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METHODS OF USING NUCLEAR ENERGY

Annotation. A nuclear power plant is a nuclear power plant that uses atomic energy to generate electricity. At the center of a nuclear power plant is a nuclear reactor - the "heart" of the plant. Inside it, uranium atoms, which are the special fuel used in nuclear power plants, are split. When a uranium atom burns, it releases a huge amount of heat. This process is called a chain nuclear reaction, because one fission creates the next fission, just like a chain.

Key words: electricity, steam, turbine, nuclear reactor, and nuclear power plant.

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МЕТОДЫ ИСПОЛЬЗОВАНИЯ ЯДЕРНОЙ ЭНЕРГИИ

Аннотация. Атомная электростанция — это атомная электростанция, которая использует атомную энергию для выработки электроэнергии. В центре атомной электростанции находится ядерный реактор — «сердце» станции. Внутри него расщепляются атомы урана, которые являются специальным топливом, используемым на атомных электростанциях. При сгорании атома урана выделяется огромное количество тепла. Этот процесс называется цепной ядерной реакцией, потому что одно деление порождает следующее деление, подобно цепи.

Ключевые слова: электричество, пар, турбина, ядерный реактор, атомная электростанция.

Introduction: This article analyzes various methods of peaceful use of nuclear energy, one of the most promising areas of modern energy. The study covers not only the production of electricity through nuclear power plants, but

also the role of nuclear technologies in the navy, space exploration, modern medicine and agriculture. The article also discusses the environmental benefits of nuclear energy, its role in achieving carbon neutrality, and the importance of safety measures.

The global energy crisis requires greater use of nuclear energy, because the electricity and heat energy obtained from natural sources cannot meet the needs of humanity today and has created problems of resource scarcity, and these relations put the urgency of developing nuclear energy on the agenda today. Because nuclear energy is, on the one hand, cheap and affordable electrical energy, and on the other hand, thermal energy. What does cheap and affordable electrical energy and thermal energy obtained from nuclear energy give us?

A nuclear power plant (NPP) is a nuclear power plant that produces electricity by a controlled nuclear fission chain reaction, mainly from uranium. Its operation uses the heat generated by this reaction to heat water, which is converted into steam and used to drive a turbine connected to an electric generator. A nuclear power plant (NPP) is a power plant that is a type of thermal power plant in terms of its technological scheme. While conventional thermal power plants burn coal, oil, fuel oil (mazut) and gas, a nuclear power plant uses uranium as fuel [1].

Main part: A nuclear power plant is a nuclear power plant that uses atomic energy to generate electricity. At the center of a nuclear power plant is a nuclear reactor - the "heart" of the plant. Inside it, uranium atoms, which are the special fuel used in nuclear power plants, are split. When a uranium atom burns, it releases a huge amount of heat. This process is called a chain nuclear reaction, because one fission creates the next fission, just like a chain. The heat released heats water and turns it into steam under high pressure. This large wheel with blades, that is, steam, is directed to a turbine.

The steam turns a turbine, which in turn drives a generator, a device that converts mechanical motion into electrical current. This current is then fed into the electrical grid and distributed through wires to wherever electricity is needed. The steam then cools, turns back into water, and the cycle repeats itself. The main advantage of a nuclear power plant is that it can produce large amounts of energy without emitting any harmful substances into the atmosphere, unlike coal or gas plants. This makes nuclear power one of the most environmentally friendly ways to generate electricity [2].

Nuclear power plants (NPPs) convert atomic (nuclear) energy into electrical energy. A nuclear reactor is an energy generator. A NPP runs on nuclear fuel (uranium, plutonium, etc.). Nuclear fuel reserves are much larger than reserves of organic fuels.

Atomic energy is energy obtained from atoms. Each atom consists of energy particles. This energy, in turn, turns all the particles in the atom into a

single whole. Therefore, in atomic energy, the atomic nucleus is the source of energy. This energy is released during the decay of an atom. In practice, there are two ways to obtain energy from an atom. The first is a fusion reaction, the second is a fission reaction [3].



Figure 1. Nuclear power plant.

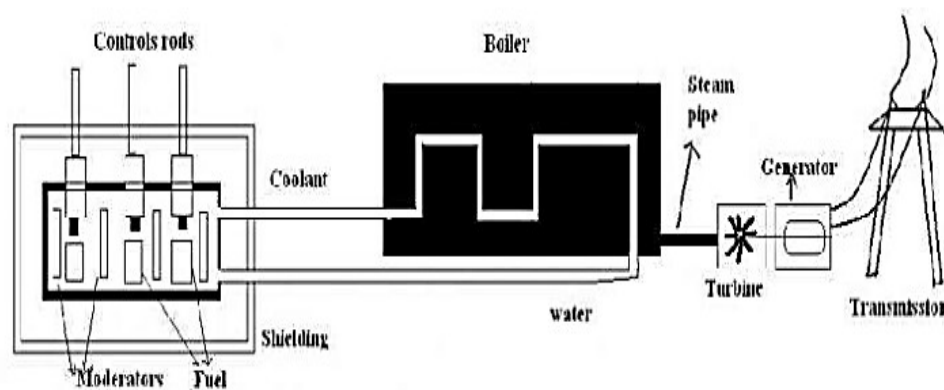


Figure 2. Simplified block diagram of AES.

The first method is a fusion reaction, where two atoms combine to form a single atom. The fusion reaction releases a lot of energy in the form of heat. Most of the energy in the sun comes from fusion reactions that occur in the sun. This is a type of nuclear energy.

The second method is a fission reaction, or fission. Fission is the splitting of an atom into two. This happens when atoms are "bombarded" by other atoms, such as neutrons (which are part of the atom).

Not every "bombardment" of an atom causes it to split. Most atoms cannot be split. However, uranium and plutonium atoms can be split under favorable conditions. One form of uranium, uranium-238 (also called a "uranium isotope"), splits into two parts when bombarded by neutrons.

Nuclear power plants are no different from thermal power plants in terms of their operating principle, only nuclear power plants have a reactor device, in

which we use Uranium and Plutonium atoms, which are considered nuclear elements, as primary fuel.

The heat produced in a nuclear reactor is transferred to water flowing through special pipes. The water is heated to boiling point and transferred to a heat exchanger, where water coming from the outside is evaporated. When the hot steam is directed towards the pipe, it rotates the generator, which generates electricity. The hot water coming out of the pipes is used to heat the water [4].

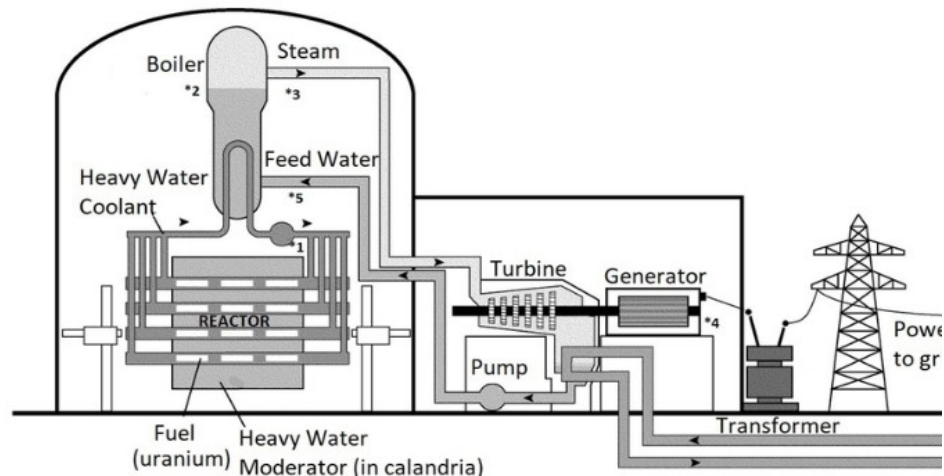


Figure 3. A structural diagram of a nuclear power plant.

The reactor device is quite simple: metal tubes filled with uranium or plutonium powder are lowered into a housing made of a material that does not allow neutrons to escape.

Neutrons are individual elementary particles that do not have any electric charge. Neutrons fall into uranium atoms and split them, as a result of which a huge amount of heat is released. Uranium is converted into plutonium, and the heat is used to generate electricity.

Currently, all the necessary technologies have been developed for the safe and effective management of radioactive waste in the nuclear energy industry. Nuclear energy sources can be minimized, compacted, reduced in radioactivity, processed, recycled, transported, and utilized, and these works are carried out and monitored in accordance with modern requirements for environmental safety.

The most important thing is that nuclear power plants reliably produce electricity and heat 24 hours a day, regardless of weather conditions, and are the base generation for a stable power grid [5].

Nuclear power plants, while producing large volumes of electricity, heat, and other products, occupy a small area, which allows them to preserve biodiversity in many regions and ecosystems from man-made changes caused by human influence for many years.

4 kilograms of uranium enriched to 1%, which is used as nuclear fuel in nuclear power, when completely burned, releases energy equivalent to the energy generated by burning approximately 100 tons of high-quality coal or 60 tons of oil. Most interestingly, the fissile base material (uranium-235), which is used as nuclear fuel in nuclear power, does not burn completely and, unlike ash and slag from organic fuels, can be reused after regeneration [6].

Conclusion: Nuclear power does not pollute the atmosphere and does not emit greenhouse gases that are dramatically worsening the climate of our planet, polluting the soil and increasing the acidity of the oceans. Coal and gas power plants, in turn, have been using the atmosphere we all breathe for years to eliminate their uncontrolled emissions and get rid of them for free. It is well known that the impact of nuclear power on the environment (ecology) is minimal. Nuclear power plants are the most environmentally friendly way to produce electricity on an industrial scale.

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