



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

for Investment Proposal:

**BUILDING A NEW NUCLEAR UNIT OF THE LATEST GENERATION
AT THE KOZLODUY NPP SITE**

**CHAPTER 8: DESCRIPTION OF THE MEASURES ENVISAGED TO
PREVENT, MITIGATE OR, WHERE POSSIBLE OFFSET ANY
SIGNIFICANT ADVERSE IMPACTS IN RADIATION AND NON-
RADIATION ASPECT ON THE ENVIRONMENT, AS WELL AS A
PLAN FOR THE IMPLEMENTATION OF THESE MEASURES**

Original

Copy

PREPARED BY:

NELLY GROMKOVA - TL

VERSION:

VERJINIA DIMITROVA - PM

VALIDATED BY:

TZVETANKA DIMITROVA - TQ CONTROL EXPERT

DATE: АВГУСТ 2013г.

CONTENTS

8	DESCRIPTION OF THE MEASURES ENVISAGED TO PREVENT, MITIGATE OR, WHERE POSSIBLE OFFSET ANY SIGNIFICANT ADVERSE IMPACTS IN RADIATION AND NON-RADIATION ASPECT ON THE ENVIRONMENT, AS WELL AS A PLAN FOR THE IMPLEMENTATION OF THESE MEASURES.....	4
8.1	MEASURES AND IMPLEMENTATION PLAN.....	4

LIST OF TABLES

TABLE 8.1-1: PLAN FOR IMPLEMENTATION OF MEASURES.....	4
---	---

8 DESCRIPTION OF THE MEASURES ENVISAGED TO PREVENT, MITIGATE OR, WHERE POSSIBLE OFFSET ANY SIGNIFICANT ADVERSE IMPACTS IN RADIATION AND NON-RADIATION ASPECT ON THE ENVIRONMENT, AS WELL AS A PLAN FOR THE IMPLEMENTATION OF THESE MEASURES

8.1 MEASURES AND IMPLEMENTATION PLAN

For the purpose of prevention, mitigation or compensation of any negative environmental impact as part of the implementation and operation stage of the NNU¹ project, a program must be developed, including short and long-term activities, to ensure the power unit's compliance with the environmental and occupational health and safety regulations.

The proposed measures are developed pursuant to *Regulation on the terms and procedures for preparation of environmental impact assessments* (SG 25/2003, amendments and elaborations in SG 3/2011). These measures take into consideration also the planned programs of measures for prevention and mitigation of anthropogenic pressure (point and diffuse sources of pollution) and impact on the water resources, monitoring and control measures, including ones for the water protection areas in Program 7.1.5, Program 7.1.6, Program 7.1.7 and Program 7.1.8 of RBMP 2010-2015 according to Letter No. 3804/08.01.2013 of BDWMDR - Pleven.

The suggested in **Table 8.1-1** Plan for implementation of measures is developed by environment components and factors, planned for prevention, mitigation or where possible offset any significant adverse impacts on the environment, both radiation and non-radiation type, along with a plan for implementation of those measures. They are associated with: **DPR** – design preparation; **C**– construction; **O** – operation, **DCM**-decommissioning.

TABLE 8.1-1: PLAN FOR IMPLEMENTATION OF MEASURES

No	Measures	Stage	Result
1. Ambient air			
1.1	Develop a Plan for organization of transportation/haulage route.	C, O and DCM	Will limit any harmful emissions of exhaust gas to the environment and minimize the negative impact on the ambient air in the region.
1.2	Maintain all construction and transportation equipment in good repair	C, O, and DCM	Will protect the air and public health, including employee health.

¹ New Nuclear Unit

1.3	The planned equipment and vehicles must meet the provisions of Regulation 10/2004 (SG 11/2004) – Measures for reducing gaseous and dust pollutants from the internal combustion engines installed on off-road construction vehicles and machines	C, O and DCM	Will limit any harmful emissions of exhaust gas to the ambient air and minimize the negative impact on the ambient air in the region
1.4	Do not overload vehicles with soil and rock material.	C and DCM While loading	Will prevent any spill, squashing or crushing of these materials which later become extra sources of fugitive dust emissions. Will protect air and soils, employee and local community health.
1.5	Restrict idle mode engine operation of any construction and haulage vehicles.	C, O, DCM	Will limit the harmful gas emissions to ambient air. Air protection; health protection of site personnel and the local community.
1.6	Use dust suppression equipment (on-wheels) to limit dust emissions generated by various operations (loading, offloading, stockpiling etc.).	C, DCM	Will limit dust emissions to the ambient air. Will protect employee health.
1.7	In dry and windy weather, apply dust suppression (water spraying) to any storage areas for bulk construction material (primarily sand) and construction waste.	C, DCM In dry/windy weather	
1.8	1. Coordinate all transportation/haulage routes with the local municipal authorities and village mayors; 2. Limit any heavy traffic through towns/villages. If inevitable, ensure prompt and safe drive through the town, at steady speed (with no stops or pull-overs) and set lower speed limits	C and DCM	Will ensure stable temperature of the equipment engines, where harmful emission levels are much lower.
1.9	Haulage vehicles must be covered while transporting earth materials, construction materials, construction waste etc.	C, DCM	Will prevent dust emissions.
1.10	Use low-sulphur diesel fuel.	C, O, DCM	Will limit the sulphur oxide emissions to the ambient air.
1.11	Clean/rehabilitate storage areas for bulk construction materials immediately after completion of construction works	Immediately after completion of C, DCM	Air protection; Waste management.
2. Surface and ground water			
2.1	Prior to the completion of a waste water treatment plant (with	DPR, C	Water protection; pollution protection.

	sufficient capacity to collect and treat the municipal waste water from the site), any household waste water will be connected and discharged to chemical toilets at the construction stage and the NNU ² operation stage.		
2.2	<ol style="list-style-type: none"> 1. Maintain all electrical and mechanical equipment of the treatment plant in good repair. 2. Develop and follow operation manuals for all treatment facilities. 	O, DCM	Will ensure optimal operation of the treatment plant.
2.3	Ensure that no pollutants are discharged to waters at the construction, operation and decommissioning stage of the project.	C, O, DCM	Will minimize the site's impact on the regional waters and biodiversity.
2.4	Use low-permeability materials for the sewage reticulation.	DPR, C	Will protect the earth's interior and ground waters from pollutants.
2.5	Use low-permeability concrete.	DPR, C	Will prevent seepage and prevent soil and ground water pollution.
2.6	Plan and use a designated site for the construction equipment in order to prevent surface and ground water pollution by oil and fuel.	DPR, C	Will prevent soil and water pollution (ground and surface waters) by oil and fuel.
2.7	Design and implement potable water supply option based on the existing potable water reticulation of the NPP, and industrial water supply option based on the existing hydrotechnical facilities.	DPR, C	Will minimize the site's impact on the quality and quantity of the regional water supply. Will prevent a risk of overconsumption of ground waters.
2.8	Build separate household, industrial and storm water sewage reticulations with buffer tanks for storm water.	DPR, C	Will prevent soil and surface water pollution
2.9	Design and implement dewatering system to manage ground waters	DPR, C	Will protect excavations from harmful impact of waters
2.10	Design and construct water drainage system as part of the monitoring system of the NNU. All drainage waters must discharge the Danube following some settling time at a settling tank to enable quality control.	DPR, C, O, DCM	Water protection from harmful impact
2.11	Obtain new, extend/amend the existing permits pursuant to the Waters Act	DPR, C, O, DCM	Will ensure compliance with the regulatory requirements to surface and ground water protection

² New Nuclear Unit

2.12	Design and construct surface and ground water monitoring system of the NNU as a component of the existing monitoring system of Kozloduy NPP, which will be functioning at the operation and decommissioning stage of the NNU	DPR, C, O, DCM	Will ensure effective control over the water condition. Will prevent pollution.
3. Subsurface			
3.1	Ensure that the NNU design is based on up-to-date engineering-geological and hydrogeological studies and investigations.	DPR	Sound design solutions to prevent big and uneven ground settling; protection of earth's interior and ground waters.
3.2	All structural solutions need to be compliant with the seismic resistance standards applicable to nuclear power facilities, and the specific seismic profile of the area.	DPR	The structures must endure the maximum potential seismic load with no damage to the integrity of the facilities or lengthy loss of production.
3.3	Build soil cement bedding underneath the NNU foundation.	C	Will improve the bearing capacity of the foundations, eliminate the loess subsidence and act as a screen against radionuclide diffusion at depth.
3.4	Apply on-going monitoring of ground water levels (GWL) and maintain the natural levels by eliminating any factors, which may cause levels to rise.	C, O, DCM	Will prevent GWL rise; Will keep the integrity of the ground and act as a screen on the radionuclides' pathway to ground waters.
4. Land and soil			
Non-radiological aspect			
4.1.1	Store all humus at a designated stockpile, separate from other earth material.	C	Humus conservation.
4.1.1	Minimize temporary and permanent land expropriation;	DPR – Preliminary/Feasibility studies	Conservation of land and forest land
4.1.3	Use excavated earth material for backfill and rehabilitation at the site	DPR, C	Phased-out rehabilitation of any disturbed land
4.1.4	Apply rehabilitation of any land disturbed by construction works; remove and rehabilitate any temporary sites, platforms, earth and soil stockpiles; restore soil and vegetation.	DPR, C	Will recover any disturbed soil cover and local landscape.
4.1.5	Enhance any disturbed land by planting indigenous vegetation	DPR, C	Will preserve the indigenous vegetation of the area.
4.1.6	Change the designated purpose of the land disturbed by the site; plant vegetation in any areas available for landscaping.	DPR, C	Compliance with the regulatory requirements.

4.1.7	Use maximum amount of stockpiled humus upon minimized disturbance of the adjacent areas	П, C	Soil conservation within the site and adjacent areas.
4.1.8	Keep any works within the approved site borders	C, DCM	
4.1.9	Prevent any soil pollution by construction materials/waste outside the project site	C, DCM	Soil conservation
4.1.10	Ensure that no household or other waste type is disposed to any areas different from designated waste storage/disposal areas	C, O, DCM	Soil conservation
4.1.11	When selecting new access roads to the selected NNU site, plan measures for unimpeded runoff and drainage of any surface waters		Will lower the flood risk and minimize any land degradation processes such as water saturation
4.1.12	Rehabilitate any disturbed land at the site and use humus stockpiled in the designated area prior to commencement of construction works	C, O, DCM	Recover/rehabilitate any disturbed soil cover and landscape in the area.
4.1.13	Complete rehabilitation of the disturbed land at NNU decommitmentig.	DCM	Recover/rehabilitate any disturbed soil cover and landscape in the area.
Radiological aspect			
4.2.1	Identify initial radiation status of local soils	DPR, before C	Public health prevention efforts; environmental protection
4.2.2	Develop Soil Monitoring Plan and ensure regular updates	O, DCM	Will ensure optimal protection of the environment, waters and public health
4.2.3	To minimize any migration of radioactive isotopes from soils to the vegetation: apply soil liming, natural and mineral fertilizers and microfertilizers	O, DCM	Will act as prevention to ensure production of safe food for human and livestock consumption. Will minimize the impact on the environment, water and soils
4.2.5	Select crop and plant types which accumulate lesser level of radioactive elements.	O	Will minimize the impact on the environment, water and soil
4.2.6	Apply natural methods, natural minerals such as zeolites or non-traditional chemicals	O, DCM	Will prevent radiation impact on water and soil.
4.2.7	Apply monthly soil monitoring. Dispose any low and intermediate-level radioactivity, short-lived radioactive soils (with proven reading) at the Lime Plant site.	DCM	Safe storage; minimized environmental impact
4.2.8	Apply rehabilitation to any land where soils are disturbed; restore the soil cover by soils with physical	C, DCM	Will ensure rehabilitation of any disturbed and polluted soils in strict compliance with the regulatory

	and chemical features which support lower migration level of pollutants.		requirements.
4.2.9	Enhance the disturbed land with indigenous vegetation	DPR, C	Conservation of the indigenous vegetation in the region.
5. Landscape			
5.1	For the closure stage of the propose investment project, plan a landscaping project for the area.	DP	Landscape protection
5.2	Prevent any pollution to adjacent landscapes as a result of oil and/or fuel spills from the construction equipment at the site.	C, DCM	Landscape protection
5.3	Concurrently with and after the construction stage, take measures to rehabilitate the disturbed land along with measures for vegetation with suitable plants.	DP, C, O, DCM	Landscape protection
5.4	Implement biological and technical reclamation by a landscaping project for the area.	DCM	Landscape protection
6. Biodiversity. Protected Areas			
6.1	Perform regular monitoring of the environmental status of the Danube River in the NPP area.	C, O	Will enable the control over the water quality and the timely notification of the MoEW and other regulators about any unauthorized sources of organic or inert pollution.
6.2	Perform monitoring of external invasive waters in the port area by the NPP at the NNU construction stage.	C	Will identify any new invasive aquatic species once introduced, and whenever required will enable the development of measures for their elimination, as well as measures for prevention and control with the objective to mitigate the cumulative effect of navigation.
6.3	At the NNU operation stage, perform regular monitoring of external invasive waters in the port area adjacent to the NPP.	O	Will identify any new foreign invasive aquatic species once introduced and whenever required, will enable the development of measures for their elimination, as well as measures for prevention and control with the objective to mitigate the risk of introducing new invasive aquatic species and the impact of those already identified in the area, as well as limit the cumulative effect of the thermal load of the water.
6.4	Apply regular mechanical cleaning of the hot channels, especially in cases of generated fouling of any type, such as biological growth,	C, O	Will eliminate the newly introduced invasive aquatic species and enable the control over the impact mitigation of those already

	incrustation, marine growth etc.		identified.
6.5	Ensure ship hull cleaning of any fuel vessels before their entry in the hot channel area including cleaning of fouling material and use of anti-fouling paint; any bilge water from ships will be disposed in designated containers and will by no means be discharged to the Danube or the channels.	C, O	Will prevent the introduction and propagation of any new invasive aquatic species.
6.6	The preliminary construction works involving site preparation and clearing of vegetation <u>will</u> start in any period different from the period birds nest and fauna breeds (01.04.-15.06.)	C, DCM	Will minimize the project impact on any breeding and nesting birds and other local species
6.7	Any vegetation and rehabilitation works will use species typical of the area.	C, O, DCM	Will help to avoid undesired events such as unnatural competition between indigenous and non-indigenous species, genetic pollution and erosion.
6.8	Recover the biodiversity, which was typical of the site to ease the integration of the disturbed site in the surrounding environment.	C, DCM	Conservation of the local biodiversity.
6.9	At the construction stage, strictly follow the project documents; prevent accumulation of overburden material and construction waste outside the approved designated areas and sites.	C	Prevent any damage to the vegetation in any land adjacent to the project site.
6.10	Following completion of the main construction works, perform landscaping and use indigenous species – both shrub and trees.	After completion of the main construction works	Will create favourable environment and habitat for the small-size fauna.
6.11.	Prior to commencement of the construction works, a zoologist will walk the selected site; in case the zoologist identifies individuals subject to conservation, (amphibian, reptiles etc.) they will be captured and relocated to suitable habitats in the area. It is recommended that activity to take place in early May by sending a prior notification to the regional environmental inspection.	C, O	Preservation of species subject to conservation.
7. Waste			
7.1	Prepare Construction waste	C, DCM	Compliance with the applicable

	management plan		regulations.
7.2.	Introduce logbooks for waste reporting; prepare Annual reports under art.44 of the Waste Management Act.	O	Compliance with the applicable regulations.
7.3	Timely remove any generated waste.	O	Prevention of water and soil pollution.
7.4	Following completion of the construction works, any construction waste will be hauled to a designated construction waste site.	After completion of the construction works.	Soil protection. Waste management
7.5	Plan areas for temporary disposal of household waste; plan waste haulage to be provided by a specialized company.	DPR, C, O	Will protect the area and any adjacent land from pollution; waste management.
7.6	Use maximum of the earth material while preparing construction designs for the site	DPR, C, O	Will protect the area and any adjacent land from pollution; waste management.
7.7	Use 100% of the humus.	DPR, C, O	Will protect the area and any adjacent land from pollution.
7.8	Sign contracts with licensed companies for treatment and recycling of dangerous waste	DPR, C, O	Waste management
7.9	For disinfection purposes, regularly apply lime or calcium hypochlorite to domestic waste	DPR, C, O	Health risk prevention
8. Hazardous substances			
8.1	Develop instructions for work safety and use of personal protection equipment.	C, O, DCM	Will prevent health risks for any personnel working at the site
8.2	Comply with all instructions for safe handling and operations involving dangerous substances. Any construction processes at the site and primarily asphalt capping will strictly comply with the regulatory requirements to occupational health and safety and fire safety.	C, O	Will prevent health risks for any personnel working at the site.
8.3	Ensure compliance with all requirements to reagent storage areas. To mitigate any potential adverse effects of dangerous substances, ensure compliance with the requirements to handling, loading and offloading of any powder materials supplied in paper or plastic bags, and ensure suitable storage of dangerous	DPR, C, O, DCM	Will prevent air pollution at the work environment. Will prevent health risks for any personnel working at the site.

8.4	<p>substances.</p> <p>Any delivered materials will be accompanied by certificates of analyses, Materials Safety Data Sheets, Safe Operating Instructions, including measures in case of spills, dust generation and damage to employee health. Each original package will have a label containing information on the health and environmental risks and the safety measures. Dangerous substances and products are subject to control by the Ministry of Health.</p>	C, O, DCM	Will prevent health risks for personnel working at the site. Employee health protection
9. Harmful physical factors - Noise, vibrations, etc.			
9.1	<p>Prepare Transportation Plan for all construction-related equipment and coordinate with Kozloduy Municipality. Set 20 km/h speed limit for haulage trucks in the nearby towns/villages.</p>	DPR, C	Will limit the noise impact on community members
9.2	<p>Any construction equipment used for the project will comply with the <i>Regulation on the major requirements to and compliance assessment of machines and facilities operated outdoors in terms of their noise emissions to ambient air</i> (State Gazette 11/2004).</p>	C	Will limit the noise emissions to the environment; Health protection of personnel and community members
9.3	<p>Plan noise screens for any fans installed outside production buildings if their noise emissions exceed the regulated limit applicable to production and storage sites.</p>	DPR, C	Compliance with the regulated hygiene limit for noise levels at production and storage sites.
9.4	<p>At the construction stage, ensure employee personal safety and noise protection by the use of personal noise protection equipment;</p>	C, DCM	Health protection of personnel and community members
9.5	<p>Any equipment used will be in good repair and will meet any technical requirements, specifications and standards applicable in the EU.</p>	C, DCM	Health protection of personnel and community members
9.6	<p>To prevent disturbance of local birds by the generated noise, we recommend any noise-generating machines to be used only in</p>	C, DCM	Health protection of personnel and community members; Will ensure peace and quiet for local birds.

	daytime, by 5PM. Restrict the noise emissions outside the site to 50 dB		
9.7	Use modern machines and equipment with good technical features, including noise parameters. Plan suitable noise screens for the ventilation systems. Maintain any machines and facilities in good repair.	C	Health protection of personnel and community members; Will ensure peace and quiet for local birds.
9.8	Ensure that any technical specifications and dimensions of all switchgear components and facilities prevent any employee exposure above the regulated electromagnetic field limits. Apply the national legislation in that respect, which regulates the design of such facilities (Regulation 14, SG 53 /2005 <i>on the technical rules and norms applicable to design preparation, construction and use of electrical power generation, transformation, transmission and distribution facilities</i>)	DPR, O	Protection of any personnel working at outdoor switchgears
9.9	Comply with the national legislation on employee protection in electromagnetic environment – Occupational Health and Safety Act, Regulation 7, State Gazette 88/1999, Regulation 3, State Gazette 14 / 2008 on the Terms and Procedures of Labour Medicine Service operations	C, O, DCM	Will ensure employee health and safety according to the national legislation
10. Health protection and Risk Management			
10.1	Comply with all instructions on safety, occupational hygiene and fire safety applicable to the individual work area types	DPR, C, O	Heath risk prevention
10.2	Any construction and repair works will comply with the minimum requirements to occupational health and safety applicable to such works	C, DCM	Employee health risk mitigation

10.3	Comply with all health risk prevention requirements in terms of on-off-work schedules and the physiological norms of manual work and manual handling of heavy items provisioned in the regulations of the Ministry of Healthcare.	C, O, DCM	Employee health risk mitigation
10.4	Strictly use the planned personal and collective protection equipment	C, O, DCM	Risk prevention
10.5	Mandatory safety induction to employees will be delivered by competent experts	C, O, DCM	Risk prevention
10.6	Preventive medical examinations will take place at least once per year by: internist, otolaryngologist, cardiologist, neurologist and ophthalmologist (for welding operations).	C, O, DCM	Health risk prevention and simultaneous diagnostics
10.7	Prevent any fuel and oil spills. If spilled, immediately localize, remove and haul to suitable disposal sites.	C, O	Risk prevention
10.8	Maintain construction machines in good repair and at optimal load, first to reduce exhaust gas emissions and second, to reduce noise and vibrations.	C, DCM	Risk prevention
10.9	Employee <i>on-off work schedule</i> in case of vibration exposure will be prepared to ensure total shift-based exposure (contact with vibrations) of less than 90-120 min.	C, DCM	Risk prevention
10.10	Personnel on any job will wear suitable seasonal work clothes and personal protective equipment (PPE); When harmful factors are in place in the work environment, PPE will include dust protection masks, ear muffs, and anti-vibration gloves; Ensure optimal on-off-work schedule for employees.	C, O, DCM	Risk prevention
10.11	Maintain first-aid kit in good condition in order to support delivery of first-aid.	C, O, DCM	Timely administration of first aid as needed.
10.12	Update any radiation protection programs and procedures.	O, DCM	Reduce radiation impact on personnel and the environment
11. Cultural Heritage			
11.1	In case any objects are found in	C	Protection of cultural heritage sites

the course of construction works and there are indications that the finds may be cultural heritage, suspend works and immediately notify the home municipality on whose constituency land the find was located; arrange for investigation of the find by non-destructive methods.		
---	--	--