GL10B Revision Sheet for Economic & Environmental Geology

The following are chief topics and important terms from each of the 9 lectures presented on mineral and energy resources and environmental geology. This is just a brief overview of the semester and of course doesn't cover everything we went over during GL10B.

Resources and Reserves

Know what is meant by the terms resource and reserve. Understand how total reserves may increase, decrease or remain unchanged as they are used. Understand what is meant by renewable and non-renewable resources.

Terms

Subeconomic resources hypothetical resources speculative resources

Mineral Resources I &II

Understand the major types of mineral deposits and be able to give examples of each type. Be able to relate in a general way plate tectonic activities and the formation of mineral deposits.

Terms

Metallic and Non-metallic resources Ore Grade Enrichment Factor Spoil Acid mine drainage Deposits- Hydrothermal, Magmatic, Metamorphic, Sedimentary, Placer, Residual, Marine kimberlite evaporites

Petroleum

Know how oil and natural gas form and are trapped in economic quantities below the earth's surface.

Know the characteristics of source rocks & reservoir rocks. Be able to describe stratigraphic traps and structural traps.

Terms

Maturationpetroleum windowgeothermal gradientSource RocksReservoirsTraps

Coal

Understand coalification and the steps in this process.

Know how & when most of the earth's coal formed.

Know how coal is mined and the chief environmental problems associated with the mining of coal. Know what is meant by the term fossil fuel, the relative abundance of these different fuels and

problems associated with the use of each.

Know some of the potential non-traditional sources of petroleum- tar sands & oil shale.

Terms

Peat, Lignite, Sub-bituminous, Bituminous, Anthracite High sulphur coal volatiles

Nuclear Energy

Understand the general characteristics of energy sources; renewable or non-renewable, diffuse or concentrated, constant or variable through time, transportable or stationary, polluting or non-polluting.

Understand how nuclear energy (fission) is used to power an electric generator.

Know the rocks and minerals in which uranium is found and how it is used to produce nuclear fuel.

Know relative abundance of U in the crust and the relative abundance of U that is fissionable (U-235)

Know possible benefits and limitations of using U fuel and some geological aspects of radioactive waste disposal.

Terms Uraninite carnotite Uranium U-235 yellowcake fission fusion

Geothermal Energy

Understand how geothermal heat can be used as an energy source. Understand how geothermal gradient may vary across the globe. Know the benefits and limitations of this energy source

Terms

Direct use heat exchange electric power generation Dry steam plant flash steam plant binary cycle plant geothermal gradient

Alternative energy sources

Be able to describe the benefits and limitations of solar power, tidal power, wind power,

hydropower and biomass fuels.

Know what is meant by gas hydrates and the possible environmental problems associated with their exploitation.

Know geological considerations that must be taken into account when exploiting these alternatives.

Terms hot-dry rocks Active and passive solar systems Biogas

Waste and Waste Disposal

Understand what is meant by **point sources** and **non-point sources** of pollutants and waste. Be able to describe a well-constructed sanitary landfill.

Understand the general problems with placing any waste disposal facility

Understand the special characteristics of radioactive waste and how disposal facilities must be constructed to deal with these differences.

Terms

Biodegradable high level & low level radioactive waste leachate methane Secure landfill