Radiation And The Scrap Yard

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by

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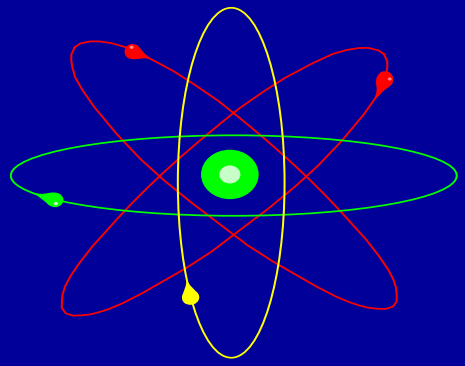
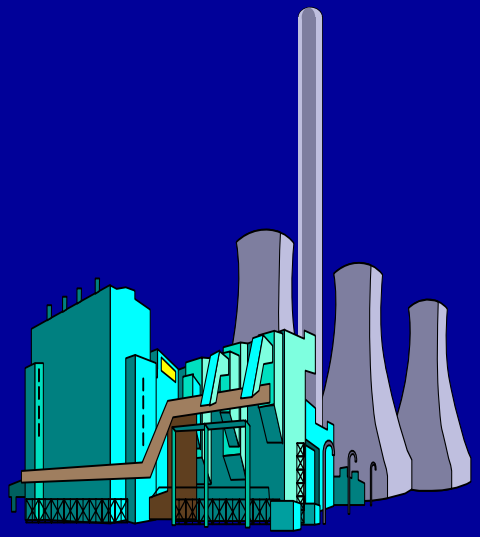
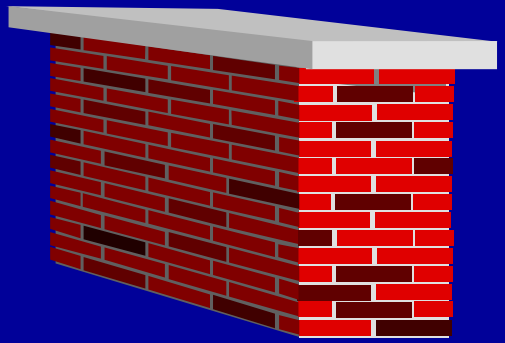
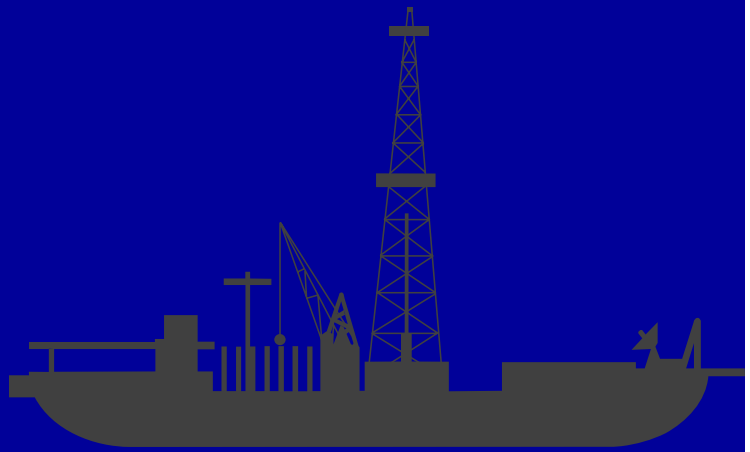
Radioactive Material
Where Does it Come From?

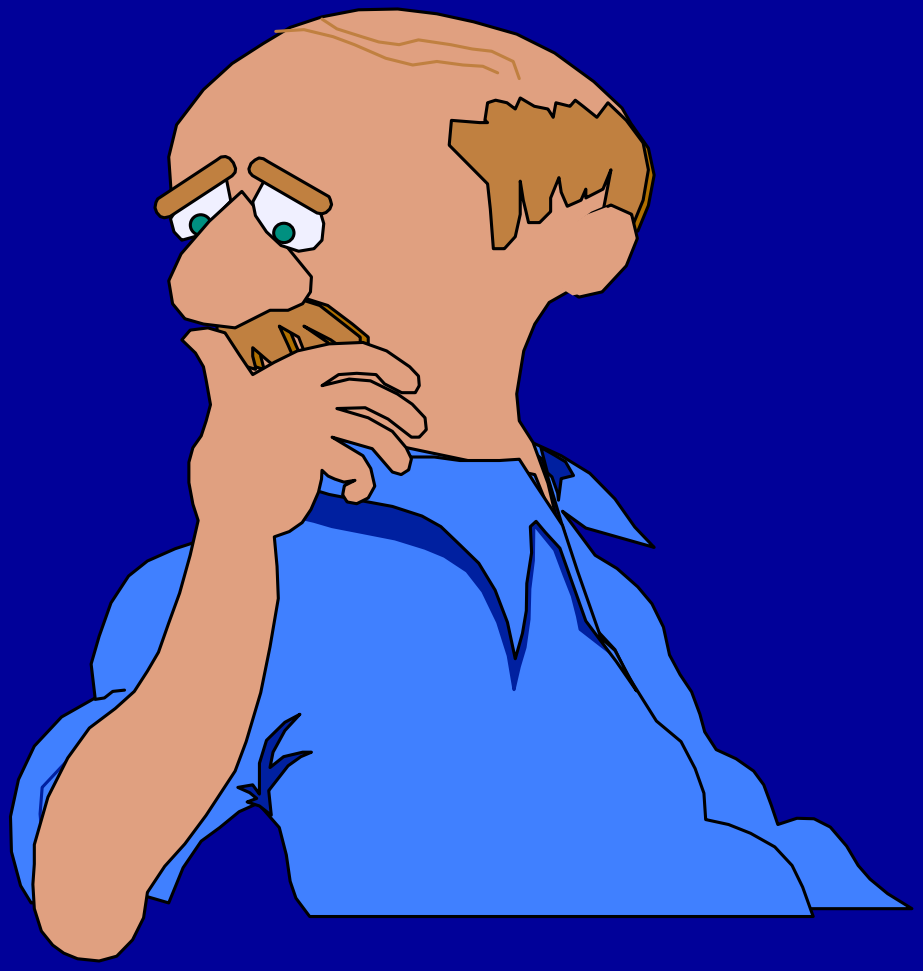




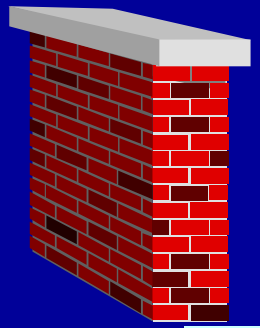


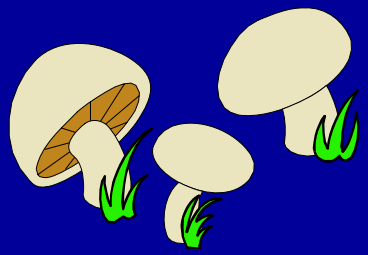


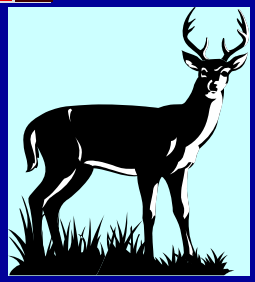
RADIO-PHOBIA

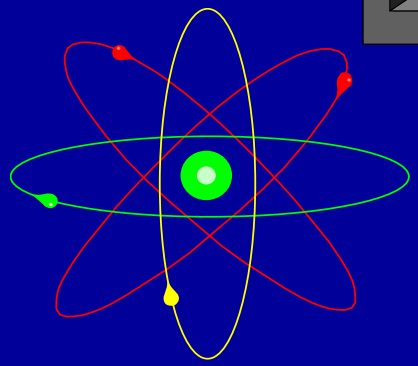


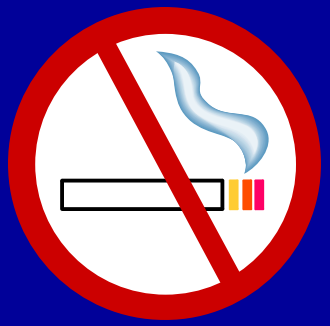
Radiation in our Everyday lives





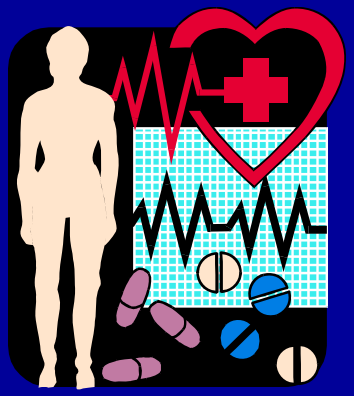






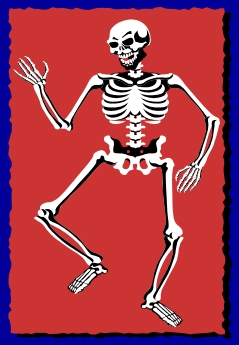
Healing Arts

- Medical
  - Medical Diagnosis



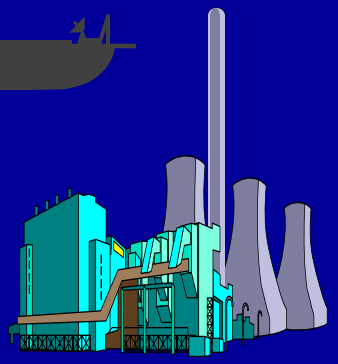
  - Dental Diagnosis

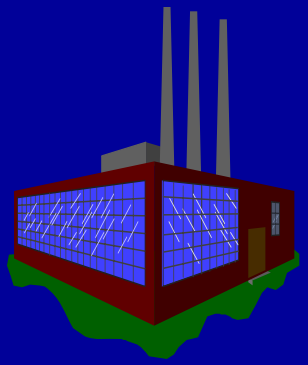
  - Therapy

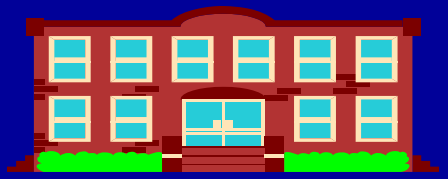


Industrial Activities

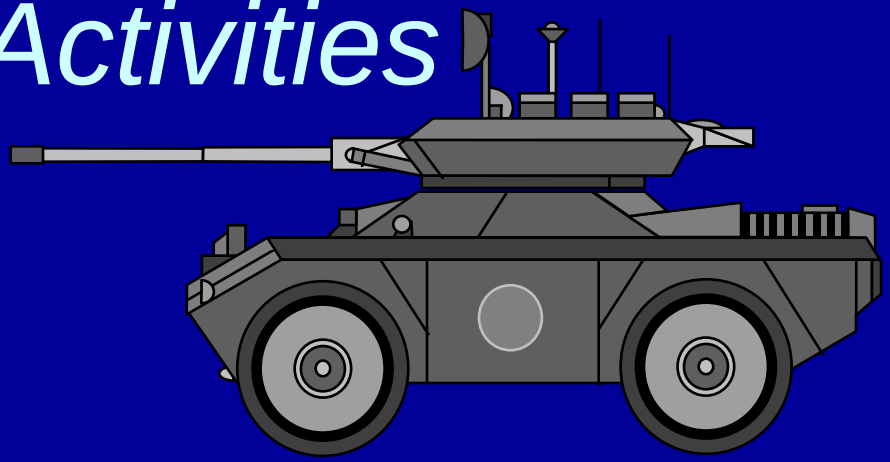
- Exploration
- Power Generation
- Manufacturing
- Research



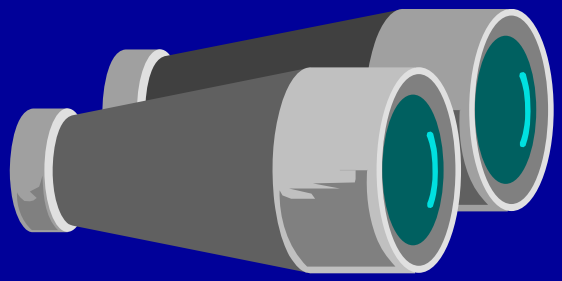




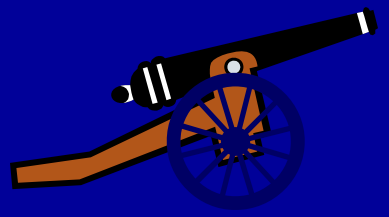
Military Activities



- Gas/fog detection



- Lens coatings



- Offensive Weaponry

- Planning

Good Planning

- Everyone is trained
- Everyone is informed
- Everything goes smoothly
- SAFETY FIRST is always paramount
- Normal / safe operation

Often, things do not go as planned

Steel Industry

Radioactive Materials Effects Scrap and Steel Industry

- **More than 94 accidental *REPORTED* smeltings of radioactive materials in steel mills worldwide**
- **Most recently in (USA, Africa, and China)**
  - **Yes, it still happens!**
- **Multi-million dollar decontamination efforts**
- **Deaths and Injuries are occurring**

Cost of Decontamination

- **Average steel mill $12,000,000**
- **Highest U.S. steel mill $30,000,000**
- **Highest worldwide***
  >$100,000,000
  - **still counting**

Economic Consequences

Spain, 1998:

- Cs-137 source mixed with recycled metal not detected. Source melted in steel mill.
- "Radioactive cloud" drifts away from national monitors, floats over Mediterranean
- Plume in Italy, France, Switzerland, etc.
- "8000 x background" and "worst since Chernobyl" causes international crisis.

Scrap Recycling Industry

Recycling Industry

- **Notable Orphan Source Accidents**

Thailand, 2000:

- **Disused Co-60 teletherapy unit not stored securely.**
- **Machine dismantled, source falls out when further disassembled at scrap recycling yard.**
- **10 people severely exposed, 3 die.**
- **“Rogue orphan source” suggested when physicians see patients with similar signs and symptoms at local hospital and notify authorities.**

Recycling Industry

Brazil, 1987:

- **Disused Cs-137 teletherapy source dismantled, source breached, causing exposures, contamination.**
- **4 people died; 249 others exposed.**
- **Widespread contamination of portion of city; clean-up costly.**
- **Severe economic consequences for region.**

Economic Consequences

- Goiania, Brazil, 1987: Treatment and care of the victims estimated at US$ 750,000.
- 125,000 individuals voluntarily monitored.
- 8,000 residents certified “non-contaminated.”
- Hotels refused registrations; airlines, buses refused travel; vehicles stoned, etc.

Economic Consequences

- Agriculture value dropped 50%;
- Prices for textiles, finished products fell 40%, stayed depressed for over 1 month;
- Sales loss estimated as >US$ 7,000,000;
- Clean-up cost > US$ 7,000,000;
  - (In an area where labor cost is very low)
- Housing prices fell; tourism dropped; etc.

Krypton 85 source from demolished textile mill (10X allowable amount)

Cesium 137 source from demolition site

Depleted uranium caske filled with cobalt 60, shipped to U.S. with recycled scrap from Russia

Lead-wrapped radioactive source (Cs 137)

Beer kegs

Beer keg


Radioactive material removed
from beer keg

Radioactive Vehicle

Orphan?

Military gear co-mingled with Radiation sources

Radioactive Equipment

Radioactive Equipment stolen and smuggled from Iraq

Exposure

What does exposure to radiation look like and what are the potential consequences?

(If you've got a weak stomach, don't look!)


'00 3 6

Burned torso

fatality

Color Photo C-24. Accident at Meet Halfa: The elder son; July 1, 2000. Extensive skin burns appear in the lower right quadrant of the abdominal wall extending laterally. The thumb and middle finger show evidence of healing radiation ulcers.

Burned hands

Lost both hands

Burned knee-cap

Color Photo C-25. Accident at Meet Halfa: The younger daughter; July 1, 2000. Severe skin burns are seen with scabbing and finger contractures of both hands involving palms, index finger, and thumb; a deep localized ulcer occurs on the right knee, and a localized ulcer on the outer aspect of the right thigh.

Burned torso

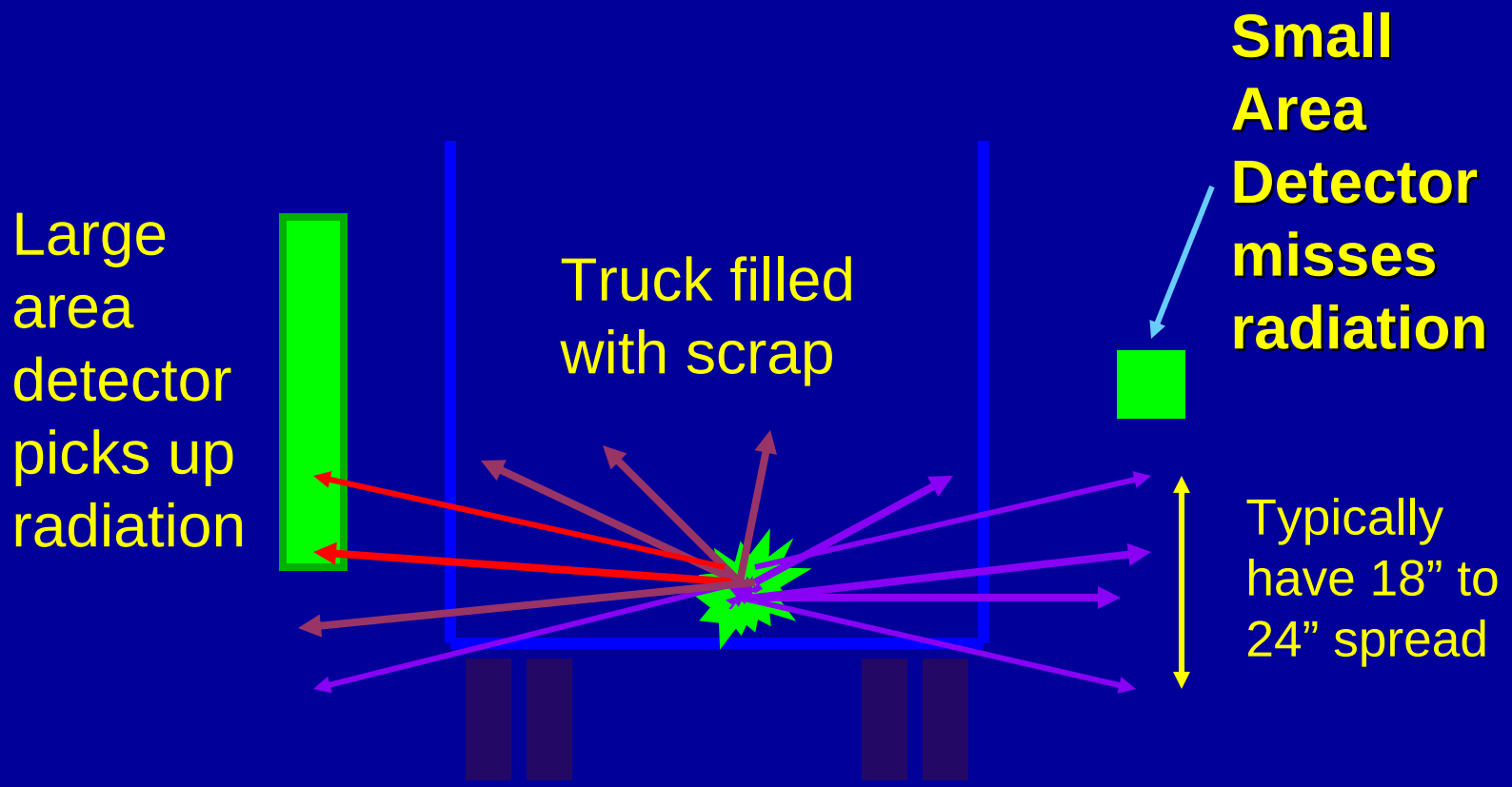
Fatality

Radiation Detection

Common Radiation Detectors
(Scrap and Steel Industry)

- **Sodium Iodide (Most scrap yards)**
- **Cesium Iodide (Some steel mill and some scrap yards in Europe)**
- **Plastic Scintillators* (All U. S. steel mills, some ports)**
  - ***This is the only material in use in steel mills that will detect neutrons.**
  - **Average cost to steel mills - $100,000-$250,000**

Advantage of Large Area Detectors



Portable (Handheld) Equipment

- Purpose / Application
- Single Channel Scintillation Detector
- Multi-Channel Detectors
- Usage
  - limitations
- Maintenance
- Calibration / Testing

Program Implementation
Selecting a Radiation Manager

- The importance of designating a Responsible Person
- Management buy-in and support
- Selecting and installing equipment

Program Implementation
Writing Your Companies Policies and Procedures

- Establishing acceptance standards
- Knowing your Consumer's requirements
- Understanding State and Federal Requirements

Procedural Requirements

Problem situations

Customer leaving without USDOT clearance

Radiation contamination / spill

Radioactive material from one of your satellite locations.

Response

Response

- Avoiding panic and misinformation
- Implementing procedures (importance of following protocol, leadership, communications)
- Isolating the Source
- Characterizing the source
- Understanding false alarms (false positives) (protocol)

Response

- Notification of appropriate individuals:
  - **KNOW WHO THEY ARE**
- Acceptance / rejection of materials
- Complete Rejections
  - notification of authorities
  - follow-up
- Partial Rejections
- Contaminated Customers?

Health and Safety

- Planning for Catastrophe:
  - crisis management (“what-if” plan)
- Pre-planning (working with Local Rescue Responders)
- Exposure:
  - First aid
  - Rescue / first responders
- Containment
- Clean-up/decontamination

Communication and Notification

- Training – (Safety's Best Friend)
- Public Relations (your company's health insurance)
- Personal Protective Equipment (PPE), gloves, respirators, glasses, tools, etc.

QUESTIONS?