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Project
«LP 750 kV Zaporizhzhia AES - Kahovs'ka of PS 750 kV« Kahovs'ka »
and measures 330 kV submarine »
(Zaporizhia Oblast, Kherson region)

Document regarding project

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Initiator of the project: "Ukrenergo"

Designers: OOO «Southern Energy Company»

External consultant: ERM Iberia (Madrid, Spain)

1. Introduction
1.1 Basic Information

NEC «Ukrenergo» plans to build air line elektroperedavannya 750 kV Zaporizhzhia AES - Kahovs'ka (PL 750 kV Zaporizhzhia AES - Kahovs'ka), including the new 750/330 kV substation «Kahovs'ka» (PS 750 kV «Kahovs'ka») within Dnipryanskoyi village near the city of New Board Kakhovka Kherson and two measures dvolantsyuhovyh LP 330-kV Novokahovskoe Ostrovskaya and PL 330 kV Novokahovskoe - Kherson at PS 750 kV «Kahovs'ka» to connect the new PS 750 kV «Kahovs'ka» to the United Energy Systems of Ukraine (Ukraine OES), and also reconstruction of the existing 330 kV substation «Novokahovskoe» (PS 330 kV «Novokahovskoe»). Overall this project entitled «PL 750 kV Zaporizhzhia AES - Kahovs'ka of PS 750 kV« Kahovs'ka »and activities PL 330 kV ».

Zaporizhia nuclear power plant (CEAO) currently operates with a capacity of 5300 MW, whereas its full capacity of 6000 MW. This situation is caused by non-adherence to the design scheme OES Ukraine.

«Pattern of OES in Ukraine in 2010 with the prospect by 2015» NEC «Ukrenergo» for able to issue the full power of the Zaporizhia nuclear power plant for the construction of 750 kV submarine Zaporizhzhya NPP - Kakhovka.

Institute Ukrenerhomerezhproekt completed feasibility study on the feasibility construction of 750 kV submarine Zaporozhye NPP - Kahovs'ka of PS 750 kV "Kahovs'ka and measures LP 330 kV. This document set the stages of construction and implementation of the identified economicindicators of the project. This feasibility study agreed at a meeting of the Scientific and Technical Council Ministry of Fuel and Energy Minister.

Therefore, the aim of this project is to improve the efficiency of energy sector through providing work Zaporizhzhya nuclear power plant at full capacity (6000 MW), after improving its joining the grid. Covered regions project ultimately will also have benefit from increased reliability of electricity supply and the quality electricity.

The project develops LLC «Southern Energy Company»

International financial institutions (IFIs), in particular, the European Bank for Reconstruction and Development (EBRD, London), consider the possibility of financing the project.

1.2 Assessment of the impact of environmental and social

Environmental impact assessment (EIA) is part of the standard for Ukraine procedures to be performed during project planning and obtaining permits. Rules EIA and consultations with the public and disseminate information contained in State construction standards of Ukraine DBN A.2.2.-1-2003, («Composition and content of assessment environmental impact (EIA) in the design and construction businesses, homes and installations »). Construction of new high voltage aerial power lines are not included in the list facilities (Appendix E of the DBN A.2.2-1-2003) that «environmentally dangerous».

Therefore, procedures and EIA granting permission are within the competence of local (in Zaporozhye and Kherson region) t environmental and sanitary-epidemiological territorial government.

In addition, the MFIs have their own environmental and social policies, such as «policy environmental protection and social services »Bank (May 2008). According to these documents, Environmental impact assessment and social sector (OVNSSS) has performed for Category A projects (including high air lines), as prerequisite to funding such projects.

1.3 Planning Process

Environmental impact assessment (EIA) is conducted for this project, NEC «Ukrenergo» in accordance with Ukrainian legislation. The draft EIA report with planned completed by September 2009.

In addition, to meet the requirements of MFIs (such as EBRD) will provide additional information in report to assess the impact of the environment and social sphere (OVNSSS). If local EIA aims to obtain permission from the Ukrainian regulators on environmental issues, the OVNSSS held to meet the environmental and social requirements of the EBRD and other potential creditors of the project.

Will be meeting members of the public to inform stakeholders and public in the region of the planned project, according to the policy potential creditors. Initial information about the project will be provided to interested parties and public in this document regarding the project before the above charges. This document contains the basic facts and figures about the proposed project and outlines studies have been conducted to assess the impact on the environment and social sphere, provided the timing and subsequent steps.

2. Common characteristics of
2.1. Major elements and scope of the project

Strategic, systemoutvoryuyuchi, the main power of state property:
- Airway elektroperedavannya voltage of 750 kV (330 kV) - construction of a large number poles along selected routes with appropriate intervals (for 750 kV PL 400-500 m for PL 330 kV 300-350 m) for transmission of electric power wires for voltage of 750 kV (330 kV) located outdoors and attached using izolyuvalnyh structures (insulation suspension - with garlands tarilchatyh glass insulators) and special fittings to said rack.
(Airway elektroperedavannya LP - Line elektroperedavannya, wires which are supported over ground using poles and insulators).
- Elektropidstantsiya PS - electric substation designed to convert electrical energy of a class of voltage in electrical energy of another class of voltage using transformers.

The composition of the project include:

- construction of 750 kV submarine Zaporozhye NPP - Kahovs'ka;
- dvolantsyuhovyy west LP 330 kV Novokahovskoe - Ostrovskaya at PS 750 kV «Kahovs'ka»;
- dvolantsyuhovyy west LP 330 kV Novokahovskoe - Kherson at PS 750 kV «Kahovs'ka»:
- construction of the new PS 750 kV «Kahovs'ka» two autotransformers 2h1000 MBA;
- reconstruction of the existing 330 kV PS «Novokahovskoe».

Designing PL 750 kV Zaporizhzhia AES - Kahovs'ka, including measures dvolantsyuhovyh LP 330 kV Novokahovskoe - Ostrovskaya and PL 330 kV Novokahovskoe - Kherson at PS 750 kV «Kahovs'ka» implemented in accordance with applicable rules and regulations, including the technical confirmed the design criteria for the state standards (GOST).

Lengths of the new LP: LP 750 kV - 190 km west dvolantsyuhovyy LP 330 kV Novokahovskoe - Ostrovskaya at PS 750 kV «Kahovs'ka» - 28,15 km west dvolantsyuhovyy LP 330 kV Novokahovskoe - Kherson at PS 750 kV «Kahovs'ka» -17 km.

Airway elektroperedavannya consists of wires located outside of through insulators attached to poles, installed at certain intervals along selected road.

Typical of materials and design solutions include the following:

- Shock LP 750 kV: tie-and intermediate angle, vilnostoyachi. High resistance to arm - 35 m to can increase through the stands. Height tie-angle bearing to the wire - 20 m; it can increase to 35 m using the stands. Minimum distance from wires to land for support - 24.5 m, in mid-run - 12.5 m and at points of intersection of road roads and railways - 15 pm
- Shock LP 750 kV are usually at intervals of 400 or 500 meters, depending on characteristic landscape
- Wires attached to the towers using izolyuvalnyh structures (suspension insulators). For complete line of suspension insulators designed glass used tarilchati insulators.
- The wires are made of aluminum bahatodrotovyh lived reinforced steel and come in large drums. Each leg has three phases (each with 5 wires), and Two lightning protection cables.
- Reconstruction of substation include expanding distribution device, replacement transformer and construction of relevant technological facilities. For construction used concrete foundations, and electrical work - a range of other materials (glass, ceramics, steel, copper, aluminum). Transformers will have oil cooling.

Shock - steel structure, constructed using bolted fasteners standard steel sections. Foundations generally are using reinforced concrete piles, driving depth which depends on geological characteristics of the site and type of towers.

In order to protect people from exposure to electric fields generated by electric networks and their elements (elektroperedavannya air lines, electrical substations) alternating current industrial frequency (50 Hz) established sanitary-protective zone - for LP set a land whose boundaries are regulated on both sides of it at a distance projection of the extreme phase wires to the ground in the direction perpendicular to the LP. Also for conservation of electric networks in accordance with the requirements of established security rules zone of electrical networks: in zdovzh routes elektroperedavannya - in the form of land and airspace, restricted vertical planes that far on both sides of the line of extreme nevidhylenomu wires at their position. The width of sanitary protection and protection zones for submarine 750 kV 40 m, with 36-meter projection LP 750 kV protection and security zone will cost 116 m wide. For PL 330 kV width of sanitary protection zone of 20 m, protection zone - 30 m, with 18-meter projection LP 330 kV protection and security zone выдповыдно cost 58 m and 78 m wide. Within the health-protective and security zones LP land owners and their users are not removed and used with restrictions provided for current rules. Land outside these zones can used for any purpose without restriction. Companies, institutions, organizations and citizens who are given ownership or use of land where the facility electrical networks, must take appropriate measures to preserve these objects.

Construction of PS 750 kV «Kahovs'ka» to establish two compensator 1000 MBA. Existing PS 330 kV «Novokahovskoe» will be reconstructed, including compensator 220/150/35 kV will be replaced by a 330/220/35 kV autotransformer. Works on PC vykonuvatymutsya within the existing fence around the perimeter, without expansion of substations.

3. Features tracks

General characteristics of the three routes of power lines and substations locations listed below. Location of three fruit, developed during the planning process, shown in Review the map (see appendix). Detailed description of the route below.

A) PL 750 kV Zaporizhzhia AES - Kahovs'ka

The planned route of 750 kV submarine Zaporozhye NPP - Kahovs'ka passes through Kamenskaya - Kiev Zaporizhia region and Verhnorohachytskoho, Velykolepetyskoho, Gornostayivs'ka, Kakhovka of the Kherson region.

Line 750 kV Zaporizhzhia AES - Kahovs'ka begins at Zaporizhzhya nuclear power station and is in west, outside the settlements on the territory of land Enerhodarskoyi m / d, Vodyanskoyi c / d and Kamyanka-Dneprovskoy m / d, then go south, passing along the eastern shore Great River Bilozerka. Then line returns to the west and crosses this river, together with existing lines, and then goes towards smt Upper Rohachyk. Nearby smt Upper Rohachyk line returns to the south from. Samiylivka, where it again turns south-west, avoiding the village. Nikolayevka with south east and the village. Rubanivka - from the north west. Next line goes by with. Cossack Lagerya on its southern border, returning more to the west. The line runs north of the village. Kostyantynovka and the south of the village. Vasilivka and then crosses Kakhovka channel south of the village. Lyubymivka. She continues in the west, city and town Tavria Nova Mayachka remain in the north of it, and finally, the line reaches PS 750 kV «Kahovs'ka» west of smt Dnipryany.

B) West LP 330 kV Novokahovskoe - Ostrovskaya

The planned route west dvolantsyuhovoho LP 330 kV Novokahovskoe - Ostrovskaya on PS 750 kV «Kahovs'ka» held territory Kakhovka, Tsurupinsk areas Kherson region.
This 330 kV submarine has a length of about 28.15 km. He is the new PS 750 kV «Kahovs'ka» on south, then to the north of smt. New Mayachka returns to the east past the village. Chernyanka and joins existing 330 kV submarine Novokahovskoe - Ostrovskaya. south of the village. Tsukury.

B) West LP 330 kV Novokahovskoe - Kherson

The planned route west dvolantsyuhovoho LP 330 kV Novokahovskoe - Kherson on PS 750 kV «Kahovs'ka» held territory Dnipryanskoyi village council Nova City Kakhovka District Council and Lviv Beryslav Village district of Kherson region.

This LP 330 kW is roughly 17 km. He comes from PS 750 kV «Kahovs'ka» north crosses the Dnieper to the west of the village. Korsunka and pp. Lviv, and then joins the existing network PL 330 kV Novokahovskoe - Kherson north of the village. Lviv.

G) PS 750 kV «Kahovs'ka»

The area under the new PS 750 kV «Kahovs'ka» Located in the village Dnipryanskoyi Nova Kakhovka city council district, Kherson region.

G) PS 330 kV «Novokahovskoe»

Ground current PS 330 kV «Novokahovskoe» is located in Nova City Council Kakhovsky region Kherson region.

The project will not affect the industrial and residential facilities. Industrial facilities in the

area construction is not a residential area is situated at a great distance from the zone of the track lines.

Given, that the lines at a relatively early stage of planning, the possible local changes in the route the road

.
Alternative routes are not considered (see also section 4).

New power lines meet the technical design criteria, applicable to Ukraine, based on technically proven design criteria for the state standards (GOST), developed in Soviet times.

Development of quarries for extraction of construction materials in the vicinity of the trails Power lines and aircraft platforms is not planned, construction will be of materials that dostavlyatymutsya from other places.

4. Alternative options

At the current stage of planning for the route chosen shortest connection that, as a whole expected to be a variant of the least influence. So far not found any obstacles that caused the change of the scheduled route. However, during the detailed planning of the route can need local deviations scheduled route.

5. Environmental Impact

Here's a list of main areas of expected impact on environment. Environmental impact assessment will include assessment of impacts are Only structures and structures created in the project, and the impact that vynykatyme during construction and operation of submarines and aircraft.

Initial assessment of the expected impact on the environment and planned measures its mitigation contained in section 6.

Air Line elektroperedavannya

With the construction of new ground LP 750 kV and 330 kV submarine measures should be taken into account following factors that may cause impact on the environment:

<u>Physical structure of PL 750 kV and 330 kV submarine measures:</u>

- disqualification of the permanent use of land for location of towers;
- potential land use restrictions within the protection and security zones LP;
- requirements for the corridor route in terms of security, free movement and rights disqualification;
- visual characteristics of the line and changing the visual characteristics of the landscape;
- potential effects for the areas under the Ramsar Convention (Convention on the water Swamp lands - an intergovernmental agreement which creates a basis for action at national level and international cooperation in the conservation and wise use of wetlands and their resources), and important places of living birds in Europe;
- potential obstacles to the birds.

<u>Construction PL 750 kV and 330 kV submarine measures:</u>

- transportation and temporary storage of materials;

- establishment of foundations in the ground for support;
- potential time effects for the areas under the Ramsar Convention, and important places the lives of birds in Europe;
- installation of wires;
- impact of emissions at the stage of construction on air quality;
- influence the formation of solid and liquid waste in the construction stage.

Operation PL 750 kV and 330 kV submarine measures:

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- low frequency electromagnetic fields within the sanitary protection zones;
- Crown level of noise;
- impact of potential violations of the operation, accidents and natural disasters.

Electrical substation

Construction of new PS 750 kV «Kahovs'ka» and reconstruction of existing 330 kV PS «Novokahovskoe» not require additional areas outside of the land. Potential causes of environmental impact is to establish new equipment and accidental violations of the operation, accidents and emergencies.

6. The initial impact assessment of selected route and proposed measures to mitigate this influence

Below is a review of the expected impact on the environment for the route, and measures to mitigate this impact, which will be taken during construction and LP operation to reduce the maximum impact on the environment.

More detailed impact assessment and measures for mitigation will be provided later in «Report environmental impact assessment and social sector »

Expected impact / potential environmental problems	Possible measures to mitigate
Soil and foundation Information on geologically protected objects designed around the track at this stage not found. Further research on this question will be held on the stage OVNSSS. Impact of construction: Need a temporary working strip construction of towers and rozmotuvannya wire. Effect of physical structure: Removing a particular area of arable land in permanent Use a change of purpose land for the construction of towers PL. During the installation of towers LP surface layer soil will be replaced, or at least characteristics of the soil will be partially modified in construction zone. According to the technical standards, the width of temporary lane carrying out construction works be for PL 750 kV - 21 m for 330 kV submarine -- 14 pm Influence of operation and maintenance: Influence of vehicles in the periodic technical reviews, maintenance and possible emergency restoration works. Equipment, which is planned to existing and new aircraft, does not contain harmful substances that may enter the soil. Under maslonapovnenym equipment arranged masloulovlyuvachi and aircraft equipped maslozbirnykamy.	Remove fertile soil for further use. Reclamation is use zones. As a measure to mitigate, fertile land should be to remove the top build and save for later use (after the restoration of areas construction or improvement of less fertile soil in other places).
Pollution of groundwater and surface water **Ground water:** Significant impact is expected. Even if foundations of towers to take groundwater at you can not attend because of small size buildings. Expansion of substations will have no impact on ground water. Substation equipment have protect groundwater from contamination. Surface water:	Using the correct methods of construction and economic activity in the construction ground to prevent impact on surface and ground water (eg zamulennya reservoirs).

The project will cross several surface water, but the exact distance from the poles to these reservoirs are not yet known. The potential impact may occur in the event of construction of near surface waters. Air pollution and impact on climate During construction may occur short-term and local impact on atmosphere. During the operation does not have any LP pollution of the atmosphere (gases, aerosols etc.). Corona discharges can cause small ionization of air around the wires. Expansion will include the installation of substations tight gas (with shestyftorystoyu sulfur, SF6) equipment (switches and transformers 750/330 kV). Beginning елегазу greatly contribute to global warming. **Noise** Stage construction During construction sposterihatymutsya typical noise effects, which can not be avoided. However, construction work or not sprychynyatymut excessive or prolonged noise, even at Using a helicopter. Operational noise Corona discharge creates audible noise, especially moist air (eg, during rain). Since the line will be at a great distance from possible recipients of noise (eg, housing houses), noise from the Crown level can not regard. **Protection of flora and fauna** Impact on the habitat of flora and fauna on the main part of PL is low, so that the line passes mostly over agricultural land. At the current stage of planning road LP is lands outside national parks or other objects of nature. The availability of area of land with rare species flora and fauna, and species that disappear need to be verified. According to available information at this stage, route LP does not pass on the plantation, fruit orchards and vineyards. Forest clearance along agricultural land should avoided by careful construction Route Line Land project located near major places the	Using the correct methods of construction to reduce dust emissions at the stage construction. Appropriate treatment of елегазом (according to the manufacturer's instructions and principles of good international practice). Limitations of time on the stage of construction (only on weekdays, only during the day) in operation near settlements. Compensation in case of loss vidomooho environment existence (eg, planting new trees). Consider local changes route route in case of crossing forests, fruit orchards or windbreak. The risk of collision of birds and their impression electric current can usually reduce by establishing special devices.

lives of birds, particularly along Kakhovsky reservoir on the Dnieper. The threat of collision birds from the line or electrical lesions current, especially near the intersection of Sky can not be avoided, because in this area You can expect large nesting populations birds.	
Landscaping terms Creating a new line can change the visual existing landscape features and landscape. But if you take into account the construction of towers, routing the line along existing structures and a large distance from settlements, expected that this effect will be moderate or low.	Restriction cutting of trees, shrubs and other important elements of the landscape, creating green vegetable strips along the ground track of changes to reduce the visual properties. Lisovidnovlennya forced return cleared trees, forest loss compensation.
Land Use LP does not pass through the settlements. Line passes mainly through agricultural land. Impact on land use arises through need for land to establish bearing fruit, as well as restrictions in the short use of land allocation in within the protection and security zones LP	Compensation for withdrawal (redemption) zemelnyh areas that will be required to install bearing fruit, farm compensation losses in construction and operation of submarines. Distance to the nearest towns LP need to be verified. To minimize the impact on agricultural beginning of construction on agricultural lands should generally plan for the period after harvesting.
Electromagnetic fields may adversely LP affect human health. Ukriyinski norms and rules for electric-magnetic fields in general more stringent than in Western Europe. To protect people from the impact, according to Ukrainian «sanitary rules and regulations» 1996 year (approved by Decree number 239 of the MH 01 August 1996.) set health-protective area for 750 kV submarine - at a distance 40 m from the projections extreme phase wires LP for LP 330 kV - 20 Outside the city sanitary-protective zones LP electric field intensity does not exceed 1 kV / m. This is even lower than recommended International Commission for the Protection of Non-ionizing radiation to 5 kV / m. As the trail LP held outside settlements, LP no negative impact on health population.	Measurement of electric field tension under time of operation will be conducted according to special graph organization that responsible for operating submarines. Will apply the correct methods of work (education and training of personnel, application of appropriate labor standards) to reduce the risk of occupational diseases and accidents.
Construction and expansion of substations include establishing tight gas (with shestyftorystoyu sulfur, SF6) power equipment (switches and transformers). Елегаз is relatively nontoxic gas, but substances that are allocated during electrical discharge may have negative impact on human health.	

Transmission, distribution or transformation electricity even a risk for view of safety and safety. **Socio-economic effect** Aim is to increase reliability energy and the quality electricity for consumers. It is expected that more reliable supply electricity and improved its quality in general promote socio-economic development region. **Protecting cultural heritage** Pam `yatok architecture, history and culture in the area laying of submarine or near it were found	Now the important cultural facilities in the LP no. If you lay the foundations supports will be made archaeological discoveries, will take appropriate measures for their protection.