSG-9 states „<..>For sites in intraplate settings, the largest observed earthquake may not be a good estimate of M_{max} . <...>“. Accordingly, the parameter M_{max} for intracratonic areas of low seismicity has to be assessed using commonly accepted safety margin of 0.5 and has to be calculated as $M_{max} = M_{max_observed} + 0.5$. Lithuania noted that Belarus in the deterministic seismic hazard evaluation for the two closest seismogenic zones (Daugavpils and Ashmyany) to the Ostrovets site used only the assumption that $M_{max} = M_{max_observed}$.

Belarus accepted that approach ($M_{\max} = M_{\max_observed} + 0.5$) could be adopted for the Kaliningrad seismogenic zone, however this position has not been integrated in EIA or other project documentation. Moreover, Belarus did not agree that the same approach could be adopted to the Ashmyany and the Daugavpils seismogenic zones, located in close vicinity of the Ostrovets site.

Lithuania requested Belarus to provide the same calculations of peak ground accelerations and intensities for the Ostrovets site from the Ashmyany and the Daugavpils seismogenic zones using safety margin of 0.5. Belarus promised to carry out deterministic seismic hazard assessment for these zones using $M_{\max} = M_{\max_observed} + 0.5$ assumption and to provide new data to the Lithuanian side in writing, as consistent package of integrated data and information.

Essential Lithuanian requests to Belarus:

- 1) To carry out direct probabilistic seismic hazard calculations for the Ostrovets site following the recommendations of the IAEA documents (Safety standards NS-R-3, NS-G-1.6 and SSG-9 (items 1.2 and 6.4.) adopting commonly accepted and verified methodologies and to provide seismic hazards assessment (e.g. seismic hazard levels SL-1 and SL-2) in terms of obtaining ground motion values (Peak Ground Acceleration) for the NPP design basis in the Ostrovets site;
- 2) To provide consistent final value SL-2 for the Ostrovets site used for project documentation that corresponds the requirements of the IAEA document NS-G-1.6;
- 3) To make additional deterministic seismic hazard calculations of peak ground accelerations and intensities for the Ostrovets site induced by the Ashmyany and the Daugavpils seismogenic zones using safety margin of 0.5 while assessing the maximum potential magnitude M_{\max} ;
- 4) To provide the aforementioned information related to seismic hazard assessment for the Ostrovets site in writing as consistent package of integrated data and information by updating and amending the EIA report or adding it as an Annex to the EIA report.

4. IAEA's Site and External Events Design (SEED) mission and stress-tests for Belarus NPP:

Lithuania repeatedly called on Belarus to immediately accomplish the International Atomic Energy Agency's (IAEA) Site and External Events Design Review Service (SEED), in its full scope, with a view to provide an independent review of the site evaluation and the design of the NPP. Lithuania has been reiterating the request since 2013. Lithuania also urged Belarus to fulfil its commitment of June 23, 2011 to undertake comprehensive risk and safety assessments (stress tests), taking into account the agreement with the European Commission. Lithuania insisted on Belarus to invite experts from the European Union, including Lithuania, to take part in the IAEA SEED mission and the stress-tests exercise, as only international expertise can guarantee impartial assessment. Belarus reiterated its promise to accomplish the IAEA SEED mission⁵ and the stress tests in December 2016, yet Belarus ignored Lithuanian request regarding the explicit information about the planned dates and scope of the mentioned international review exercises, and the participation of the EU (including Lithuanian) experts in the mentioned international review. Belarus even demonstrated a lack of understanding how the stress tests and the SEED mission should be performed. Belarus side claimed that the scope of the SEED mission will be set by IAEA, **meanwhile the scope of IAEA mission is under the request of the inviting country. In this context, Lithuania insisted on Belarus to suspend the construction works in the Ostrovets site until the above mentioned international commitments are fulfilled.**

Essential Lithuanian requests to Belarus:

- 1) To provide information on exact date and scope of the IAEA SEED mission;
- 2) To provide information on exact date and scope of the stress tests exercise;

⁵ <https://issc.iaea.org/web/seed.html>

- 3) To perform the stress tests of the Ostrovets NPP in accordance with the European specification⁶, including the peer review of the results of the stress test with participation of the EU and Lithuanian experts;
- 4) To perform the IAEA SEED mission for the Ostrovets NPP site in its full scope (all six modules⁷) with the participation of the EU and Lithuanian experts;
- 5) To present to Lithuania and the Implementation Committee of the Espoo Convention the results and reports of the stress tests and the IAEA SEED mission;
- 6) To implement the recommendations given as a result of the stress tests and the IAEA SEED mission before the commissioning of the Ostrovets NPP;
- 7) To suspend construction works of the Ostrovets NPP until the IAEA SEED mission and the stress tests are fully accomplished;
- 8) To revise the decisions on the Ostrovets NPP construction if prohibiting factors are identified or the recommendations following the stress tests and the IAEA SEED mission with regard to the Ostrovets site not implemented.

5. Assessment of impacts in case of accidents. Preparedness and response to a nuclear or radiological emergency:

In the discussion on the site selection, Belarus experts noted that population density ($\Rightarrow 100$ people/km²) could be a prohibiting factor when considering location for an NPP. However, Belarus acknowledged that only the population density in the territory of Belarus was assessed and situation in Lithuania was not taken into account. Furthermore, it is important to note that the Ostrovets NPP is situated only 40 km⁸ away from Lithuanian capital Vilnius, which is the most densely inhabited and biggest Lithuanian city (~543 thousand residents). This information is of utmost importance, as the International Atomic Energy Agency (IAEA) requires to assess the possibility to implement emergency preparedness plans in the areas most likely to be affected before choosing the location for a NPP⁹. During the meetings Belarus noted that it limited the assessment to its own territory and is planning emergency preparedness only for the territory of Belarus, but not for Lithuania.

Belarus did not evaluate population density in Lithuania, did not take into account that Vilnius was not only the capital city of Lithuania, but also the most densely inhabited city. Lithuania strongly opposes the approach that Belarus applied in assessing the population density and, consequently, possible radiological impact. Lithuanian experts estimate that in case of an accident at the Ostrovets NPP, one third of the Lithuanian population (within the radius of 100 km from the Ostrovets NPP) could be affected. Lithuania strongly insisted that Belarus takes into account Lithuanian population density and short distance from the Ostrovets NPP to the Lithuanian capital and the biggest city Vilnius (40 km¹⁰) and to reassess a possible radiological impact on Lithuanian population in line with the most recent recommendations of HERCA-WENRA¹¹. Belarus estimates that Lithuanian population will not face any radiological threats even in case of accidents at the Ostrovets NPP. However, Lithuanian Center for

⁶ http://www.ensreg.eu/sites/default/files/EU%20Stress%20tests%20specifications_1.pdf

⁷ In April 2016 Belarus declared that it would accomplish only 5th and 6th modules of the SEED mission that were related to construction and design evaluation and was about to skip the first four modules for site selection criteria and site evaluation. Lithuania requests to accomplish the SEED mission in its full scope, especially, as issues of site selection that Lithuania has been raising, remain without answers.

⁸ 40 km from the Belarus NPP to the Vilnius city boundary and 50 km to the city centre.

⁹ The IAEA Safety Requirements NS-R-3, para 2.28 and 2.29, <http://www-pub.iaea.org/MTCD/publications/PDF/Pub1709web-84170892.pdf>

¹⁰ 40 km from the Belarus NPP to the Vilnius city boundary and 50 km to the city centre.

¹¹ Heads of the European Radiation Protection Authorities (HERCA) and Western European Nuclear Regulators Association (WENRA) in 2015 developed and agreed on a new approach to further improve the response and cross-border coordination for all types of possible accident scenarios including severe accidents, like the one in Fukushima. It contains overarching principles and provides an incentive for joint actions between neighbouring countries. In 2015 Belarus joined WENRA as an observer and committed to implement WENRA's recommendations.

Physical Sciences and Technology (former – Institute of Physics) modelled an accident at the Ostrovets NPP (level 7, INES scale¹²) and concluded that protective actions, such as evacuation, sheltering, iodine thyroid blocking and restrictions of consumption of food and other commodities¹³ for Vilnius residents might be necessary, as in the first 7 days residents of Vilnius might get 100 mSv radiation dose. At the request of Belarus, Lithuanian experts gave a detailed presentation on the assessment of the radiological consequences of the NPP accident at the Ostrovets site at the meeting of 13-14 September in Minsk.

Lithuanian experts having evaluated the emergency preparedness zones and measures to be applied in case of an accident at the Ostrovets NPP that were foreseen by Belarus, concluded that they are not in line with the international recommendations set by the IAEA, and HERCA-WENRA. The EIA report for the Ostrovets NPP states that in case of a serious beyond design-basis accident the preventive action zone should not exceed 800 m from the NPP, iodine prophylaxis should be applied up to 4 km (for pregnant women and children up to 12 km), sheltering would be required up to 6 km, evacuation might be considered only for pregnant women and children up to 4.7 km, restrictions of consumption of locally produced food – up to 30 km. This contradicts the recommendations of the IAEA and the HERCA-WENRA for the emergency preparedness and planning zones. Lithuania considers that Belarus' approach to estimation and setting of emergency planning zones does not meet recommendations of the IAEA and the HERCA-WENRA. According to the HERCA-WENRA approach¹⁴ and the new IAEA recommendations¹⁵ the extended planning zone should be set up to 100 km radius (in case of Lithuania it includes 14 administrative districts, including Vilnius region, a total population of ~919 000 residents), where sheltering and iodine prophylaxis must be applied.

Table No 1. The IAEA and the HERCA-WENRA recommendations for the emergency preparedness and planning zones

The IAEA¹⁶ recommendation	HERCA-WENRA¹⁷ recommendation
<p>Off-site emergency zones and distances around the NPP:</p> <ul style="list-style-type: none"> • Precautionary action zone (PAZ). Distance: 3-5 km, actions: evacuation, sheltering, iodine thyroid blocking (ITB); • Urgent protective action planning zone (UPZ). Distance: 15-31 km, actions: evacuation, sheltering, ITB, deactivation, restrictions of consumption of food; • Extended planning distance (EPD). Distance: 100 km, actions: ITB, sheltering; and • Ingestion and commodities planning distance (ICPD). Distance: 300 km, actions: restriction of 	<p>HERCA and WENRA consider that in Europe:</p> <ul style="list-style-type: none"> • Evacuation should be prepared up to 5 km around nuclear power plants, and sheltering and iodine thyroid blocking (ITB) up to 20 km; • A general strategy should be defined in order to be able to extend evacuation up to 20 km, and sheltering and ITB up to 100 km.

¹² INES scale - International Nuclear and Radiological Event Scale (min – 1, max – 7), is a tool for promptly and consistently communicating to the public the safety significance of events associated with sources of ionizing radiation. Accidents at the Chernobyl NPP and the Fukushima NPP were of level 7, INES scale.

¹³ These indicated protective actions are used if the projected dose exceeds 100 mSv in the first 7 days.

¹⁴ HERCA-WENRA Approach for a better cross-border coordination of protective actions during the early phase of a nuclear accident, Stockholm, 22 October 2014.

¹⁵ Actions to Protect the Public in an Emergency due to Severe Conditions at a Light Water Reactor, IAEA, 2013.

¹⁶ Actions to Protect the Public in an Emergency due to Severe Conditions at a Light Water Reactor, IAEA, 2013, http://www-pub.iaea.org/MTCD/Publications/PDF/EPR-NPP_PPA_web.pdf

¹⁷ HERCA-WENRA Approach for a better cross-border coordination of protective actions during the early phase of a nuclear accident, Stockholm, 22 October 2014, http://www.wenra.org/media/filer_public/2014/11/21/herca-wenra_approach_for_better_cross-border_coordination_of_protective_actions_during_the_early_phase_of_a_nuclear_accident.pdf

consumption food and other commodities.	
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Essential Lithuanian requests to Belarus:

- 1) To reassess possible radiological impact on Lithuanian population, taking into account population density not only in Belarus, but also in the territory of Lithuania, including Lithuanian capital and biggest city Vilnius. The estimations should be based on the recommendations of the IAEA and the HERCA-WENRA;
- 2) After the realistic reassessment of the population density around the Belarus NPP, including Lithuanian territory, to develop emergency preparedness and response plans in case of accidents at the Belarus NPP.
- 3) To conclude agreement with Lithuanian nuclear safety regulatory authority VATESI on exchange of experience and information on nuclear safety issues and early notification in case of nuclear accidents. The draft agreement has been submitted to Belarus in April 2016 so far no response has been received regarding the content of the draft agreement. Additional request for information was made in the beginning of September.

6. Potential contamination of the river Neris (Vilija) and groundwater resources in capital Vilnius in case of major accidents in Ostrovets NPP

Lithuania repeatedly provided information about the potential contamination of the groundwater resources in the capital Vilnius in case of major accidents in the Ostrovets NPP, as it was estimated by 3D numerical modelling of Lithuanian scientists in 2014 (*Gregorauskas et al., 2014*). The river Neris is envisaged as the main cooling source for the Belarus NPP. The river flows through the Lithuanian capital Vilnius and belongs to the Nemunas river basin, which covers 72 percent of Lithuanian territory. The only source of potable water in Vilnius is groundwater. 11 out of 20 watering places of Vilnius city are located on the banks of the river Neris and groundwater resources are partly refilled with the river water by filtration through the soil. Moreover, these 11 watering places contain 73% of total potable water supply of Vilnius and can be directly affected by a major accident in the Belarus NPP. In case of a major accident at the Ostrovets NPP, water of the river Neris, contaminated with radioactive substances, would reach Northern Vilnius wellfields that are located on the riverbanks only 30 km from NPP within 12 hours. It was estimated that due to this radioactive contamination 57-89% of exploitable groundwater resources could be lost in the wellfields of the biggest city Vilnius (~543 thousand residents), the second biggest city Kaunas (~297 thousand residents) and Jonava city (~29 thousand residents). A special plan for potable water supply in case of a major accident should be prepared for Vilnius, Kaunas and Jonava cities. At the request of Belarus Lithuanian experts presented the study mentioned above at the meeting of 13-14 September in Minsk. Lithuania repeatedly requested to consider the presented information and to reassess the potential radioactive contamination of the river water and groundwater, taking into account the fact that radioactive pollution can result not only by dispersion of radionuclides in the air (Belarus applied such approach for the modelling of potential contamination of river Neris water), but also by direct discharges to the river, which could occur in case of a major accident. In case of a major accident it is crucial to know the radioactive status of the water in the river Neris in real time, thus, monitoring program with the access to real-time data must be assured to Lithuanian side.

The pollutants transported through the river Neris eventually fall into the Baltic Sea, so thermal, hydrological, radiological and chemical impact on the river is particularly important in terms of environmental protection. Transfer of radionuclides in aquatic environment depends on many conditions (type of watercourse, accumulation zones, water flow, chemical and physical characteristics of certain radionuclide, etc.) and the impact can be characterised as long term impact. During the time long-lived radionuclides usually settle down to the bottom sediments, where they become the secondary source of pollution. Radiological pollution of watercourse causes the exposure of flora and fauna. Therefore,

Lithuania repeatedly required information from Belarus about the planned measures of treatment and control of water contaminated with radionuclides during normal exploitation and in case of accidents.

Lithuania requested to provide input data and preconditions used for modelling of the possible releases, level of contamination and potential impact on the river Neris in Lithuanian territory in case of a major accident. In the EIA report of the Ostrovets NPP, Belarus considered releases of radioactive substances only to the air, modelled the dispersion of radionuclides in a small territory and assessed possible consequences of a medium-level accident; however, Belarus did not consider the consequences of the most severe accident (INES 7). The accident in Chernobyl NPP demonstrated that dispersion and diffusion of radionuclides can cover very large areas. Even after 30 years, the accident at the Chernobyl NPP accounts for the radioactive pollution of the Baltic Sea, which remains the most polluted sea with Cs-137 in the world.

Lithuania also raised questions regarding leakage of large amount of contaminated water that may occur in case of accidents. However, Belarus did not provide any information how the contaminated water will be collected, handled/stored; what thermal effects are expected or what critical conditions were estimated; what preventive measures are planned to ensure that contaminated water did not reach the river Neris.

Lithuania repeatedly requested Belarus to present information regarding the measures that were planned to avoid possible cooling malfunctioning in order to ensure that the demand of water supply to the NPP will always be sufficient, especially when there is a need to artificially preserve the minimum permissible flow rate in the Neris River. However, no reliable information has been given (i.e. how much water (in quantity, not percentage) will be taken from the Neris River in order to ensure the cooling of the NPP under various conditions and frequency). Lithuania required to provide information and schemes on how to increase the water flow in the Neris River from the Vileyka, Snigyanskoye and Olkhovskoye reservoirs in case of emergency; to provide explanations on how the possible conflicts among various water users will be handled; how in practice the water flow of the Neris River close to the intake point will be controlled; and what administrative measures (i.e. sanctions) will be applied in order to ensure the minimum permissible flow rate in the Neris River. In order to prove that the watercourse can be safely used as the exclusive source of water for cooling of the NPP, the assessment should include summer drought period when hydrological parameters of the watercourse are much worse than average annual. Climate change should also be taken into account, as increasing air temperatures and reduction of the watercourse level may substantially affect the assessment results. Belarus declared that the climate change will not affect water resources of the Neris river; however, Lithuanian monitoring data shows high fluctuations of the level of the river Neris, especially near the border with Belarus, with a decreasing trend.

Essential Lithuanian requests to Belarus:

- 1) To carry additional assessment on the potential contamination of the river water and groundwater with radioactive substances, taking to account the fact that radioactive contamination can reach the river Neris not only by air but also through the direct discharges to the river;
- 2) To reassess possible radiological impact on Lithuanian population, taking into account population density not only in Belarus, but also in the territory of Lithuania, which is only 20 km from the Ostrovets NPP, including Lithuanian capital and the most densely inhabited city Vilnius only 40 km¹⁸ from the NPP. The estimations should be based on the recommendations of the IAEA and the HERCA-WENRA;
- 3) To provide detailed information about the planned measures on treatment and control of water contaminated with radionuclides during normal exploitation conditions of the Ostrovets NPP and in case of accidents;

¹⁸ 40 km from the Belarus NPP to the Vilnius city boundary and 50 km to the city centre.

- 4) To provide detailed information on the measures that are planned in order to avoid possible cooling malfunctioning and to ensure safe use of the river Neris as the exclusive source of water for the cooling of the NPP;
- 5) To present an updated surface and groundwater monitoring program that would include assessment of impacts in case of major accidents at the NPP and would ensure Lithuanian access to real time data.

7. Design of the Ostrovets NPP

Lithuania raised questions regarding the compliance of the design AES-2006, chosen by Belarus, with the international safety standards. The Western European Nuclear Safety Regulators Association (WENRA) requires to consider the effects of an intentional crash of a large commercial aircraft for all new NPPs, without consideration of probability of such an event and despite the air corridors above. Lithuania inquired if Belarus has assessed the resistance of the Ostrovets NPP to a heavy airplane crash, considering the WENRA recommendations and the assessment made by the Finish nuclear safety regulator STUK (*Säteilyturvakeskus*). STUK assessed the Russian State Atomic Corporation “Rosatom” NPP design AES-2006 that is also being constructed in the Ostrovets site and concluded¹⁹ that the nuclear reactor containment building of the AES-2006 cannot resist a heavy aircraft crash and the design must be significantly modified: the outer containment building must be reinforced in order to withstand a crash of a heavy aircraft crash; physical separation of safety systems to protect the safety functions must be introduced. At the request of Finland “Rosatom” agreed to implement these requirements and to reinforce the containment building. It should be pointed out, that in the absence of more extensive structural protection, and the independence of system of severe accident management it is difficult to demonstrate the adequate retention of the safety functions in the event of an aircraft crash. Therefore, all the mentioned improvements should be implemented in the Ostrovets NPP before the commissioning. Correction of air corridors may be considered as only supplementary measures against a crash of an airplane. **Belarus declares that the NPP can resist only a light airplane (~5 tones) crash; however, no evaluations for a heavy commercial airplane (200 tones or more) have been made, although in a worst case scenario it could result in high releases of radionuclides into the atmosphere. It should be stressed that Belarus participates in WENRA activities as observer, but refuses to take over its experience and implement its recommendations.**

In the EIA report (i.e. page 41) of the Ostrovets NPP, as well as in the mass media^{20,21}, it was stated that the NPP design AES-2006 is in compliance with EUR (European Utility Requirements²²) requirements; however, Lithuania informed Belarus, that no evidence of certification of AES-2006 design against EUR requirements were found and asked Belarus for clarification. Belarus admitted that the AES-2006 design has not passed EUR certification.

Lithuania repeatedly raised concerns regarding the possible radioactive contamination on the transboundary river Neris²³ in case of accidents at the Ostrovets NPP, as Belarus has no solutions for the treatment of potentially large volumes of contaminated water. One of the outcomes of European stress tests was to consider treatment of potentially large volumes of contaminated water²⁴.

¹⁹ <https://www.stuk.fi/documents/88234/148256/alustava-turvallisuusarvio-liitel-fennovoima.pdf/b4a6a5ab-e798-4d88-a752-baf34b1e87df>

²⁰ http://atom.belta.by/en/dosie_en/view/belarusian-nuclear-power-plant-project-ntimeline-208/

²¹ <http://archive.rosatom.ru/en/presscentre/highlights/50dbef0048a71f2e9f0adfdb97771387>

²² The European Utility Requirements (EUR) aim at harmonisation and stabilisation of the conditions in which the standardized light water reactor NPPs to be built in Europe.

²³ The River Neris, flowing through the city of Vilnius, is one of the most important rivers in Lithuania and is envisaged for cooling purposes of the Ostrovets NPP that is situated upstream from Lithuania. The river Neris flows into the biggest Lithuanian river Nemunas and into the Baltic Sea. The Nemunas River basin covers 72 percent of Lithuanian territory. The river Neris is a significant source that supplements underground potable water used in Vilnius.

²⁴ http://www.ensreg.eu/sites/default/files/EU%20Stress%20Test%20Peer%20Review%20Final%20Report_0.pdf

Essential Lithuanian requests to Belarus:

- 1) To implement all safety requirements and recommendations given by Finish regulator STUK for AES-2006 design in the design of Ostrovets NPP, including the reinforcement of the outer containment building and physical separation of safety systems;
- 2) To gain certification of NPP design, applied for Ostrovets NPP against European Utility Requirements;
- 3) To prepare solutions for the treatment of potentially large volumes of contaminated water at the Ostrovets NPP site before commissioning of it in order to prevent radioactive contamination of the river Neris;

8. Nuclear Safety Regulatory authority

The role of the nuclear safety regulatory authority is of utmost importance during the implementation of a NPP project, regulation and supervision of nuclear safety issues in the development of the entire nuclear programme that shall include radioactive waste management infrastructure in the country. The regulator shall: establish the national regulatory system in accordance with the international safety standards and practices (e.g. the IAEA standards and WENRA safety goals and levels); supervision of the implementation of those requirements; and act in an open and transparent manner in the decision making in the process of authorisation and control of licensee's activities, as well as in case of incidents or accident.

According to Lithuanian knowledge, in Belarus the legal framework in the field of nuclear energy is incomplete and lacks nuclear safety regulations. Both Belarus nuclear safety regulator and the IAEA experts have identified regulatory gaps concerning: a) supervision and control of the implementation of the Belarus NPP project, b) sanctioning process, c) radioactive waste and spent fuel management, d) civil liability for nuclear damage. Information on the measures taken to eliminate the above-mentioned regulatory gaps was not provided. Although the nuclear safety regulator is responsible for the supervision and control of the implementation of a nuclear facility, Belarus nuclear safety regulatory authority "Gosatomnadzor" (Department within the Ministry of Emergency Situations of Belarus) did not issue any evaluations on the incidents that occurred at the Ostrovets NPP in the period of April-August 2016. However, all the comments, including on the incident of 10th July when a 330-tone reactor vessel dropped down from the height of 4 m., were given by the Russian State Nuclear Energy Corporation Rosatom. Taking this into account, among other things, Lithuania has serious doubts regarding the competence and independence (including independence from political decisions) of the Belarus nuclear safety regulator.

Belarus nuclear safety regulator and its technical support organizations experts' capability to carry out the proper licensing and safety review of the safety justification documentation as well as effective supervision of the construction process raise serious doubts. In 2012, the IAEA INIR mission concluded that Belarus nuclear safety regulator and its technical support organization do not have sufficient specialists, relevant knowledge and experience for expert assessment, which was needed to conduct the review of safety justification documentation and other licensing documents qualitatively, as well as efficient supervision of the construction process. It remained unclear, whether licensing and safety justification documentation provided by the Operating organization have been thoroughly analysed by the Belarus nuclear safety regulator and whether the construction process itself is effectively supervised.

Essential Lithuanian requests to Belarus:

- 1) To establish modern and transparent regulatory system based on internationally recognised safety standards;
- 2) To establish mandatory safety regulations based on the IAEA safety standards, as well as WENRA safety goals and reference levels, including those dedicated for new designs and other recognised international practices. Practices of other countries, not only of Russia, should be analysed and applied;

- 3) To ensure independence of the Belarus nuclear safety regulator “Gosatomnadzor”;
- 4) To present the Belarus nuclear safety regulator’s evaluation of the incidents at the Ostrovets NPP in the period of April-August 2016 and explain its role and responsibility with regard to the supervision of construction works of the NPP and nuclear safety issues. To provide explanations why Belarus nuclear safety regulator did not provide their own assessments and comments to the media on the incidents happened during the construction of the Belarusian NPP;
- 5) To ensure active participation of the Regulator in stress tests and other international missions;
- 6) To conclude agreement with Lithuanian nuclear safety regulatory authority VATESI on exchange of experience and information on nuclear safety issues and early notification in case of nuclear accidents.

9. Recent incidents at the construction site of the Belarusian NPP; Measures taken to control and ensure highest quality of construction works and during operation of the NPP; Prevention and management of incidents

Lithuania requested for comprehensive information about the four incidents that have occurred at the Ostrovets NPP in the period of April – August, 2016, (on April 8, June 4, July 10, and August 26). Lithuania noted that the incident of 10 July, when, according to available information, a 330-ton reactor vessel was dropped from the height of 4 m, was especially serious and could have negative impacts on the safety of the NPP, if the damaged vessel is used. Belarus did not disclose any information about the incident until it appeared in the independent Belarus media on July 25. Even then, Belarus officials denied the fact of an incident, calling it an “unusual situation” and the contractor general of the Ostrovets NPP, the Russian State Nuclear Energy Corporation Rosatom, tended to downgrade the scale of the incident by saying that the reactor vessel did not fall down, but touched the ground at a speed of a pedestrian²⁵. Only due to active Lithuanian stance on the issue Belarus disclosed some information, however refused to provide the video that recorded the incident, and admitted that the damaged reactor vessel must be replaced. The Minister of Energy of Belarus Mr. Potupchik on 11 August 2016 asked Rosatom to do so. In the meeting of 13-14 September, Lithuania inquired, when the reactor vessel will be replaced and requested to dismantle the damaged one. Belarus informed that the replacement details were being negotiated with Rosatom and Belarus was not interested, where the reactor vessel will end up, as it was the property of Rosatom.

Lithuania is concerned about Belarus attitude towards transparency and openness. Lithuania learned about the incidents from the independent Belarus media with a delay of several weeks, instead of being operatively informed by Belarus authorities. Lithuania stressed that the recurrent incidents reveal a pattern of Belarus behaviour: firstly, to always deny any incident, afterwards, when the information is leaked in the independent media, to admit the fact of the incident, but make every effort to downgrade the consequences. In case of these incidents, Belarus did not inform neither the national and neighbouring public, nor the international organisations. At the meeting of 13-14 September, Belarus noted that as long as the nuclear fuel was absent from the Belarus NPP, it had no obligation to inform neither the international organisations, nor the neighbouring countries, thus demonstrating a formalistic point of view towards the international good practise. However, Lithuania pointed out that the IAEA has relevant platform for the collection and effective dissemination of construction, operating and decommissioning experience information among Member States, i.e. the IAEA IRS (International Reporting System for Operating Experience).

Belarus also demonstrated a lack of understanding of the key safety culture aspects; therefore, Lithuania is even more concerned about the serious systematic problems of Belarus attitude. Belarus declared that the Operating organization has a strong quality assurance programmes, which should prevent serious incidents during construction, and stressed that the rules of contractor dismissal from work in case of

²⁵ “Rosatom: Belarusian NPP reactor housing not damaged, but we can replace it” (publication dated 2 August 2016 <http://belsat.eu/en/news/rosatom-korpus-reaktaru-belaes-ne-pashkodzhany-ale-my-gatovyva-yago-zamyanits/>)

violation of requirements (i.e. “red card system”) are strict. In this regard Lithuania noted that quality assurance programmes is not sufficient in order to build strong safety culture while punishment and fear atmosphere may lead to hiding of safety related problems, errors and defects. This leads to serious deterioration of safety culture particularly in the areas, which are characterized by the following safety culture attributes “*The management system should establish a working environment in which staff can raise safety issues without fear of intimidation and retaliation*” and “*Open reporting of deviations and errors is encouraged*”.

Essential Lithuanian requests to Belarus:

- 1) To assure that information on all the incidents at the Ostrovets NPP was provided to Lithuania in reasonable time with conclusion on potential impact of such incidents on future safe operation of the NPP;
- 2) To assure advanced, effective and transparent control on the construction of the Ostrovets NPP;
- 3) To provide information on the licensee's ability to implement its direct responsibilities for safety by properly controlling the construction process and ensuring that the Belarus NPP is being built according to the agreed project documentation and international standards;
- 4) To provide information about the causes of the incidents that occurred in 2016 as well as corrective measures taken not only to deal with the consequences of these incidents, but also to avoid similar incidents in the future a) in operating (customer) organization; b) in main contracting organizations and c) in organization, performing the supervision of nuclear safety;
- 5) To provide information about the approved rules of notification of incidents and their investigation during the construction of nuclear facility as well as Belarus nuclear safety regulator's actions in informing the public about the incident and the independent assessment results;
- 6) To provide information how the independent control of production, transportation and installation of the substitute reactor vessel will be ensured and what is the Belarus nuclear safety regulator's role in this process. How will it be ensured that the damaged reactor vessel will not be used in other Belarus NPP units?
- 7) To provide explanations, what is the relationship between the Belarus nuclear safety regulator and the Belarus NPP contractor general Rosatom. Why did Rosatom issue press releases in the media about the incidents, but the Belarus NPP and Belarus nuclear safety regulator did not provide their own assessments and comments?

10. Spent nuclear fuel and radioactive waste management policy and plans

in our context

At the meeting of 13-14 September in Minsk, Lithuania noted the faulty practise of the most post-soviet countries to keep the radioactive waste for an indefinite time in temporary storages. The IAEA holds and it is globally accepted that the only sustainable solution for radioactive waste disposal is geological repositories in old and stable geological formations. Besides, the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management requires to avoid imposing undue burdens on future generations.

The information presented by Belarus does not show clear policy for responsible and sustainable management of the radioactive waste. Lithuania has not received answers, how, where, and when the waste from the NPP will be disposed of. These questions are extremely important in case of high level long lived waste that requires deep geological disposal. Safety of radioactive waste in Belarus is essential for Lithuania as the Belarus NPP is only 40 km from Lithuanian capital Vilnius.

Belarus has informed Lithuania about the plans to transport Spent Fuel to Russia; however, it raises a number of additional questions. Import of radioactive waste to Russia is forbidden by law; therefore, Russia can accept spent fuel for reprocessing only and the secondary waste that remains after reprocessing must be returned to Belarus. At the meeting of 13-14 September Belarus noted that the issue

is still being discussed with Russia and no solutions are found yet. Belarus also informed Lithuania about the ongoing development of the radioactive waste management program, but it foresees only a near surface repository. This technical solution does not allow to dispose of high level and long lived radioactive waste that is unavoidable in the operation of a NPP even if the secondary radioactive waste from fuel reprocessing remains in Russia.

It must be noted that construction of the radioactive waste management facilities take significant time and sufficient time for these activities must be devoted. For the time being the sustainability of the whole schedule of nuclear program development in Belarus is at question, as there is currently no understanding about what radioactive waste management facilities and when they will be needed and is there sufficient time devoted for their construction. It is assumed by Belarus that there is 10 years of power plant operation to resolve these issues, but taking into account the international practice for construction of radioactive waste and spent nuclear fuel management facilities this time might be not sufficient.

Essential Lithuanian requests to Belarus:

Belarus should develop sustainable and responsible radioactive waste management program resolving the following questions:

1. How Belarus will dispose of the secondary waste from spent fuel reprocessing and other long lived high level radioactive waste?
2. Where and how the long lived waste, including the secondary waste, will be managed and stored?
3. How a geological disposal site will be selected?
4. How Belarus will finance construction of geological repository?

11. Organization of environmental monitoring

The question on organisation of national monitoring was not discussed at the meetings due to the lack of time; however, Lithuania noted that the Directorate-General for Energy of the European Commission proposed to Belarus to accomplish the verification mission according to the Euratom Treaty Article 35. In 2015, the European Commission sent an official proposal with regard to the verification mission in Belarus, but did not receive any answer. Lithuania wondered, why Belarus did not react to this proposal. Lithuania had two verification missions, in 2005 and 2011, and benefitted from European expert visits. Belarus claimed that the invitation was not received.

Verifications are carried out in the EU Member States; however, the verification missions were also initiated in the EU neighbouring countries. At the Euratom Treaty Article 35-36 Experts' Meeting, which was held on 5-6 April, 2016, Belarus was mentioned as an especially important verification target.

III. Conclusions

Lithuanian and Belarus approaches towards the implementation of the Ostrovets NPP project, the application of the transboundary EIA procedures, international requirements and nuclear safety standards, safety culture and management of incidents at the Ostrovets NPP are fundamentally different. The bilateral expert discussion revealed that Lithuanian and Belarus positions differ on all the issues with regard to the Ostrovets NPP: site selection, absence of alternative sites in the EIA process, violation of the UN Espoo Convention, geological, seismological and hydrological assessment of the Ostrovets NPP, possible radiological impact on Lithuania, use and possible impact on the river Neris, the risk and safety assessment (the stress tests), the IAEA SEED mission, safety of the NPP design, work and safety culture, competence and independence of the nuclear safety regulator. The main issues of disagreement:

- **The transboundary EIA.** Lithuania holds that the transboundary EIA procedures in line with the Espoo Convention for the Belarus NPP are still pending: Lithuanian questions remain unanswered; the revised EIA report, which would meet the requirements of the Espoo convention and Findings and Recommendations of the Implementation Committee, has not been submitted to Lithuania, the public hearings have not been arranged, experts' consultations in accordance with Article 5 of the Espoo Convention have not been completed. Belarus refuses to implement its obligations under Espoo Convention;
- **The International Experts' Commission,** proposed by the Implementation Committee of the Espoo Convention modelled after the Inquiry Commission set in Appendix IV. Lithuania highly supports the initiative; however, Belarus categorically refuses it;
- **Assessment of locational alternatives for the construction of the NPP, site evaluation and selection criteria.** Belarus has not provided Lithuania with consistent integrated specific data (geological and tectonic maps, cross-sections etc.) on the geological and seismo-tectonic structure of the sites (capability of faults, suffusion-karst processes, risk of technogenic flooding, etc.), has not presented information related to the site selection process (Belarus claims the information is classified). Lithuania requested Belarus to provide to Lithuania presentations given during the meetings of 21-22 June and 13-14 September and include all the presented information in the form of a revised EIA report, or as an Annex to the EIA report for further analysis by Lithuanian experts and public consultations. However, Belarus refused to revise the EIA report. Moreover, Belarus agreed to share the information and presentations only under the condition that Lithuania admitted that the transboundary EIA for the Belarus NPP is finished;
- **Seismic hazard assessment.** Belarus has not carried out the direct probabilistic seismic hazard assessment to determine seismic hazard levels SL-1 and SL-2 for the NPP design basis in the Ostrovets site according to the recommendations of the IAEA. Belarus fails to make consistent deterministic seismic hazard assessment for the Ostrovets site according to the internationally accepted methodologies;
- **The IAEA SEED mission and the stress tests.** Belarus has not provided information on the exact date and scope of the IAEA SEED mission and the stress tests exercise. Lithuania holds that the stress tests for the Ostrovets NPP must be performed without any further delay, strictly according to the European specification and with the participation of the EU and Lithuanian experts. The IAEA SEED mission for the Ostrovets NPP project must be performed as a matter of urgency, in its full scope (should include all six modules) and with the participation of the EU and Lithuanian experts. Until the IAEA SEED mission and the stress tests are fully accomplished, the construction works of the Ostrovets NPP must be suspended. The recommendations resulting from the stress tests and the IAEA SEED mission must be implemented before the commissioning of Ostrovets NPP. If the Ostrovets site appears to be unsuitable, the decisions on the construction of the Ostrovets NPP must be reviewed;
- **Preparedness and response to nuclear or radiological emergencies.** Belarus has assessed population density around the Belarus NPP only in the territory of Belarus and did not take into account that Vilnius was not only the capital of Lithuania, but also the most densely inhabited city and the distance from Vilnius to the Ostrovets NPP is only 40 km. Lithuania requests to re-estimate population density and reassess possible radiological impact on Lithuanian public in case of accident at the Belarus NPP in line with the requirements and recommendations of the IAEA and HERCA-WENRA as up to 1/3 of Lithuanian population might be affected by Belarus NPP.
- The IAEA requires to assess population density with a view to evaluate the feasibility to plan and implement emergency preparedness measures. If it is impossible to implement emergency preparedness plans, the site should be deemed unsuitable for the construction of a NPP;
- **Potential contamination of the river Neris and potable water.** Lithuania requests Belarus to carry out assessment of potential radiological contamination of the river Neris and groundwater resources, taking into account that radionuclides can reach the river Neris not only from the air, but also through the direct discharges, and the radioactive contamination could reach Vilnius wellfields within 10-12 hours. Belarus should also provide information about the planned measures for treatment and control of water contaminated with radionuclides during normal exploitation and in case of accidents, about

the planned measures in order to avoid possible cooling malfunctioning of the NPP and ensure safe use of the river Neris as the exclusive source of water for cooling of NPP. Lithuania requests Belarus to present an updated surface and groundwater monitoring program that would ensure among other things Lithuanian access to real time data;

- **Impact of a heavy aircraft crash.** Belarus is requested to assess the impact of a heavy aircraft crash on the Belarus NPP, taking into account the recommendations of WENRA and Finnish nuclear regulator's findings with regard to the NPP design AES-2006. Lithuania requests Belarus to reinforce the outer containment building of the NPP so that it would be in line with European standards and requirements;
- **Belarus nuclear safety regulatory authority.** The competence and independence of the Belarus nuclear safety regulator remain doubtful. Belarus should establish a transparent regulatory system based on internationally recognised safety standards. Lithuania encourages Belarus to conclude the bilateral agreement on exchange of experience and information on nuclear safety issues and early notification in case of nuclear accidents;
- **Incidents at the Belarus NPP and quality of construction works.** In the period of April-August, 2016, four incidents occurred at the Belarus NPP, but Lithuania was not informed by Belarus authorities. Moreover, Belarus concealed and negated the information. Taking into account the principles of openness, transparency and good neighbourliness, Belarus should operatively inform Lithuania about all the incidents (causes, consequences, assessment, conclusion on possible impact, etc.) at the Belarus NPP and ensure effective and transparent control of the construction works according to the agreed project documentation and international standards. As the reactor vessel was damaged during the incident of July 10th, Lithuania requested Belarus to have the vessel replaced. Lithuania raises questions, how the independent control of production, transportation and installation of the substitute reactor vessel will be ensured;
- **Spent nuclear fuel and radioactive waste management.** Belarus has no clear policy for responsible and sustainable management of the radioactive waste. It is especially relevant in case of high level long lived waste that requires deep geological disposal. Belarus can rely on Russia only for the reprocessing of the spent fuel, but secondary waste as well as radioactive waste resulting from the operation of a NPP, will have to be managed in Belarus. Lithuania is concerned that the Belarus radioactive waste management program foresees a near surface repository only, which does not allow to dispose of high level and long lived radioactive waste;
- **Organization of environmental monitoring.** This issue was not discussed at the bilateral Lithuanian-Belarus delegations' meetings due to the lack of time. It should be noted that Lithuania has a lot of unanswered questions regarding the environmental monitoring to the Belarus side.

The issues mentioned above were opened at the bilateral Lithuanian-Belarus delegations' meetings of 21-22 June in Vilnius and of 13-14 September in Minsk. Lithuania considers that the analysis of the issues regarding the Ostrovets NPP has only started and in this process Lithuania hopes for open and benevolent cooperation from Belarus. Lithuanian position is based on the argumentation presented above that can be summarized as follows: Belarus refuses to present to Lithuania presentations given at the meetings and information regarding the researches of the alternative sites for the construction of the Belarus NPP and criteria for the selection of the Ostrovets site, ignores Lithuanian requests to reassess the possible negative impact to Lithuanian environment and populations (population density, radioactive contamination of the river Neris and, consequently, potable water, impact of a heavy aircraft crash, preparedness for emergency situations due to possible accidents at the Belarus NPP, etc.), delays the accomplishment of the stress tests and the IAEA SEED mission, and refuses to engage international experts that would serve as a means for restoring mutual trust.