

## Chapter 17 Section 2 Notes

Nuclear Energy can be broken into two types

- nuclear fission – the splitting of atomic nuclei
  - new nuclei and neutrons result from the splitting of an atom's nucleus
- nuclear fusion – the combining of atomic nuclei; must take place at extremely high temperatures; deuterium and tritium are used in fusion reactions

How Nuclear Energy Works

- nuclear energy is contained within the nucleus of an atom
- in a nuclear power plant three pipe circuits pump water through the reactor, turbine, and cooling tower
- nuclear reactors – site of controlled fission reaction
- nuclear reactors are surrounded by a thick pressure vessel filled with a cooling fluid
- uranium is used in a nuclear reaction
- during the process of nuclear fission a neutron splits a uranium-235 atom, forming new elements and releasing several neutrons plus energy

The Advantages of Nuclear Energy

- produces electricity
- reduces the use of fossil fuels
- releases less radioactivity into the atmosphere than burning coal
- does not produce air pollution

Why Aren't We Using More Nuclear Energy?

- Storing or Processing Waste
  - storage sites for nuclear wastes must be located in areas that are extremely geologically stable
  - It's difficult to find a safe place to store nuclear waste
- Safety Concerns
  - the fission process can get out of control
    - Chernobyl – site of the worst nuclear accident in the world
    - Three Mile Island – site of the worst nuclear accident in the United States

The Future of Nuclear Power

- Building and maintaining a safe reactor is very expensive
  - nuclear power plant – costs more than \$3,000 per kilowatt of electrical capacity