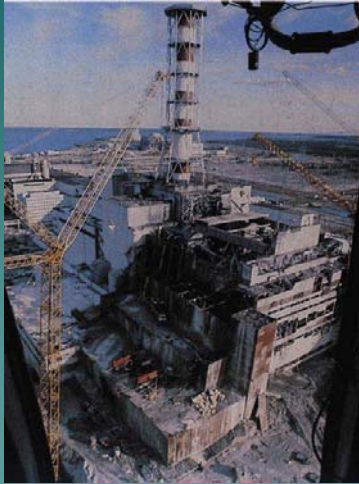
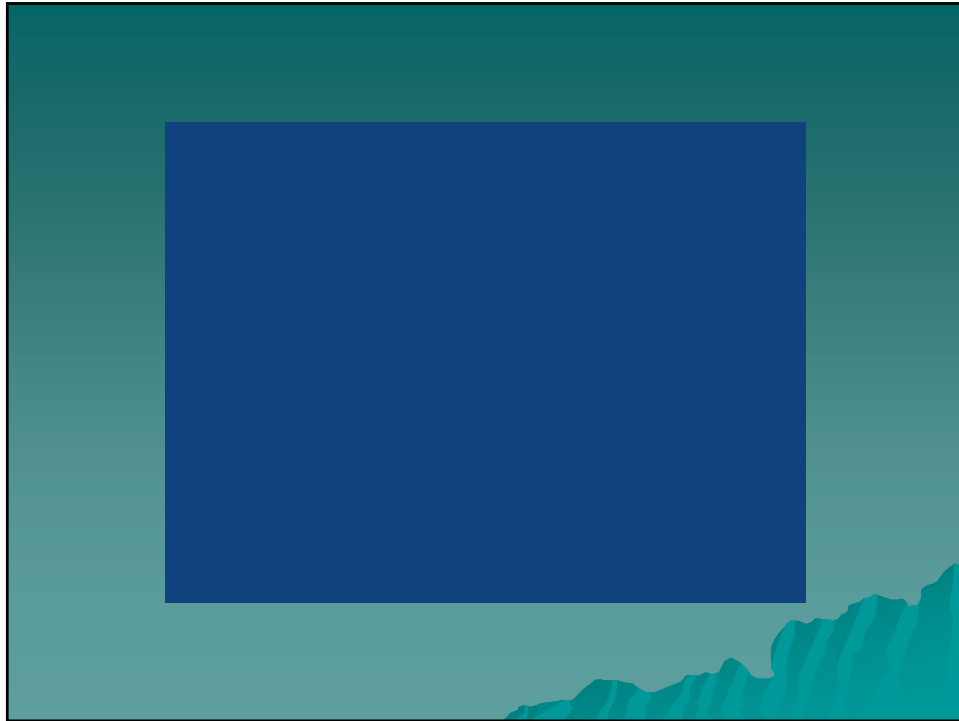


# The Chernobyl Accident

MIME 221  
Professional Practice  
Fall 2005

## Chernobyl April 1986





## April 25-26<sup>th</sup> 1986

- ◆ 1:23 am Reactor #4 becomes critical causing an explosion and massive radioactive debris release.
- ◆ 30 people killed instantly
- ◆ 116 000 people evacuated
- ◆ 2500 death attributed to Chernobyl up to this day
- ◆ 210 000 people resettled 1990-1995

## Causes

- ◆ Lack of Safety Procedures
- ◆ Design fault in RBMK reactor
- ◆ Violation of operating procedures
- ◆ Communications breakdown



## Sequence of Events

- ◆ April 25<sup>th</sup>, 1986 Reactor #4 scheduled for maintenance shutdown
- ◆ Test to be carried out to determine if enough electricity could be produced during a reactor shutdown until backup generators kick in.
- ◆ Test planned at 1000 MW power level
- ◆ To avoid influencing results, emergency cooling system is put off line (in violation of safety protocols)

## Sequence of events

- ◆ Due to time delays and operator errors power level falls to 30 MW
- ◆ Operators remove manually all rods but 8 (safety protocols: never less than 26 rods at all times)
- ◆ Power climbs back to 200 MW, problems with steam pressure to generators.
- ◆ To maintain steam pressure operators reduce feed water flow

## Sequence of events

- ◆ Excess steam is produced in the circulation system and reactor gets into the positive void coefficient condition (design weakness)
- ◆ Temperature in reactor core increases rapidly to 100 times the nominal level
- ◆ Reactor #4 becomes critical: confining concrete chamber insufficient to contain explosion: radioactive material is released in the atmosphere.

## Aftermath

- ◆ Soviet economy: 12.8 Billion\$ loss
- ◆ Contamination: covering a wide area
- ◆ People affected through food chain even outside of the contaminated zone
- ◆ Cancer, birth defects
- ◆ Long term effects on people health
- ◆ Population traumatized
- ◆ But still, Chernobyl nuclear plant remained in operation for 15 years after the accident

## More on Chernobyl

[www.chernobyl.co.uk](http://www.chernobyl.co.uk)