

## **ANNEX C. DESCRIPTION OF ALTERNATIVES AND TERRITORIAL BASIS OF BENEFITS THE SELECTED SITE**

### **1. Explanation for site selection for construction of new units**

Rationale for site selection for construction of new power plants was carried out before the start of a feasibility study:

- To justify the choice of the construction site of a major nuclear power plant in the central regions of Ukraine, made in the 70s of last century as part of the Technical Project Khmelnytsky nuclear power plant consisting of four power units with total capacity of 4,000 MW;
- The justification of the construction plans during the development of the "Energy Strategy of Ukraine till 2030".

Construction of a major nuclear power plant in the central regions of Ukraine called for the Council of Ministers of the USSR of 16.03.1971 r

Select the item Neteshynskogo Khmelnytsky region as the site of construction of the new plant and its name - the Khmelnytsky nuclear power plant were determined act of the Government Commission of the Council of Ministers of the USSR № 2 of 22.07.1975 was agreed by the USSR State Planning Committee Decision № 56 of 14.08.1975, and adopted Resolution USSR Council of Ministers № 536 from 10.12.1975, the Engineering design of the Khmelnytsky nuclear power plant consisting of four power units with total capacity of 4000 MW has been developed by the Kiev branch of the Institute "Teploelectroproject" and approved by order of the Ministry of Energy of the USSR № 150 from 28.11.1979, the PSConstruction units № 1,2,3,4 KhNPP started, respectively, in 1979,1983,1985,1986 GG

"Energy Strategy of Ukraine till 2030" (Energy Strategy), approved by Decree of the Cabinet of Ukraine № 145-p dated 15.03.2006, has identified the construction of power units № 3, 4 on-site KhNPP as one of the priority of Adana. This job has been detailed by subsequent orders of the Cabinet of Ukraine ("On Approval of the Action Plan for 2006-2010 to implement the Energy Strategy of Ukraine till 2030» № 436-p dated 27.07.2006 and "On urgent measures for construction power units № 3 and № 4 Khmelnytsky NPP »№ 118 of 18.02.2009, the).

As justification for the construction and development plans in the development of the Energy Strategy was carried out much later development of the Technical Project KhNPP and on the basis of the modern legislative field below summarizes the results of a comparative analysis in the framework of this particular study.

### **2. Analysis of existing documents and materials on the site of the earlier stage of site selection (comparison of variants of sites)**

In 1974 the Kiev branch of the institute "Teploelectroproject" was carried out a feasibility study (FS) for siting of construction of Khmelnytsky NPP (KhNPP).

Considered the possibility of placing the new plant in the western regions of Ukraine - Volyn, Lviv, Transcarpathian, Rivne, Ternopil, Ivano-Frankivsk, Chernivtsi, and Khmelnytsky. Review of 50 points possible deployment of nuclear power plants has revealed the reasons for which were rejected by 48 points (points are not cost-effective, partly secured by technical water with adverse geotechnical conditions, or requiring the exclusion of a large Number of highly productive land.

In the feasibility study was performed comparing the technical and economic indices of nuclear power plants in Neteshynskom indicators point to nuclear power in competitive Rozhnyativ point in the Ivano-Frankivsk region.

Competitive area compared to the technical and economic indicators and in terms of construction:

- topographical conditions;
- geotechnical conditions;
- hydrogeological conditions;
- terms of environmental protection;
- traffic conditions;
- size and composition of the territory of the land allotment;
- volume of the major engineering works on the development of the territory;
- conditions of water supply.

As a result of the comparison, it was recommended the construction of nuclear power plants in Neteshinskom paragraph Khmelnytsky region. In the feasibility study of building a nuclear power plant in Neteshinskom paragraph Khmelnytsky region was carried out study selection, paragraph placement of building nuclear power plants.

Completed study determined the technical and economic feasibility of building nuclear power plants in Neteshinskom paragraph Khmelnytsky region.

Based on the results of comparing the possible options the NPP, USSR Ministry of Energy has decided to number 80 on 17.04.1975, the construction of the Western Ukrainian nuclear power plant № 2.

### **3. Comparison of the expansion of the Khmelnytsky nuclear power plant (completion of block number 3, 4) with the expansion of other existing nuclear power plants in Ukraine.**

As the world practice, in terms of efficient use of previously invested funds and lower costs for the construction of new units, the most viable option is the placement of new facilities to build on the sites of existing nuclear power plants. Favorable factors is the presence of:

- developed network of motor roads and railways;
- objects obshchestvennogo destination, in particular support structures and water supply facilities;
- building industry, construction industry enterprises and construction organizations;
- staffing, etc.

In this case, if the commissioning of new facilities to replace those that are removed from service at the site, none of the limiting factors is not essential (regional energy needs, networking opportunities, the availability of water resources, etc.).

For all the sites of existing nuclear power plants (except for the construction of power units № 3, 4 on-site KhNPP) general constraint placement of additional facilities (without the final stop of the exploited blocks) is the need for additional water supply.

Since the construction of the units provided on the existing site of the Khmelnytsky nuclear power plant, which has been selected and approved for a 4,000 MW nuclear power plant, site selection and design of site selection act in accordance with the requirements of ND is not required. In the feasibility study was carried out confirm the applicability of the grounds for the construction of power plants KhNPP number 3, 4, in accordance with the requirements of normative documents.

#### **The impact on the environment during the expansion of existing nuclear power plants**

Except for the expansion of the Khmelnytsky nuclear power by building new power units № 3,4, the construction of new facilities at the sites of existing nuclear power plants will not increase the capacity of each plant as a whole, as new units will be introduced instead of decommissioning. As new objects can not be less than reliable and safe in comparison with the existing generating units, the environmental impact of the latter is a conservative estimate maximum possible impact of the new replacement units. The actual impact of existing units ZNPP, RNPP, and KhNPP SUNPP in their

normal operations by orders of magnitude less than the established limits. Acceptability of impacts of accidents at nuclear power plants of Ukraine confirmed in the relevant EIA (RNPP power units № 4 and № 2 KhNPP) and the Safety Analysis Report (ZNPP, SUNPP, other units and KhNPP RNPP).

In terms of impact in a transboundary context, actual and potential impact of new units on the site KhNPP compared to other sites are critical for maximum proximity to the site KhNPP territory of neighboring states. Thus, the performed assessment of the impact of new power KhNPP in a transboundary context can be regarded as the most conservative estimate for other potential host sites. In this case, even for areas considered most critical level of cross-border impact on the population and the environment is acceptable, ie, not exceed levels established by national requirements and international recommendations.

### **General conclusions on the siting of building new power plants**

A. For the Zaporozhye nuclear power plant, subject to the conditions of technical water supply and proximity to human settlements, the simultaneous operation of six units of 1000 MW is possible, new blocks can be put into operation, provided the final stop of existing units.

Two. Hydrogeological conditions at the site of Rivne NPP require special measures to eliminate a possible karst due to natural and anthropogenic factors. Water supply is sufficient for the Rovno nuclear power plant of installed capacity to 4,000 MW, the new units can be put into operation, provided the final stop of existing units.

Three. Reasonable initial design capacity of Khmelnytsky NPP is 4000 MW with the operation of four units. After starting the unit number 2 the existing level of water supply can be put into operation an additional 2 more power capacity of 1,000 MW each. Other new blocks can be put into operation, provided the final stop of existing units.

4. Water supply of South-Ukrainian NPP is sufficient for 3,000 MW of installed capacity, which is depleted power units № № 1-3, are in operation. New blocks can be put into operation, provided the final stop of existing units.

Five. The level of cross-border impact on the population and the environment for all possible placement of new units projected to the relevant national requirements and international recommendations.