

## Lecture 22 - Energy Crisis

### 1973 Arab Oil embargo

- Oil supplies cut off
- Oil shortages follow
- Long lines at gas pumps
- Focuses attention on the need for an energy policy
- Nuclear energy did not benefit

### Federal legislation

- 1973, Nixon, Special Energy Committee
- 1974, Energy Reorganization Acts
  - > ends AEC, replaces with NRC
  - > creates ERDA
- 1977, Energy Organization Act
  - > creates DOE, brings all together
- 1980, major energy agencies
  - > DOI (Interior)
  - > EPA
  - > NRC
  - > DOE
  - > Synfuel Corporation

### Oil Policy

- 1972, tax on foreign oil fails
- 1973, trans-Alaska pipeline
- 1975, increase access to federal lands
- 1978 deregulate natural gas
- 1979 deregulate oil prices
- 1970s, general, increased emphasis on research on oil recovery, etc.

### Oil Shale

- began leasing land in 1974
- 1980, Energy Security Act, Synfuels Corporation
- oil prices fell in 1980s and government support was withdrawn, project failed

### Solar

- 1974, Energy Research and Development Administration (ERDA)
- 1974, Solar Energy Research, Development, and Demonstration Act
  - Solar Energy Research Institute
- 1980, strong support, not immediately be a major player

### Energy conservation

- 1975, Energy Policy and Conservation Act
- 1977, National Energy Program
- 1978, National Energy Conservation Policy Act

### **1960s, Start of the Nuclear Age**

- LW Reactors adopted as industry standard
- Europe bases its nuclear technology on US technology
- Demonstration reactors come on line
- GE & Westinghouse offer “turn-key” reactors
  - Price set in advance
  - When completed, utility “turns key,” power comes on

### **Three Mile Island (TMI-1)**

- mid-1965, begin planning
  - - Susquehanna River
  - - 10 miles SW of Harrisburg, PA
  - - 819 megawatts
- 1966, ordered from Babcock & Wilcox
- 1974, on line

### **TMI-2**

- begun, early 1970s
- Dec. 28, 1979, TMI 2 came on line
- January/February, 1979 a series of minor valve leaks and pump problems
- March 28, 1979 major accident

### **Accident, TMI-2**

- water circulating pumps went off line
- dial misread, shut off emergency system
- core overheated, danger of a meltdown
- radioactive water flooded several buildings
- some water leaked in the local river
- Hydrogen bubble threatens explosion
- radiation into the atmosphere through cooling towers

### **Growing doubts about nuclear power**

- 1966 Fermi, Monroe, MI (near meltdown)
- 1975, strontium 90 in milk, Shippingport, PA
- 1976, Browns Ferry, Decatur, Alabama (fire)
- 1976, Rasmussen Report, meltdown, 1/20,000 (NRC),
- 1977, increased cancer, Waterford, CN
- 1979, GAO report, calling for evacuation plans

### **Focus shifted to damage control**

- Margaret Reilly, PA Dept of Radiation Protection
  - the release of radiation amounted to “a gnat’s eyelash”
- Governor Thornburgh refused to order evacuation
- NRC report: “On the basis of present scientific knowledge [the radiation doses] were so small that there will be no detectable additional cases of cancer, developmental abnormalities, or genetic ill-health as a consequence of the accident at TMI.”
- put odds at 1 in 325,000

### **Critics response**

- before accident, reports of harm to animals
  - miscarriages in cats, pigs, goats
  - cows not being able to give birth
  - white residue on buildings that made animals sick and killed grass
  - duck and chicken eggs would not hatch
- accident increased concerns
  - new evidence of increased infant mortality

### **Scientific issues:**

- how much radiation was released, in what forms?
- where was the radiation released?
- have there been any detectible effects?

### **How much radiation released?**

- mathematical estimates
  - - estimated 1.4 millirems, comparable to background radiation
- four sources of information:
  - stack monitors
  - charcoal filters in stacks
  - thermo-luminescent dosimeter (TLD)
  - samples of milk, animals, etc
- conclusion: not enough to cause effects

### **Critics replied:**

- stack meters inaccurate
- charcoal contaminated by the accident
- TLDs measured only limited areas
- never did a comprehensive survey of effected animals

### **Did accident cause human injury?**

- initial reviews, no effects
- critics reanalyzed, found results
- NRC explained results away
- critics did not accept

### **Became political battle**

- newspapers divided
- Thornburgh fired his Commissioner for public health

### **Key event**

- moratorium on licensing
- May 6, 1979, 100,000 nuclear opponents gathered in DC
- Sept 23, 200,000 in NYC

### **Rejection of nuclear technology is more complex**

- Anti-nuclear groups begin to form in the 1960s
- Nuclear projects cancelled well before 1979

### **Causes of decline**

- Late 1960s, AEC shifted from LWR to BR
- Industry underestimated cost of building plants
- AEC remained secretive due to weapons programs
- No one looked seriously at the waste issue
- Carter (1977) stopped fuel reprocessing
- New environmental laws slowed plant construction
- Critics skillful at using nuclear issue to push environmental and energy concerns

### **Nuclear policy**

- 1974, AEC ---> ERDA and NRC
- Under Carter, DOE established