

**Nuclear Power Plant  
Safety and the  
Public Health Response**

Satellite Conference and Live Webcast  
Friday, April 13, 2012  
12:00 – 1:30 p.m. Central Time

Produced by the Alabama Department of Public Health  
Video Communications and Distance Learning Division

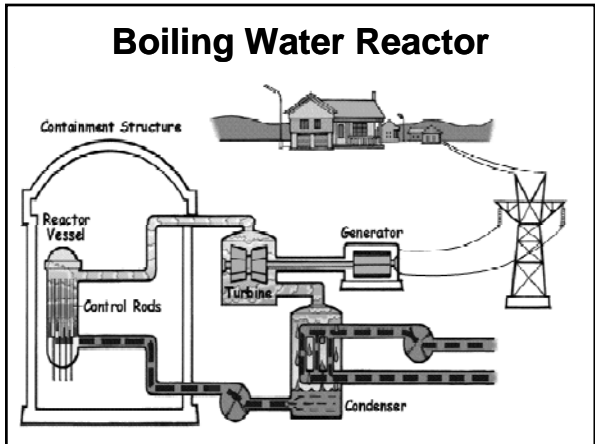
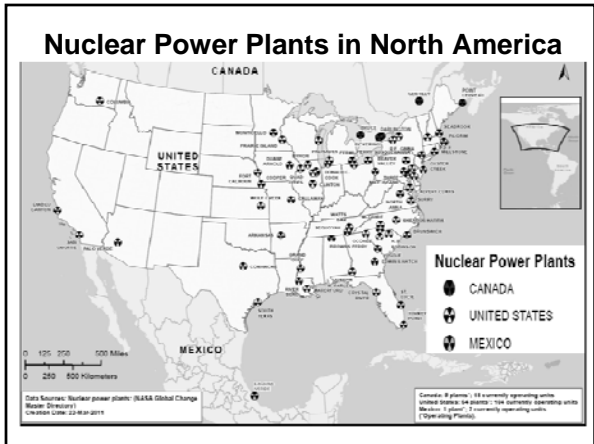
**Faculty**

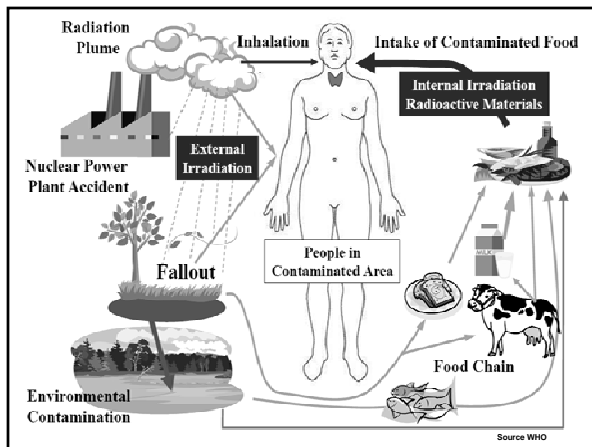
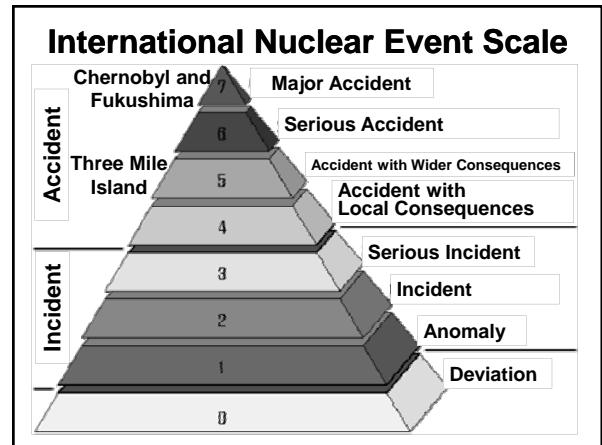
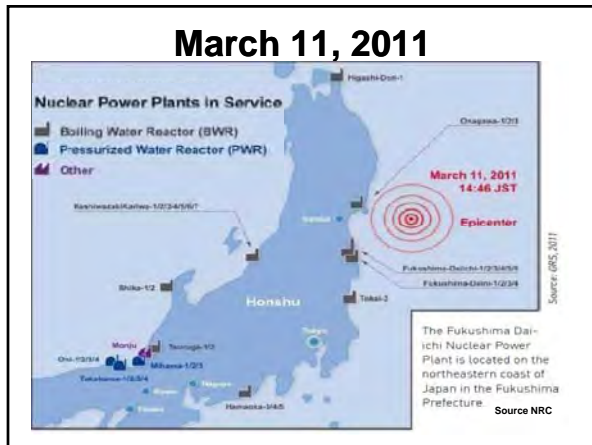
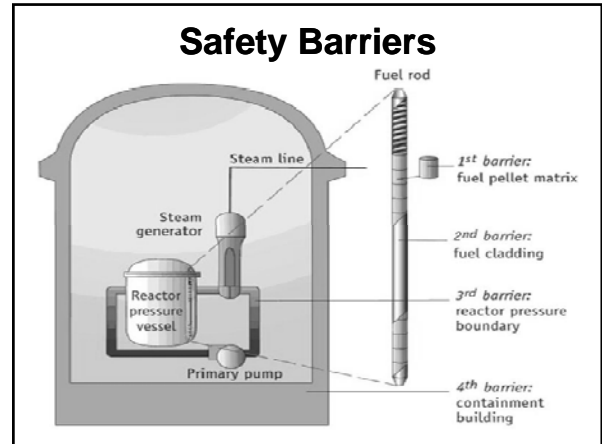
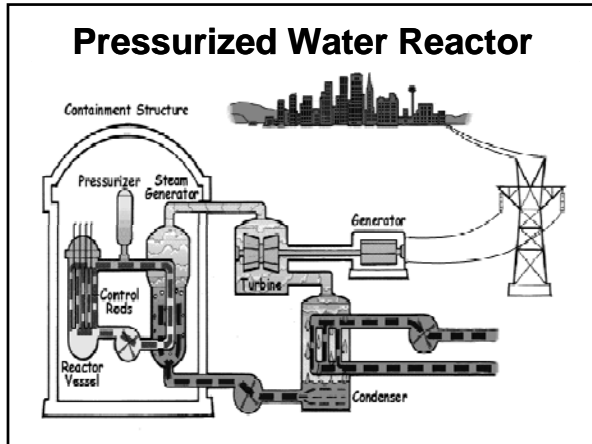
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Environmental Health  
Centers for Disease  
Control and Prevention

**Nuclear Power Plant  
Basics**



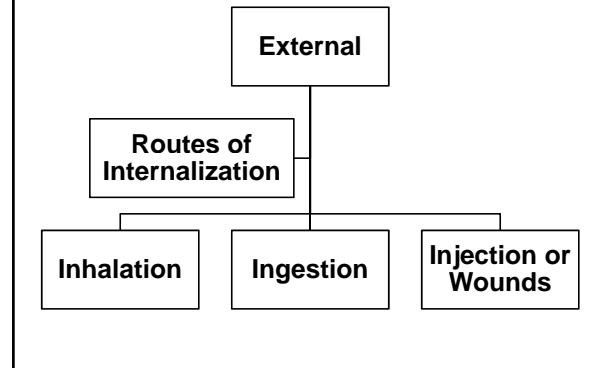


### Health Effects

### Medical Hazards

- In the surrounding communities
- In the proximity of the nuclear power plant

### Contamination



### Clinical Consequences of Internal Contamination

- Primarily Chronic
  - Solid tumors
    - Thyroid
  - Leukemias

### Thyroid Cancer

- Secondary to inhalation or ingestion of radioactive iodine
- Highest risk:
  - Pregnant women and children

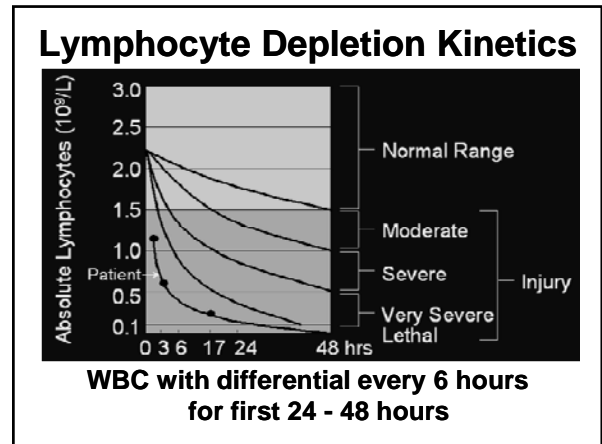
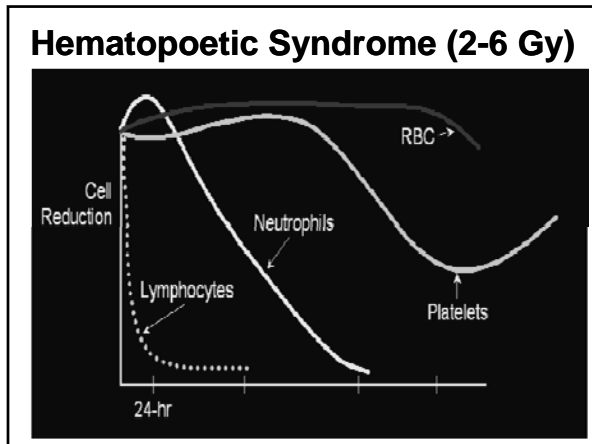
### At the NPP Site

*“The workers were laying cables Thursday in the basement of the reactor’s turbine building when they stepped in the water. It seeped into the ankle-height boots of two of the men, according to Tokyo Electric Power Company, which operates the plant.”*

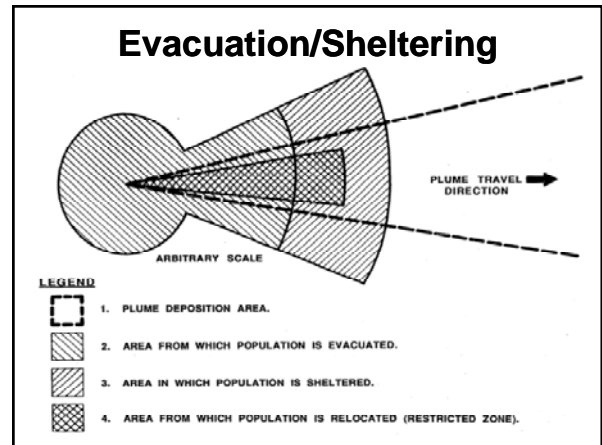
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### Prodrome

- Vomiting within 4 hours of exposures suggests exposure to a significant dose of radiation
- The earlier the vomiting the more severe the exposure



## Protective Action Measures

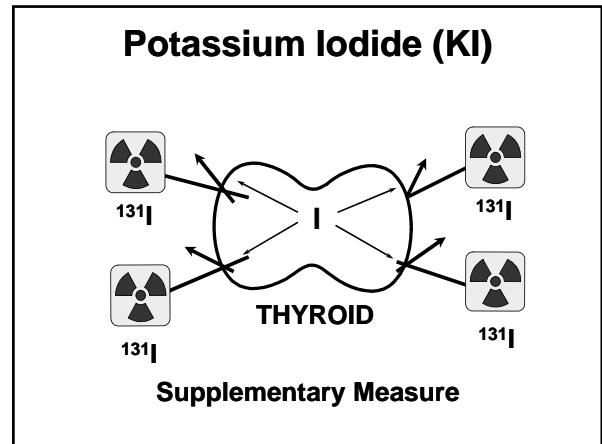
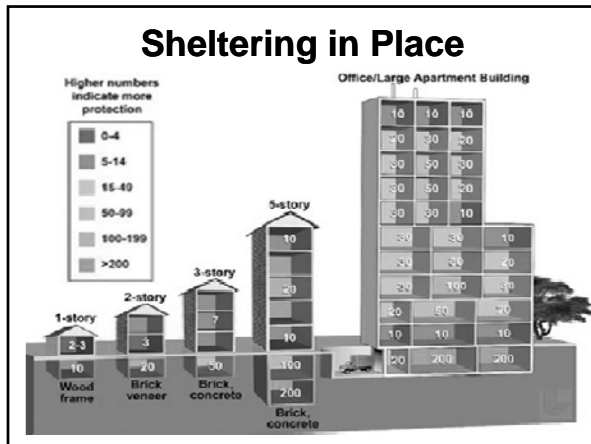


## Emergency Planning Zones

- 10-mile EPZ
- 50-mile EPZ

Time Phase	Protective Action	Limit (mSv)	Comments
Early	Evacuation or Sheltering	TED 10-50 Thyroid 50 - 250 Skin 500 - 2500	Evacuation should normally be initiated at 10 mSv. Sheltering may be the preferred protective action when it provides protection equal to or greater than evacuation.
	Administration of KI	250	Equivalent Dose to the thyroid from radioiodine. Requires approval of state medical officials.

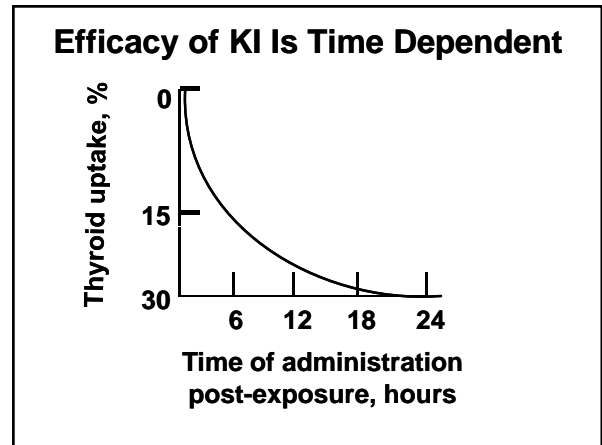
Source FRMAC Assessment Manual, Volume 1 Appendix C - Table 2-2, April 2010



### US FDA – Dosing

	Predicted Thyroid exposure (cGy)	KI dose (mg)	# of 130 mg tablets	# of 65 mg tablets
Adults over 40 yrs	>500	130	1	2
Adults over 18 through 40 yrs	>10			
Pregnant or lactating women				
Adoles. over 12 through 18 yrs*	≥ 5	65	1/2	1
Children over 3 through 12 yrs				
Over 1 month through 3 years		32	1/4	1/2
Birth through 1 month		16	1/8	1/4

\*Adolescents approaching adult size (> 70 kg) should receive the full adult dose (130 mg).



### Population Monitoring

- <http://emergency.cdc.gov/radiation/cr/c/vcrc/asp>

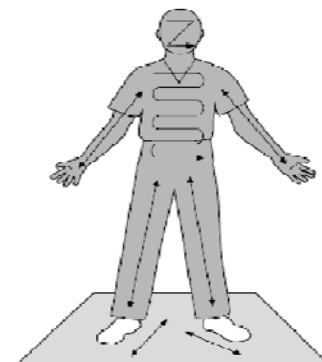
### Immediate Monitoring

- In the first hours:
  - Determine who is contaminated
  - Internal vs. external
  - Decontamination
  - Dose assessment and health risk

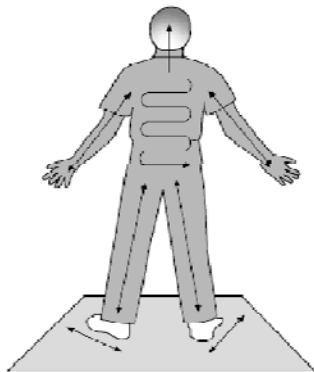
### CDC Responsibilities

- Provide guidance to state, local, tribal governments for:
  - Establishing monitoring operations
  - Treating internal contamination
  - Creating a health registry
  - Determining radiation doses and health risk

### Radiation Detection in the CRC



### Radiation Detection in the CRC



### External Decontamination

- Paired with radiological survey
- Soap and water

### Further Evaluation

- Internal contamination
- Exposure to radiation

### Additional Resources

- Radiation Emergency Medical Management Web Portal
  - <http://www.remm.nlm.gov/>
- CDC Emergency Preparedness Web Portal
  - [www.emergency.cdc.gov/radiation](http://www.emergency.cdc.gov/radiation)

### **Additional Resources**

- **Radiation Emergency Assistance Center/Training Site Web Portal**  
– <http://orise.orau.gov/reacts/>

### **For More Information**

**Centers for Disease Control and Prevention**  
**1600 Clifton Road NE**  
**Atlanta, GA 30333**  
**Telephone: 1 – 800 – CDC – INFO**  
**1 – 800 – 232 – 4636**  
**TTY: 1-888-232-6348**  
**Email: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)**  
**Web: <http://www.cdc.gov>**

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the CDC.

### **For More Information**

**National Center for Environmental Health**  
**[www.cdc.gov/nceh](http://www.cdc.gov/nceh)**