



**LIETUVOS RESPUBLIKOS APLINKOS MINISTERIJA  
THE MINISTRY OF ENVIRONMENT OF THE REPUBLIC OF LITHUANIA**

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**EIA DECISION ON THE PROPOSED ACTIVITY – RECONSTRUCTION AND  
TRANSFORMATION OF IGNALINA NPP STORAGE FACILITY OF BITUMINISED  
RADIOACTIVE WASTE INTO REPOSITORY**

This letter notifies your State of the environmental impact assessment decision on the proposed activity – “Reconstruction and transformation of the Ignalina NPP storage facility of bituminised radioactive waste into a repository”.

As required by Article 6(2) of the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) and provisions of national legislation of the Republic of Lithuania, please find enclosed the final decision, which includes the reasons and considerations on which it was based.

We would like to thank you for successful and constructive consultations and assure that the Republic of Lithuania will continue its contribution towards open and transparent transboundary EIAs.

ENCLOSED. Decision on the environmental impact of the reconstruction and transformation of INPP storage facility of bituminised radioactive waste into repository, 2024-04-26 No (30-2)-A4E-5434 (translation into English, 15 pages).

Vice-minister

Raminta Radavičienė



**ENVIRONMENTAL PROTECTION AGENCY**

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**DECISION ON THE ENVIRONMENTAL IMPACT OF THE RECONSTRUCTION AND TRANSFORMATION OF INPP STORAGE FACILITY OF BITUMINISED RADIOACTIVE WASTE INTO REPOSITORY**  
**No. (30-2)-A4E- of 2024-**

**1. Organiser (Customer) of the proposed economic activity (legal entity, person of contact, address, phone).**

State Enterprise Ignalina Nuclear Power Plant, Drūkšiniai v., LT-31500 Visaginas, phone +370 386 24382, fax +370 386 24396, e-mail: [koliada@iae.lt](mailto:koliada@iae.lt)

**2. Developer of the Environmental Impact Assessment documents (legal entity, person of contact, address, phone).**

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**3. Name of the proposed economic activity, legal grounds of the environmental impact assessment according to Article 3(1) of the Law of the Republic of Lithuania on Environmental Impact Assessment of the Proposed Economic Activity, with indication of clause (clauses) of Annex 1 of the Law of the Republic of Lithuania on Environmental Impact Assessment of the Proposed Economic Activity and/or indication of a selection conclusion made by the designated authority that the environmental impact assessment is mandatory (letter number and date) or a significance conclusion of the protected areas authority that the impact can be significant (letter number and date).**

The Environmental Impact Assessment (hereinafter referred to as the “EIA”) for the proposed economic activity (hereinafter referred to as the “PEA”) — the reconstruction and transformation of the Ignalina NPP storage facility of bituminised radioactive waste into a repository— has been carried out in accordance with the provisions of the Law of the Republic of Lithuania on the Environmental Impact Assessment of Proposed Economic Activity (hereinafter referred to as the “Law on EIA”) Annex 1, article 3.5 (“processing and (or) storage of irradiated nuclear fuel or radioactive waste”) and article 3.7 (“disposal of radioactive waste in a repository”).

**4. Site for the proposed economic activity location (county, municipality, township; city, town, village, or farmstead; street).**

The Ignalina Nuclear Power Plant (hereinafter referred to as the “INPP”) is located in the north-eastern part of Lithuania, on the shore of Lake Drūkšiai, close to the state borders with Belarus and Latvia (the site of the PEA is at the distances of 5 km and 8 km, respectively), at Utena district, Visaginas municipality, Drūkšiniai village, Elektrinės str. 4. A sanitary protection

zone (SPZ) has been established around the Ignalina NPP within a radius of 3 km, where economic activities not related to the operation and decommissioning of the Ignalina NPP are restricted and there are no permanent residents.

According to the detailed plan of the land plots of the SE “Ignalina Nuclear Power Plant”, approved by the Visaginas municipal administration order No. IV-460 “On the approval of the detailed plan” of 19 May 2010, the land with a total area of 419.1762 ha (12 plots of land) is assigned for the use of the INPP. Other land plots were transferred to JSC “Visaginas AE” and PLLC “Lietuvos Energija”, 2 plots were returned to the State Free Land Fund. The bituminised radioactive waste storage facility (Building 158) is located within the industrial area that belongs to SE “Ignalina Nuclear Power Plant”, about 200 m west from the first reactor unit and about 600 m from the south shore of Lake Drūkšiai.

## **5. Description of the proposed economic activity (key technical and economic indicators, alternatives considered, etc.).**

The PEA is the reconstruction and transformation of the Ignalina NPP bituminised radioactive waste storage facility (building 158) into a repository by installing surface engineered barriers, i.e. the implementation of the waste disposal *in situ* approach.

Building 158 has been operated as a bituminised radioactive waste storage facility from 1987 to the present and is monitored according to the currently valid Ignalina NPP environmental radiological monitoring programme. Bituminised radioactive waste (hereafter referred to as “RAW”) is derived from bitumen and salt concentrate, which is generated by vaporizing INPP operational and decommissioning liquid radioactive waste. The storage facility is an above-ground two-storey rectangular construction (~74×75 m) with bearing walls and concrete blocks for biologic protection. The facility is located above ground level, at the first floor 11 canyons (sections) are located, the capacity of each is 2500 m<sup>3</sup> (working volume – 2000 m<sup>3</sup>) and one canyon is of 1000 m<sup>3</sup> capacity (working volume – 800 m<sup>3</sup>). Three canyons are empty and one is partially filled.

During the implementation of the PEA, the transformation of the bituminised RAW storage facility into a repository will be carried out in stages, which will include the preparation of the storage facility for reconstruction, the installation of engineered barrier structures, the formation of the engineered barrier (multilayer cap), and the institutional control period. The following activity stages and their implementation periods are planned:

- 1) Filling in all the unfilled canyons of the storage facility (preliminary term 2028–2029).
- 2) Dismantling of the second floor of the storage facility (preliminary term 2028–2029)
- 3) Covering of all flooring and exterior walls of the storage facility with waterproofing materials (preliminary term 2028–2029).
- 4) Conservation and maintenance of the storage facility (preliminary term 2029–2039).
- 5) Installation of engineered barrier supports of the future repository on the flooring of Building 158 (preliminary term 2039–2040).
- 6) Installation of the engineered barrier of the repository (preliminary term 2039–2040).
- 7) Period after repository closure, i.e. institutional control period (100 years of active control and 200 years of passive).

Before the installation of engineered barriers of the repository (Stage 6), the nearby buildings 150, 151, 156 and 158/2 must be dismantled. The dismantling of these adjacent buildings will be carried out in accordance with the Final Decommissioning Plan<sup>1</sup> of SE Ignalina NPP, which foresees that these buildings 150, 151, 156 will be demolished by 2037. The presence of the adjacent buildings does not affect the implementation of Stages 1–5 of the PEA. However, the beginning of the implementation of Stage 6 directly depends on the dismantling of the adjacent buildings, and the dismantling of these buildings and its environmental impact assessment will be

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<sup>1</sup> The Final Decommissioning Plan of the SE Ignalina NPP, approved by the Order No. 1-248, of the Minister of Energy of the Republic of Lithuania of 11 August 2020 (hereinafter referred to as the Final Decommissioning Plan of the Ignalina NPP).

presented in the Ignalina NPP decommissioning EIA report (the decommissioning of the INPP is planned for 2038). Since Stage 6 of the PEA is expected to start no earlier than after 15 years, during this entire period the necessary repair works of the storage facility (building 158), maintenance of required technical state, environmental monitoring, and periodic safety assessment will be carried out.

The main objectives for the installation of the surface engineered barrier (multilayer cap) are the following:

- limiting surface moisture (rain, melting snow, etc.) infiltration to the repository and at the same time minimizing solving of waste and waterborne spread of radionuclides;
- protection against direct contact with potential recipients (human, fauna, flora);
- control of gas releases that may be generated in the waste.

The possibilities of transforming the bituminised RAW storage facility at Ignalina NPP into a repository have been being evaluated since 2007, when a feasibility study for transforming the storage facility into a repository was prepared (Study of possibilities to transform the interim storage of bituminised radioactive waste (building 158) at Ignalina NPP into a final repository (substantiation of long-term safety), 2009). An IAEA expert mission was organised in 2015 to assess the feasibility of converting the storage facility into a repository, and in 2019–2022 a conceptual design of the repository (Repository Concept, Volume I “Conceptual Design”, 2021) was prepared, the safety justification of the repository concept (Repository Concept, Volume II “Report on safety justification of the repository concept”, 2022) and an evaluation of the repository site (Repository site evaluation report, 2022) were performed. Taking into account the characteristics of the bituminised radioactive waste and the features of the site, the conceptual design of the repository considers possible technical solutions for the installation of engineered barriers during the transformation of Building 158 into a repository. Engineered barriers of different thicknesses and layers were also analysed taking into account the peculiarities of the constructions of Building 158, the possible loads of engineered barriers, the requirements for ensuring radiation safety, and the external impacts of the environment. It was stated that the optimal option for the transformation of Building 158 into a repository would be to dismantle the 2<sup>nd</sup> floor of Building 158 and to install steel-reinforced concrete structures on the remaining reinforced concrete upper cover of Building 158, which would support the 5.8 m thick engineered barrier (multilayer cap) installed above the building. Before the installation of the engineered barrier, the 2<sup>nd</sup> floor of Building 158 will be dismantled after the project has been prepared and permission for dismantling has been obtained.

The anticipated components of the surface engineered barrier and their functions are as follows:

- 1 – Gas removal layer (sand layer). Designed for the removal of moisture that penetrated surface engineered barriers or discharge of gases, since the possibility of gas release from bituminised waste cannot be completely excluded. The layer shall be formed with the required slope to ensure proper water drainage. Layer thickness – 20 cm;
- 2 – Insulating clay layer. It is a waterproofing layer of the repository made of natural materials. It shall protect the repository from moisture ingress. Layer thickness from 2.4 m along the centre of the storage facility to 1.5 m along the perimeter;
- 3 – Drainage layer for water removal. Drainage layer shall be formed of gritty sand. Layer thickness – 30 cm;
- 4 – The protective layer is designed to protect against external actions, such as human intrusion, and water infiltration. The protective layer consists of moraine clay. Layer thickness – 70 cm;
- 5-7 – Drainage layers for water removal. The layers are also intended for protection against intrusion of humans and / or animals. The drainage layer would consist of crushed stone (thickness of 80 cm), sandy gravel (thickness of 60 cm) and dusty sand (thickness of 60 cm). The total thickness of the drainage layers is 2 m;

- 8 – Vegetation layer. The vegetation layer is designed to protect against climatic factors such as freezing, thawing, and erosion. The vegetation layer would consist of soil and plants. Vegetation layer 20 cm.

#### ***Information on the evaluated alternatives of PEA***

An analysis of PEA alternatives is performed in the EIA Report. “Zero”, location and technological alternatives were considered. In the case of the “zero” alternative, it was concluded that the indefinite storage of bituminised radioactive waste in Building 158 was not feasible because previous assessments had shown that in the long term, the structures of Building 158 would start to degrade and would not provide a reliable containment of the waste. When considering the location alternative, i.e. the repository is constructed in another site, the bituminised radioactive waste from Building 158 should be retrieved, placed in appropriate packages and transported to the disposal site. This alternative would lead to additional socio-economic challenges in the selection of the repository site, it would be necessary to develop the technology for waste retrieval, treatment and transport of the waste would lead to increased exposure of personnel and the members of population. For technological alternatives, different technical solutions of the engineered barrier were considered, preliminary assessment of the advantages and disadvantages of these solutions was performed and an optimal solution was selected. The conversion of RAW storage facilities into repositories and the installation of surface engineered barriers is a well-known and worldwide used method for the RAW isolating from the environment. Cases of transformation of storage facilities into repositories have been successfully implemented in France, Great Britain and the USA.

#### ***Information on waste management***

The main source of pollution of the PEA, whose impact on environmental components is assessed in detail in the EIA report, is the radioactive waste located in Building 158. After the transformation of Building 158 into a repository, it will be used to dispose of the bituminised RAW (i.e. the waste already loaded in the nine canyons) and in the remaining three empty ones (canyons 7–9) it is intended to place inert materials (e.g. sand; the final decision will be made during the preparation of the Technical Design).

According to nuclear safety requirements BSR-3.1.2-2017, bituminised RAW is attributed to solid radioactive waste of classes B and C, i.e. to short-lived low- and intermediate-level radioactive waste. In accordance to requirements on radioactive waste management, the RAW of classes B and C should be disposed of in a near surface repository. It is conservatively assumed in the EIA Report that the bituminised radioactive waste from Ignalina NPP decommissioning will be class C waste. Over the entire period from 1987 to 2015 (when the bituminisation process was stopped), a total of approximately 14 422 m<sup>3</sup> of bituminised RAW was accumulated in the storage facility. The amounts of the bituminised RAW in the canyons of Building 158 and the periods of their filling, as well as their activities in the planned repository, are presented in Tables 1.4 and 1.5 of the EIA Report.

The waste generated during the PEA shall be converted into secondary raw materials or reusable materials as much as possible. During the dismantling of the construction and communication structures of the 2<sup>nd</sup> floor of Building 158 and the removal of unnecessary roof layers, preliminarily it is estimated that the following amounts of waste will be generated: dismantling of brick walls (by extracting bricks) will generate 630 m<sup>3</sup>; dismantling of the walls from small blocks will generate 630 m<sup>3</sup>; dismantling of monolithic reinforced concrete partitions will result in 465 m<sup>3</sup>; dismantling of pipelines will result in 80 tons; dismantling of frames will generate 120 tons; dismantling of the equipment will generate 25 tons.

#### ***Information on PEA impact on water***

Surface and artesian waters are used for the operational needs of Ignalina NPP. The source of the surface water is Lake Drūkšiai, and the artesian water is supplied to Ignalina NPP by SE “Visagino energija” which operates the complex of watering facilities in Visaginas. During the PEA, surface water will not be used, only the artesian water will be used for the sanitary and hygiene needs of the personnel performing the activities. It is expected that there will be no local

water demand for construction works (mainly concrete pouring), because already prefabricated concrete will be supplied to the site.

The sanitary and hygiene needs of the personnel implementing works of the PEA will be ensured in separate buildings (sanitary rooms). Wastewater from the showers and sinks of sanitary rooms will be collected in the sewage collection system. The generated wastewater will be treated as potentially radioactive waste. The radiological and chemical parameters of the accumulated wastewater will be measured. Depending on the measurement results, the accumulated wastewater will be processed in the liquid radioactive waste treatment facility or pumped for treatment to the wastewater treatment facility.

During the PEA, i.e. filling in all the unfilled canyons, dismantling of the second floor, installation of engineered barriers and other activities and during the subsequent institutional control period, no uncontrolled releases to water are expected because the operator will monitor the repository state and, if necessary, perform recovery works.

Computer programs AMBER and COMSOL were used to model radionuclide transport through engineered barriers of the repository, ground water, and in geosphere. Maximum activity values of radionuclides diffused from the bituminised RAW through concrete side walls as well as bottom layers and the foundation of the building in the case of the natural evolution scenario are presented in Table 4.3 of the EIA Report. The results of the assessment show that the total activity of radionuclides in water is mainly determined by radionuclides that have diffused through the repository walls. The groundwater monitoring network at the INPP site currently consists of 114 monitoring boreholes, including two most recent monitoring boreholes No. 72399 and 72400 that were drilled in 2019 in the vicinity of Building 158. Information on the annual average concentrations of radionuclides measured in the monitoring boreholes in the vicinity of Building 158 for the period of 2016–2022 is provided in the EIA Report. No gamma nuclides (Cs-137, Co-60) were detected in groundwater samples during all measurement periods (concentrations below the detection limit).

The main preventive measure against potential water contamination during the PEA due to potential waste leaching from the repository will be monitoring of the state of the repository's engineered barriers and, if necessary, their corrective works and ensuring the functioning of the drainage system located within the repository area, and its continuous maintenance up to the end of the active institutional control period.

#### ***Information on PEA impact on ambient air***

Bituminised waste is solidified RAW, and therefore, no gaseous radionuclide releases during the PEA are expected. During the operation of Building 158 in 1987–2015, periodic safety analysis reports were prepared, air samples were taken through breathers in order to determine the activity of aerosols inside the storage facility, and gas formation due to radiolysis was evaluated. It was found that hydrogen production because of radiolysis in the canyons of the bituminised waste storage facility is negligible, and the aerosol activity inside the storage facility corresponds to background values.

During the PEA, larger amounts of radionuclides could be released into the ambient air only in the event of accidents and inadvertent intrusion into the repository after the end of the institutional control period. The assessment of the atmospheric dispersion of radionuclides released to ambient air and sedimentation of radionuclides onto the ground surface was performed using the AERMOD modelling system and the Lakes Environmental Consultants Inc. developed user interface AERMOD View. According to the data presented in the EIA report, the radiological impact on the population due to radionuclide releases to ambient air in the case of accidents and unintended intrusion into the repository after the period of institutional control is insignificant.

Non-radiological air pollution may be expected during reconstruction activities of the storage facility and construction of engineered barriers for the future repository from mobile sources: lorries, earthmovers, etc., which will be used for transportation of construction materials and engineered structures, and installation of the surface engineered barriers of the repository. Due to these activities, NO<sub>x</sub>, SO<sub>2</sub>, CO, CO<sub>2</sub>, solid particles will be released into the ambient air; however,

the pollution will be local, covering the area of reconstruction or installation of engineered barriers and their surroundings within a radius of ~50 m. Since the activities will be carried out in the open air, natural air circulation will prevent the accumulation of significant concentrations of these pollutants. According to the data of ambient air chemical and radiological monitoring, which has been being carried out since the start of INPP operation, the decommissioning activities of the INPP have not had a significant negative impact on the ambient air so far.

***Information on PEA impact on soil, underground***

As part of environmental monitoring, INPP has been carrying out radiological measurements of soil samples in the INPP region since 1986 and presents the measurement results of the soil samples in the annual radiological monitoring reports. Soil samples are also taken and analysed at individual sites of INPP nuclear facilities (buffer storage (B19-1), SWRF (B2), ISFSF (B1), SWTSF (B34), and “Landfill” near-surface disposal facility (B19-2)). The results of radiological monitoring of the Ignalina NPP region shows (Table 4.6 and Figure 4.15 of the EIA Report) that the variation in the radionuclides concentrations in the soil samples during the monitoring period is insignificant.

The INPP site, where building 158 is located and where the planned surface engineered barriers will occupy a part of the existing buildings 158/2, 150 and other buildings as well as the existing roads, is affected by the INPP construction and operation and is nearly everywhere covered by man-made ground, and therefore there is no natural soil at the site. The man-made ground contains the mixture of the clayey loam, pebble, gravel, sand and the organic residues in certain places. During the implementation of the PEA, no additional impact increasing disturbance and contamination of the existing ground layer is anticipated, and no negative impact on the soil is expected. The EIA report indicates that, based on the available information and the studies of recent years, no valuable underground resources have been found at the NPP industrial site and its surroundings, and the impact of the PEA on the underground (geological) components is not expected.

***Information on PEA impact on landscape and cultural heritage objects***

The existing storage facility is located within the INPP industrial site, no activities outside the INPP site is planned, and therefore no other impact on the landscape is expected, apart from the fact that the storage facility will become an artificial hill of about 13 m high. The impact of the PEA on the landscape is not expected.

The territory of the PEA does not interfere with the territories of cultural heritage objects or their protection zones. The following cultural heritage objects are located outside the INPP industrial site, at a distance of 0.6–2.5 km from the site of the PEA: Petriškės ancient settlement, Petriškės ancient settlement II, Petriškės ancient settlement III, Petriškės mound, Grikiniskės ancient settlement, Grikiniskės ancient settlement II, Grikiniskės ancient settlement III. The reconstruction and transformation of the storage facility into a repository does not violate the regulations of the cultural heritage protection zone, and no impact on cultural heritage objects is expected.

***Information on impact of PEA on biodiversity and protected areas***

The PEA will be carried out on the territory of the INPP industrial site. Building 158 has been operated as a bituminised RAW storage facility since 1987 and no negative impact on biodiversity is expected due to the PEA.

The PEA is not implemented in state-protected areas thus no impact on them is expected. The nearest state protected area is the Smalva hydrographic reserve, which is located about 3.8 km from the territory of the PEA. The nearest Natura 2000 sites to the PEA territory are the habitat conservation area Lake Drūkšiai (LTZAR0029) and the bird conservation area Lake Drūkšiai (LTZARB003), which are located approximately 500 m to the north of the PEA territory.

***Information on the impact of PEA on public health***

The PEA will not produce any significant impact of conventional (non-radiological) nature that could have a negative impact on public health. The impact due to noise or dust (air pollution) during the dismantling works and installation of the repository engineered barrier is possible only

locally at the site and in the immediate vicinity of the repository (about 300 m away from the repository), where there are no inhabitants, and the personnel performing the work will use personal protective equipment to reduce the impact of noise and dust: earmuffs, respirators, protective glasses, etc.

A potential public health impact source that needs to be assessed is ionizing radiation. The EIA report contains a potential radiological impact assessment on the environment as well as to the population resulted from radionuclide release from the planned bituminised waste repository, installed in accordance to engineering and technical solutions and proposed measures, and considering a long-term safety. Detailed information on the assumptions made in the assessment, the methodology used and the results obtained is provided in the following reports: Repository Concept, Volume II “Report on safety justification of the repository concept” (Revision 8, 2022) and Repository site evaluation report (Revision 10, 2022).

Maximum exposure dose values to the reference person are evaluated and compared with design criterion, which is set at 0.1 mSv per year for the planned repository, i.e. lower than the effective annual dose constraint of 0.2 mSv defined in Lithuanian hygiene standard HN 73:2018<sup>2</sup> for operation and decommissioning of nuclear facilities. Such value of the design criterion was defined taking into account the fact that in addition to the planned bituminised RAW repository other nuclear facilities (NF) are (or will be) in operation at the INPP site. Therefore, the exposure of the reference person must be distributed in such a way that the total annual dose caused by all NF at the site cannot exceed the dose constraint. The limiting annual dose value of 10 mSv, which is established in the VATESI document<sup>3</sup>, is accepted for analysis of scenarios of inadvertent intrusion into the repository.

Performed assessment covers the time period of institutional control (100 years of the active and 200 years of the passive control) of the repository and the time period after the institutional control until the maximum impact on the reference person is possible. The impact on the reference person was assessed for the following scenarios: water pathway considering natural evolution (reference scenario), alternative (No. 1-3), hypothetical (cases 1-7) and inadvertent intrusion (road construction, drilling, and repository on-site residence) scenarios. The summarized results of the radiological impact assessment to population of the considered scenarios are presented in Table 4.29 of the EIA report. In all cases, the calculated annual doses to the reference person are below the permissible limits.

#### ***Information on PEA risk due to emergency events and situations***

The purpose of the repository’s engineered barrier is not only to isolate radioactive waste from the environment, but also to protect it from the external impacts of the environment. In the EIA report, an assessment of the risk of possible accidents of the PEA was carried out, and accidental situations that could potentially be caused due to extreme events and their possible radiological impact on the environment were identified. The following initiating events that potentially can cause damage to engineered barriers of the repository and radionuclide releases into environment:

- external natural, namely earthquake, ground settlement, increase of atmospheric precipitation;
- external man-induced, namely airplane crash onto the repository;
- internal man-induced, such as a fire;
- failure of the equipment and its components, namely malfunctioning of drainage system.

According to the data of the EIA report, in all considered cases, the expected doses remain a few times or even orders of magnitude below the design criterion value 0.1 mSv per year, or the event probability is lower than the screening probability level. In accordance with the INPP

<sup>2</sup> Lithuanian Hygiene Standard HN 73:2018 “Basic Standards of Radiation Protection”, approved by Order No. 663 dated 21 December 2001 of the Minister of Health of the Republic of Lithuania.

<sup>3</sup> Nuclear Safety Requirements BSR-3.2.2-2016 “Radioactive Waste Repositories”, approved by Order No. 22.3-188 dated 30 November 2016 of the Head of the State Nuclear Power Safety Inspectorate.



emergency preparedness plan, the PEA will be integrated into the existing INPP emergency preparedness structure.

**6. The measures to avoid, mitigate and compensate the potential significant adverse impact on the environment or to liquidate consequences thereof are provided for. Below is a description of such measures, with the indication of specific stage of the proposed economic activity when such measures will be provided for and implemented, e.g. stage of issue construction permit, permit to use underground resources or cavities, permit for integration prevention and control of pollution, pollution permit or other statutory permits, operation stage, operation termination stage).**

#### **6.1 Before the start of the proposed economic activity**

6.1.1 A comprehensive environmental monitoring programme and transboundary impact monitoring programme will be developed.

6.1.2 The technical design of the facility and safety justification documentation will be prepared in accordance with the requirements of legal acts and coordinated with the responsible institutions.

6.1.3 Detailed identification of extreme events (fire, explosion, equipment failure, human error, etc.) and the assessment of consequences will be carried out during the preparation of the safety analysis report for the reconstruction and transformation of the storage facility into a repository.

#### **6.2 During implementation stage**

6.2.1 Taking into account the fact that the dismantling of Buildings 150, 151, 156 and 158/2 located near the bituminised radioactive waste storage facility may last until 2037, Building 158 will be conserved, and every 2 years inspections of the storage structures will be carried out, assessments of the technical condition of the building will be performed and, if necessary, repairs will be carried out.

6.2.2 During the dismantling of the second floor of Building 158, the aim will be to convert the resulting waste into secondary raw materials or materials for reuse as much as possible.

6.2.3 The main preventive measures against possible water pollution caused by the possible dispersion of RAW from the repository during the PEA will be the monitoring of the condition of the engineered barriers of the repository and, if necessary, their corrective works, as well as ensuring the functioning of the drainage system in the territory of the repository and its continuous maintenance until the end of the active institutional control.

6.2.4 Wastewater from the showers and sinks of sanitary rooms will be collected in the sewage collection system and will be treated as potentially radioactive waste. Radiological and chemical parameters of the collected wastewater will be measured. Depending on the results, the collected wastewater will be processed in the liquid radioactive waste treatment facility or pumped for treatment to the wastewater treatment facility.

6.2.5 After the storage facility is reconstructed and transformed into a repository, environmental monitoring will be carried out according to the repository monitoring programme coordinated with the authorities. Once the operation has started, the PEA organiser shall be preparing the transboundary impact monitoring report (in English) annually for the previous calendar year and submitting it to the Ministry of Environment as stipulated in the transboundary impact monitoring programme.

6.2.6 During the operation stage, in the event of emergency situations, the following plans are to be followed: the plan for the liquidation of the consequences of emergency events and accidents at Ignalina Nuclear Power Plant prepared by the Visaginas Fire and Rescue Board, accident liquidation plan No. 7 for the Bituminous mass storage facility (Building 158), and the SE INPP emergency preparedness plan.

**7. Brief description of the environment surveillance (monitoring) measures, if applicable.**

From 1987 to the present day, Building 158 is a storage facility for bituminous radioactive waste, which is monitored according to the currently valid INPP environmental radiological

monitoring programme. In accordance with this programme, groundwater samples are taken from the boreholes in the vicinity of the building, and dose rate values on the roof and walls of the building are measured at defined points, etc. This EIA report provides a conceptual description of environmental radiological monitoring when Building 158 will be transformed into a repository, i.e. engineered barriers will be installed, and a multilayer cap will be formed. The environmental monitoring of the repository will include measurements of the dose rate, and external absorbed dose and radionuclide activities in various environmental components.

The tentatively proposed environmental monitoring points and the environmental components to be radiologically monitored during the active institutional control period of the repository are provided in the EIA Report. A detailed environmental radiological monitoring programme will be developed during the preparation of the technical design. Before the start of the proposed economic activity, the organiser of the PEA will prepare and submit to the Ministry of Environment a transboundary impact monitoring programme (in English), and once the implementation has started will annually submit the transboundary impact monitoring report prepared for the previous calendar year in accordance with the transboundary impact monitoring programme.

## **8. Conclusions submitted by the relevant parties of the Environmental Impact Assessment (nature, date, letter no.)**

8.1 State Nuclear Power Safety Inspectorate by letter No. (13.5Mr-43)22.1-174 of 29/02/2024 submitted a conclusion on approval for the environmental impact assessment report and the PEA.

8.2 The Utena Department of the National Public Health Centre under the Ministry of Health by letter No. (9-11-14.3.3-Mr)2-3748 of 22/01/2024 submitted a conclusion on approval for the environmental impact assessment report and the PEA.

8.3 Radiation Protection Centre by letter No. (1.11E)2-270 of 25/01/2024 submitted a conclusion on approval for the environmental impact assessment report and the PEA.

8.4 Fire and Rescue Department under the Ministry of the Interior by letter No. (9.4-528/2024(10.23 E) of 26/03/2024 submitted a conclusion on approval for the environmental impact assessment report and the PEA.

8.5 The Panevėžys-Utena territorial division of the Department of Cultural Heritage under the Ministry of Culture by letter No. 2PU-106-(9.38-PU) of 05/02/2024 submitted a conclusion on approval for the environmental impact assessment report and the PEA.

8.6 Mayor of Visaginas Municipality by letter No. (4.21Mr) 1-275 of 02/02/2024 submitted a conclusion on approval for the environmental impact assessment report and the PEA.

8.7 State Service of Protected Areas under the Ministry of Environment by letter No. V3-342 of 02/02/2024 submitted a conclusion on approval for the environmental impact assessment report and the PEA.

## **9. Public information and participation (where, when, and how the public was informed and participated, summarized nature of the proposals of the public concerned by topics).**

The public was informed about the prepared EIA report through the following information channels: the website of the Visaginas district municipality and the bulletin board on 17/11/2023; Visaginas city weekly paper “VisInfo” of 17/11/2023; the website of the EIA report developer on 17/11/2023; the website of the PEA organiser on 17/11/2023. Before the public introduction to the EIA report, printed copies of the report were exhibited in Visaginas city municipality and in the premises of the Lithuanian Energy Institute (the EIA report developer).

The public meeting for introduction of the EIA report to the public took place on 20/12/2023 at 5 p.m. in the premises of the Visaginas municipality (Parko g. 14, Visaginas) and was broadcasted live on the Microsoft Teams platform. Before the public introduction, no suggestions from the public were received, and no comments and suggestions regarding the EIA report were received during the meeting either.

The Agency informed the public about the prepared EIA report on 20/11/2023 and about the received EIA report on 08/03/2024 on its website <https://aaa.lrv.lt/> in the link *Veiklos sritys > Poveikio aplinkai vertinimas (PAV)*. Within the set deadline, the Agency did not receive proposals from the interested public regarding the EIA report and PEA environmental impact.

**10. Transboundary consultations (where, when, and how the transboundary consultations took place, nature of the proposals received).**

Two countries, Belarus (about 5 km away) and Latvia (about 8 km away), are relatively close to the INPP industrial site. The Ministry of Environment being a coordinating institution of the transboundary EIA process, in accordance with Article 3 of the Convention of the United Nations Economic Commission for Europe on Environmental Impact Assessment in a Transboundary Context, notified Latvia and Belarus and informed Poland by letter No. (10)-D8(E)-2821 of 10/05/2023 about the planned economic activity in Lithuania: the reconstruction and transformation of the INPP bituminised radioactive waste storage facility into a repository.

Responses were received from all three parties within the deadline set in the letter of notification. Poland indicated that it agrees that its environment will not be adversely affected, and therefore it will not participate in the transboundary environmental impact assessment procedures. Latvia and Belarus expressed their wish to participate in the transboundary environmental impact assessment procedures and submitted questions and comments that they requested to be taken into account in the preparation of the environmental impact assessment report and to provide an assessment of these proposals.

The developer of the EIA documents submitted to the Ministry of Environment the EIA report (in English), a non-technical summary of the EIA report (in English and Latvian) and answers to the questions submitted by Belarus for the planned economic activity.

On 06/12/2023, the presentation of the PEA and EIA report to the public and institutions of Latvia took place remotely on the Zoom platform. The memorandum of the meeting with Latvia (in English) is presented in Appendix 6 of the EIA report, and the answers to the questions asked by Latvian society and institutions as well as evaluation of proposals submitted are presented in Table 8.1 and Appendix 6 of the EIA report. The Ministry of Environment in letter No. D8(E)-407 of 17/01/2024 forwarded Latvia's letter regarding the EIA report and transboundary EIA procedures, on the basis of which it was established that transboundary environmental impact assessment consultations with Latvia were completed.

The Ministry of Environment by letter No. D8(E)-1093 of 27/02/2024 applied to the Ministry of Foreign Affairs with a request to transfer to Belarus through diplomatic channels the answers and the evaluation of the proposals (in English) prepared by the developer of the EIA documents. The answers to Belarus' questions and the evaluation of the proposals are presented in Table 8.2 and Annex 6 of the EIA report. The Ministry of the Environment by letter No. D8(E)-1853 of 10/04/2024 informed that no response was received from the Republic of Belarus within the deadline set, and therefore it was concluded that the Republic of Belarus had no further questions, and transboundary EIA consultations with the Republic of Belarus were considered completed.

A higher radiological impact on the environment water component may be anticipated due to the PEA, i.e. for Lake Drūkšiai, part of which is at the territory of Belarus. According to the data presented in EIA report, in the case of the water pathway scenario, considering a very conservative hypothetical case that lower layers, foundation, walls and top slab of the repository is cracked immediately after its closure, and the multilayer cap is also assumed to be degraded immediately after a closure, the maximum annual dose to the reference person who uses contaminated water from a well (located 50 meters from the repository) daily is  $2.908 \times 10^{-2}$  mSv/year, i.e. about 10 times lower than the dose constrain of 0.2 mSv/year. Taking into account that the nearest neighbouring settlements are more distant (at 5 and 8 km distances) from the site of the PEA, i.e. further than the distance taken into account for the assessment of the radiological impact on the reference person (50 metres away), the health impact on the population of neighbouring countries would be even lower when considering the same water pathways as for the reference person in the vicinity of the repository, because the dispersion coefficient shows that the increase in distance

from the source of the discharge results in a decrease in the activity concentrations of radionuclides and the resulting doses of radiation exposure. The impact of direct ionizing radiation to the population from the repository is insignificant. There is no other impact estimated for other environment components in the neighbouring countries during the performance of the proposed economic activity.

## **11. Conditions of implementation of the proposed economic activity related to the conducted environmental impact assessment:**

### **11.1 Before the start of the PEA**

11.1.1 The environmental impact of the dismantling of the buildings (150, 151, 156 and 158/2) located next to the repository must be assessed in the EIA report for the decommissioning of INPP.

11.1.2 In order to ensure the emergency preparedness of the storage facility/repository, the NPP emergency preparedness plan must be reviewed and updated accordingly.

### **11.2 During the operation stage**

11.2.1 The organiser of the PEA must, at their own expense, implement the measures provided for in the environmental impact assessment report and Clause 6 of this Decision to prevent, reduce, compensate or liquidate the negative impact on the environment.

11.2.2 The management of waste generated during the PEA must comply with the requirements of the Law on Waste Management of the Republic of Lithuania and other legal acts regulating waste management.

11.2.3 During the dismantling of the second floor of Building 158, the generated radioactive waste must be maximally decontaminated to the clearance levels (class 0). During the PEA, decontamination of the surfaces of construction structures must be performed if necessary.

11.2.4 After the PEA has started, the organiser of the PEA must submit to the Ministry of Environment no later than 1 July of the following calendar year an English version of the transboundary impact monitoring report prepared according to the transboundary impact monitoring programme and covering the period of the previous calendar year.

11.2.5 If it becomes clear during the activity that the impact on the environment is greater than the indicators presented in the EIA report or established in legal acts, the operator will be obliged to immediately apply additional measures to reduce the impact on the environment.

## **12. Reasons used in adopting the decision regarding the environmental impact of the proposed economic activity:**

12.1 PEA environmental impact assessment relevant parties who analysed the EIA report and provided conclusions, submitted positive conclusions regarding the EIA report and environmental impact of EIA in accordance with the provisions of Article 10 of the EIA Law.

12.2 The developer of the EIA report properly introduced the public to the EIA report in accordance with the requirements of the Procedure Description<sup>4</sup>. No offers were received from the public.

12.3 The planned reconstruction and transformation of the bituminised RAW storage facility into a repository will be carried out at the industrial site of INPP. According to the Final Decommissioning Plan of SE Ignalina NPP, after the completion of the decommissioning of INPP (planned in 2038), the facilities for the interim storage of spent nuclear fuel at the NPP will continue to be operated (until ~2065), and the institutional control of the very low-level radioactive waste repository and the low- and intermediate-level short-lived radioactive waste repository will last until ~2140 m and ~2330 m, respectively. The bituminised radioactive waste repository will be integrated into the infrastructure (environmental monitoring, physical safety, fire safety, engineering networks, access roads, offices, etc.) required for the functioning of the mentioned facilities.

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<sup>4</sup> Regulations on Environmental Impact Assessment of the Proposed Economic Activity, approved by Order of the Minister of Environment of the Republic of Lithuania no. D1-885 of October 31, 2017 "On Approval of the Regulations on Environmental Impact Assessment of Proposed Economic Activity" (hereinafter – Regulations).

12.4 The SPZ has been established around INPP within a radius of 3 km, in which any economic activity that is not related to the operation and decommissioning of the INPP facilities is restricted and there are no permanent residents within this zone. Based on the data of the chemical and radiological monitoring of the ambient air carried out since the start of operation of INPP until now, the decommissioning works of INPP have not had a significant negative impact on the ambient air so far. According to the information provided in the EIA report, no significant non-radiological and radiological environmental air pollution is foreseen during the reconstruction works of the storage facility and the construction of engineered barriers of the future repository.

12.5 INPP has many years of experience in carrying out previous dismantling and decontamination projects under the Final INPP Decommissioning Plan.

12.6 The territory of the PEA does not belong to the protected areas. The PEA will be carried out in the industrial site of the INPP and the negative impact on protected areas is not expected.

12.7 According to the information provided in the EIA report about the location of the PEA and the distances to the nearest immovable cultural heritage registered in the Register of Cultural Heritage, the effect of the PEA on immovable cultural heritage and their valuable properties is not foreseen.

12.8 The EIA report contains a risk analysis, scenarios of possible accidents, their causes and consequences. In all considered cases, the expected doses remain a few times or even orders of magnitude below the design criterion value 0.1 mSv per year, or event probability is lower than screening probability level. According to the PEA risk assessment of the potential accidents performed in the EIA report, no significant risk of the PEA due to emergency events and situations is foreseen.

12.9 The information presented in the EIA report shows that the PEA will have no significant negative impact either on the social and economic environment of the neighbouring countries, or natural components of the environment, or the health of the residents of these countries. The Ministry of Environment, as an institution authorized by the Government, coordinating the transboundary environmental impact assessment process, by letter no. D8(E)-407 (with the Republic of Latvia) of 17/01/2024 and letter no. D8(E)-1853 (with the Republic of Belarus) of 10/04/2024 concluded that the transboundary environmental impact assessment consultations with the Republic of Latvia and the Republic of Belarus had been completed.

12.10 According to the information provided in the EIA report, the use of measures reducing the impact on the environment and fulfilment of the conditions set out in Clause 11 of this Decision will ensure that the implementation of the PEA will cause no significant negative impact on the soil, surface of the earth and its depths, ambient air, water, climate, landscape, biological diversity, material values, immovable cultural heritage and the interaction of these elements; no significant negative impact on public health due to biological, chemical and physical factors of the PEA; no significant negative impact on the environment and public health due to the risk of the PEA emergency events and situations.

### **13. Alternative(s) supported or opposed**

According to the prepared EIA report, the main alternative for carrying out the PEA is approved, i.e. the reconstruction and transformation of the INPP bituminised radioactive waste storage facility (Building 158) into a repository.

**14. Nature of the decision regarding the environmental impact of the proposed economic activity (indicate whether the proposed economic activity corresponds/fails to correspond with the requirements of environmental protection, public health, protection of immovable cultural heritage, fire safety and civil safety legislation).**

Taking into account the stated reasons and following Article 12, Paragraph 1, Clause 2 of the EIA Law, the following decision is made: according to the prepared EIA report, the PEA—the reconstruction and transformation of the INPP's bituminised radioactive waste storage facility into a repository – **complies with** the requirements of environmental protection, public health, immovable cultural heritage protection, fire safety and civil safety legislation.

**15. Decision made based on this Environmental Impact Assessment Report.**

The decision on the PEA environmental impact is made based on the submitted environmental impact assessment report, which is a component of this Decision, and is published on the website of the Environmental Protection Agency <https://aaa.lrv.lt/> under the link *Poveikio aplinkai vertinimas (PAV) > 2024 metai > 9. Informacija apie priimtus sprendimus dėl planuojamos ūkinės veiklos poveikio aplinkai 2024 m. > Utenos apskritis*.

**16. Procedure of appeal of the decision regarding the environmental impact of the proposed economic activity.**

This Decision can be appealed to the Lithuanian Administrative Disputes Commission (Vilniaus g. 27, 01402 Vilnius) in accordance with the procedure established by the Law of the Republic of Lithuania on the Procedure for the Pre-Court Examination of Administrative Disputes or to the Administrative Court of Regions in accordance with the procedure established by the Law of the Republic of Lithuania on Administrative Cases within one month from the date of its delivery.

Director of the Environmental Analysis Centre,  
Acting Director

Jurgis Šarmavičius

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**LIST OF ADDRESSES OF THE AGENCY'S DECISION ON THE ENVIRONMENTAL IMPACT OF  
THE RECONSTRUCTION AND TRANSFORMATION OF THE INPP BITUMINISED  
RADIOACTIVE WASTE STORGAE FACILITY INTO A REPOSITORY**

Visaginas municipal administration

*Sent via e.pristatymas system*

National Public Health Centre under  
the Ministry of Health

*Sent via e.pristatymas system*

Fire and Rescue Department under  
the Ministry of the Interior

*Sent via e.pristatymas system*

Department of Cultural Heritage under  
the Ministry of Culture

*Sent via e.pristatymas system*

Radiation Protection Centre

*Sent via e.pristatymas system*

State Nuclear Power Safety Inspectorate

*Sent via e.pristatymas system*

State Service for Protected Areas under  
the Ministry of Environment

*Sent via e.pristatymas system*

For information

Environmental Protection Department of the Republic of Lithuania under  
the Ministry of Environment

*Sent via e.pristatymas system*

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