JUSTIFICATION OF THE TYPE OF TURBIN PLANT FOR AN AUTNOMOUSE NUCLEAR POWER PLANT WITH A VVER-600 REACTOR

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Research institute, the research point is the comparison in the efficiency and economic aspect between the reactor of the VVER 600 MW unit when there is one superheater in the circuit and when installing another super heater to become two.

A nuclear power plant (nuclear power station) looks like a standard thermal power station with one exception. The heat source in the nuclear power plant is a nuclear reactor. As is typical in all conventional thermal power stations the heat is used to generate steam which drives a steam turbine connected to a generator which produces electricity.

Superheater: A superheater is a device used to convert saturated steam or wet steam into superheated steam or dry steam it is important part in nuclear power plants.

Therefore, the purpose of this coursework is the comparison in the efficiency and economic aspect between the reactor of the VVER 600 MW unit when there is one superheater in the circuit and when installing another super heater to become two. What is the best between them and what will be the calculations and designing a steam generator on the best among them by taking the thermal energy of the steam generator from the nuclear power plant calculations and putting it into the steam generator calculations the new to design one of this is nuclear power plants (NPP) with 600 MW, as well as to gain new knowledge of design rules? This coursework acquires the skills of practical use of knowledge to calculate the scheme of a particular power unit.

The objectives of this coursework are:

- learn how to understand the schemes of the NPP;
- Learn how to properly connect accessory to basic equipment or other accessories;
- Learn to determine the parameters of flows at any points of the scheme of the NPP;
- learn how to make and solve the material and thermal balance equations of the NPP scheme;
- Learn to determine the total efficiency of the NPP.

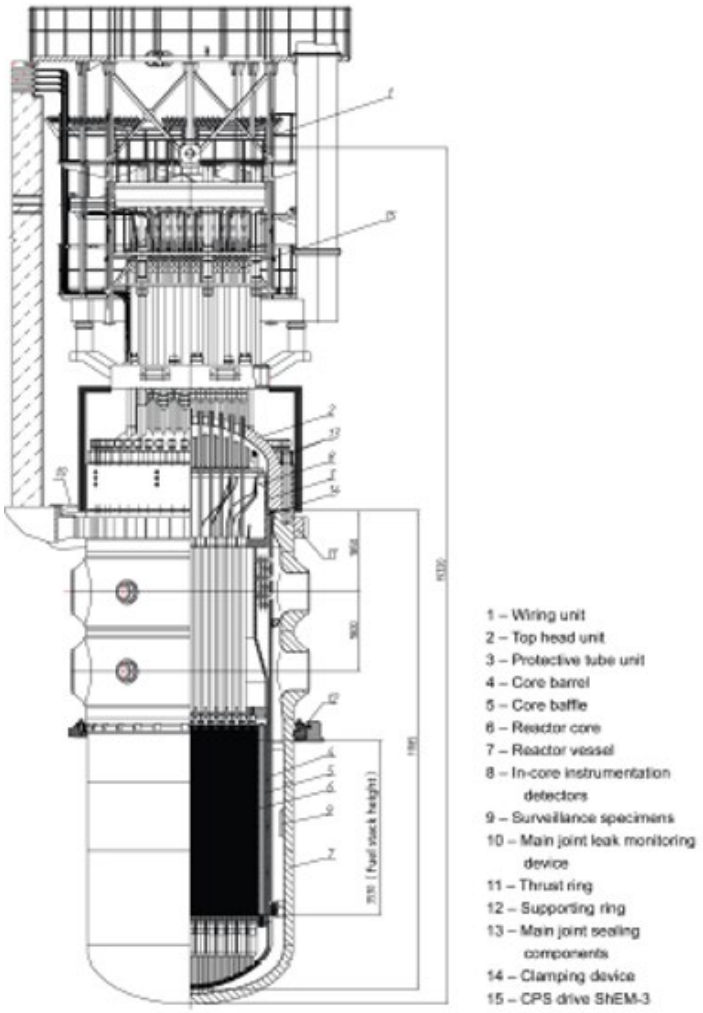

Fig. 1. VVER-600 Reactor

Steam flow to the turbine is determined by the formula:

$$G_0 = \frac{N_e \cdot 10^3}{H_i \cdot \eta_M \cdot \eta_g \cdot (1 - \sum(\alpha_j \cdot y_j) - \alpha_c \cdot y_c)}, \quad (1)$$

Thermal efficiency calculation:

We can calculate NPP gross efficiency from to this formula

$$\eta_{PP} = \frac{N_e}{Q_T}, \quad (2)$$

We can calculate NPP Net efficiency from to this formula:

$$\eta_{npp}^{net} = \eta_{PP}\left(1 - \beta_{sp}\right), \quad (3)$$

Table 1. Comparison between one superheater and tow superheater

Parameter	VVER600MWwith one superheater SH1	VVER600MWwith tow superheater SH1+SH2
G_0 kg/s	933.9	935.8
N_e MW	600	600
p_0 MPa	6	6
p_c MPa	0.004	0.004
$\eta_{PP}\%$	0.325	0.352
$\eta_{npp}^{net}\%$	0.30	0.335

Scientific adviser: A.V. Vorobyov, Candidate of Technical Sciences, Associate Professor of (SEC I.N. Butakova, ISHE) in TPU.

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EGYPTIAN NUCLEAR POWER PLANT TURBINE PROJECT

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Introduction

My research object is Established Nuclear Power Plant and Design (VVER-850) With design of Turbine from thermal and hydraulic calculation to design Egyptian nuclear power plant which before it was thermal power plant located at Banha city in Egypt Taking into account Geological area and consumers. Given the great demand for electric energy in Egypt, knowing that 105 million Egyptian citizens live only in an area that does not exceed 9 or 10% of the Egyptian land area. Therefore, a nuclear power plant must be established in the delta region of northern Egypt Because of the recent urban expansion in Egypt in terms of building new cities that need new sources of electricity and a diversity of energy sources.