Instructor: Wood
GLG 110

Exam 4 Study Guide

Mineral Resources– Chapter 14

- Resources vs. reserves
- What is a natural resource? Metallic Mineral, Non-metallic Mineral, Fuel
- Formation of mineral resources: hydrothermal/magmatic (veins, disseminated deposits, contact metamorphism, early settling of magma, plate tectonics) and surface processes (placer deposits, evaporates, glacial/stream/delta, concentration by weathering)
- Mining methods: strip, open pit, underground, placer, evaporation, in-situ
- Mining in Arizona: copper porphyry deposits with supergene enrichment
- Mining of copper: mine to market (copper oxides vs. copper sulfides)
- Environmental affects of mining: tailings, acid drainage, smelting

Energy Resources – Chapter 15

Coal

- Coal: formation & types (peat, lignite, sub-bituminous, bituminous, anthracite)
- The U.S. has a lot of coal reserves and relies heavily upon coal for energy production
- Mining methods: strip (overburden removed then replaced after mining), underground (room and pillar, long wall)
- Mining hazards: subsidence, fires, methane gas, black lung disease, sulfuric acid
- Coal mining in AZ

Oil & Gas

- Energy consumption- Who in the world has all the oil? Who in the world uses most of the oil? Where does the US get its oil?
- Oil & Gas history, first pumping well in Titusville, PA, 1859
- Oil & Gas formation, migration (source rock & reservoir rock)
- Oil and gas traps: anticlines, faults, unconformities, salt domes
- Oil shale and tar sands
- Environmental affects of drilling: subsidence, salty brine, off-shore, pipelines (Alaska), refining, tanker spillage, air pollution, acid rain.

Nuclear Power

- What is radioactivity? Unstable isotopes change into stable daughter products.
- The meaning of half-life
- Types of radiation: alpha, beta, gamma
- Nuclear reactors in the US, abundance of uranium as a source of fuel
- Uranium-235: why do we use it, and how is it used in a nuclear reactor
- Fission Reactors vs. Breeder Reactors
- Nuclear Power Station mechanics – 3 water loops
- Characteristics of Palo Verde Nuclear Generating Station
- Good and bad side of nuclear power
- Nuclear waste disposal – Yucca Mountain – criteria for a good deposition site
- Radon Gas: where does it come from? Risks. Safe levels.

Alternative Energy

- Renewable vs. nonrenewable energy
- Solar, wind, geothermal, ocean, hydrogen, hydroelectric, biomass (positives and negatives of each type)

Pay special attention to tables, boxes, diagrams. Schedule is subject to change. Most topics are listed here, but it may not be a complete list of what you will be tested on. Questions may be asked from videos or other in-class activities.