SELECTION OF SITE FOR NUCLEAR POWER PLANT

The various factors to be considered while selecting the site for nuclear plant are as follows :

1. **Availability of water.**

   At the power plant site an ample quantity of water should be available for condenser cooling and made up water required for steam generation. Therefore the site should be nearer to a river, reservoir or sea.

2. **Distance from load center.**

   The plant should be located near the load center. This will minimise the power losses in transmission lines.

3. **Distance from populated area.**

   The power plant should be located far away from populated area to avoid the radioactive hazard.

4. **Accessibility to site.**

The power plant should have rail and road transportation facilities.

5. **Waste disposal.**

The wastes of a nuclear power plant are radioactive and there should be sufficient space near the plant site for the disposal of wastes.

SELECTION OF SITE FOR THERMAL POWER PLANT

1. Land Availability.

Power plant needs a wide range of land requirements. For example, coal plants tend to need larger areas to support rail lines, coal piles, and landfills. Natural gasfired power plants may only need area for the generation facilities and support equipment . Needed information includes the site size (acres), and the portion of the site (acres) that would be occupied by plant buildings and systems.

2. Water Availability.

Many power plant technologies use water from lakes, rivers, municipal water utilities, or groundwater. Surface water is used for plant cooling and groundwater is used for plant processes. Generally, the presence of adequate and usable water resources at or near a site is preferred over sites with remote, inadequate, or low-quality water resources.

3. Fuel Availability.

Fuel availability influences choices positively; its marginal utility is diminishing with supply. Without a higher level of availability, alternative fuels are unlikely
to be adopted.

4. Skilled Manpower. Availability

A power plant requires labor for construction and operation. Local communities can benefit from these employment opportunities. Generally, sites that can make use of local labor are more desirable.

These sites would have a larger skilled work force within a short distance from the plant site.

5. Land Acquisition

Cost. Each site will have unique land acquisition requirements and effects. Generally, sites that have lower land acquisition costs and require shorter acquisition times are more desirable.

6. Future Development Limitations.

The construction of a plant at a particular site may create limitations on future development in the local area through its effect on land use or through its consumption of local PSD air increments, water resources, or water discharge capacity. Generally, sites that impose fewer limitations on future development may be more desirable.

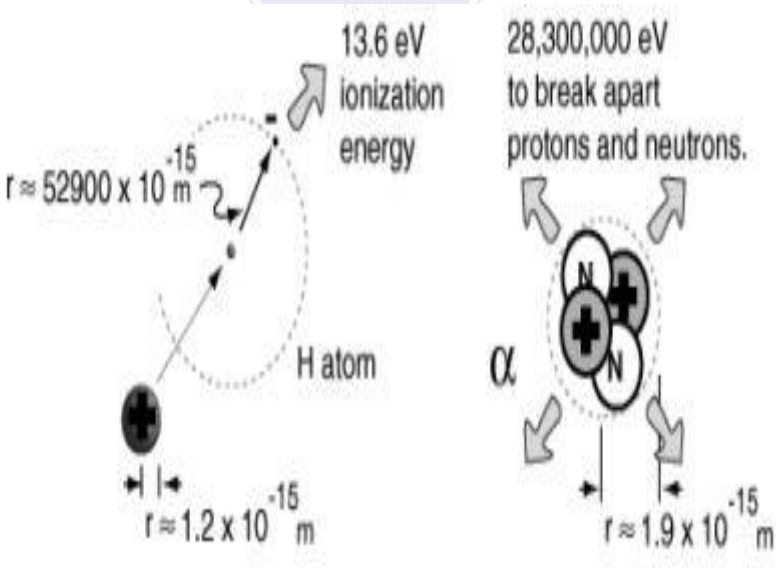
7. Possibility of Site Expansion.

A site might be able to support more generating capacity than proposed. It's usually more economical and environmentally acceptable to add generating capacity at an existing site than to build at a new site.. Often, an expandable site may be more desirable. But, a potential concern of local property owners is the effect of plant siting on nearby property values. Generally, sites that enhance property values or minimize the decrease in property values may be more desirable.

FACULTY OF ENGINEERING & TECHNOLOGY

NUCLEAR BINDING ENERGY

Nuclei are made up of protons and neutron, but the mass of a nucleus is always less than the sum of the individual masses of the protons and neutrons which constitute it. The difference is a measure of the nuclear binding energy which holds the nucleus together. The enormity of the nuclear binding energy can perhaps be better appreciated by comparing it to the binding energy of an electron in an atom. The comparison of the alpha particle binding energy with the binding energy of the electron in a hydrogen atom is shown below. The nuclear binding energies are on the order of a million times greater than the electron binding energies of atoms.



The binding energy curve is obtained by dividing the total nuclear binding energy by the number of nucleons. The fact that there is a peak in the binding energy curve in the region of stability near iron means that either the breakup of heavier nuclei (fission) or the combining of lighter nuclei (fusion) will yield nuclei which are more tightly bound (less mass per nucleon).

NUCLEAR FISSION

When unstable heavy nuclei are bombarded with high energy neutrons, it splits into several smaller fragments. These fragments, or fission products, are about equal to half the original mass. This process is called Nuclear Fission. Two or three neutrons are also emitted. 90 Power Plant Engineering The sum of the masses of these fragments is less than the original mass. This „missing" mass (about 0.1 percent of the original mass) has been converted into energy. Fission can occur when a nucleus of a heavy atom captures a neutron, or it can happen