

REFERENCES:

1. Burnard K. and Bhattacharya S. (2011). Power Generation from Coal: On-going Developments and Outlook. International Energy Agency (IEA). Paris, France
2. RESPONSIBLE HANDLING AND STORAGE OF COAL COMBUSTION RESIDUALS (CCR) <http://www.solmax.com/wp-content/uploads/2012/09/CCRTechNote-english.pdf>
3. Arrifin K.S. Fly ash – Coal Combustion Residue, University Sains Malaysia, Malaysia, Course Notes EBS 425/3 – Mineral Perindustrian
4. EPRI (2010). Comparison of Coal Combustion Products to Other Common Materials: Chemical Characteristics. Electric Power Research Institute (EPRI), Palo Alto, CA, USA, 1020556

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LIFE CYCLE OF NUCLEAR POWER PLANTS

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Nuclear power plants like any living creature has a life cycle, which includes several stages, as choosing the location for building, designing, the process of building, running and shutting down of NPP.

The first stage includes safety precautions for the environment. The chosen location has to satisfy several conditions, such as

- Nuclear power plant should be built only where the ground cannot be used in agriculture.
- Near the chosen place, there should be the source of water, as nuclear power plant requires great amounts of water for cooling.
- The ground is to be solid enough to withstand the building such huge construction, and so on.

The second stage is designing of nuclear power plant, which includes the designing the power of reactors.

The designing consists of several steps:

The first step is completion of product requirements document, the next step is calculation of project power, the amount of reactors and so on. Then, the company makes technical drawing of NPP, which includes all components of planning project.

After that, the government should confirm the plan and then the next stage starts.

Building the nuclear power plant includes creation of reactors, turbines, water colling towers; by other words, it includes the construction of all components and systems of future plant.

After the process of building is over, before running the plant, there is a testing process, which are made to become sure, that everything works as it should work. And only then the plant is started. Unfortunately, the time of running of nuclear power plant is limited. According to different sources, thus time is from 30 to 80 years.

After the limit is over there is a process of decommissioning.

There are 3 possible options for decommissioning:

1. Direct dismantling. In this case all nuclear fuel is removed. All buildings are dismantled and the area of plant is purified.
2. Delayed dismantling. This method is quite the same as the first one. But in delayed dismantling the plant is preserved for from 30 to 100 years and only then it is dismantled.
3. The last way is insulation. The whole plant may be concluded to sarcophagus and will be dismantled only after 100 years. [1]

The advantage of two last methods that they reduce the amount of radioactive fuel and, consequently, they reduce the cost of dismantling.

After dismantling, according to theory of "Peaceful Atom", the area of NPP should be restored to a greenfield site, like no nuclear power plant has ever stood here.

ЛИТЕРАТУРА:

1. В.М.Кузнецов "Российская атомная энергетика. Вчера, сегодня, завтра.". Москва, 2000 г. изд. "Голос-пресс". 287 С.

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PERCEPTRON NEURAL NETWORK. POTENTIAL WAY OF USE

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Neural network is a mathematical model, its software and technical realization. I have decided to take 2 perceptron types - single and multi. I decided to find out why multi-layer perseptron is used in calculations of nuclear reactions. Let's start with a structure of the single-layer network.

As you can see on the screen the network has only one layer - output, because the input layer does not make any counts. On the input and output layer such network takes and gives binary function. For a certain number of steps the network learns to give correct answers. Typically, the speed of learning decreases with increasing time.