2008 Integrated Safety Management Workshop
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Radiological Control in Action-

Using the Core Functions to Perform our Work.

Presented by Pam Hoggan

Senior Health Physics Technician

Materials Fuel Complex- INL

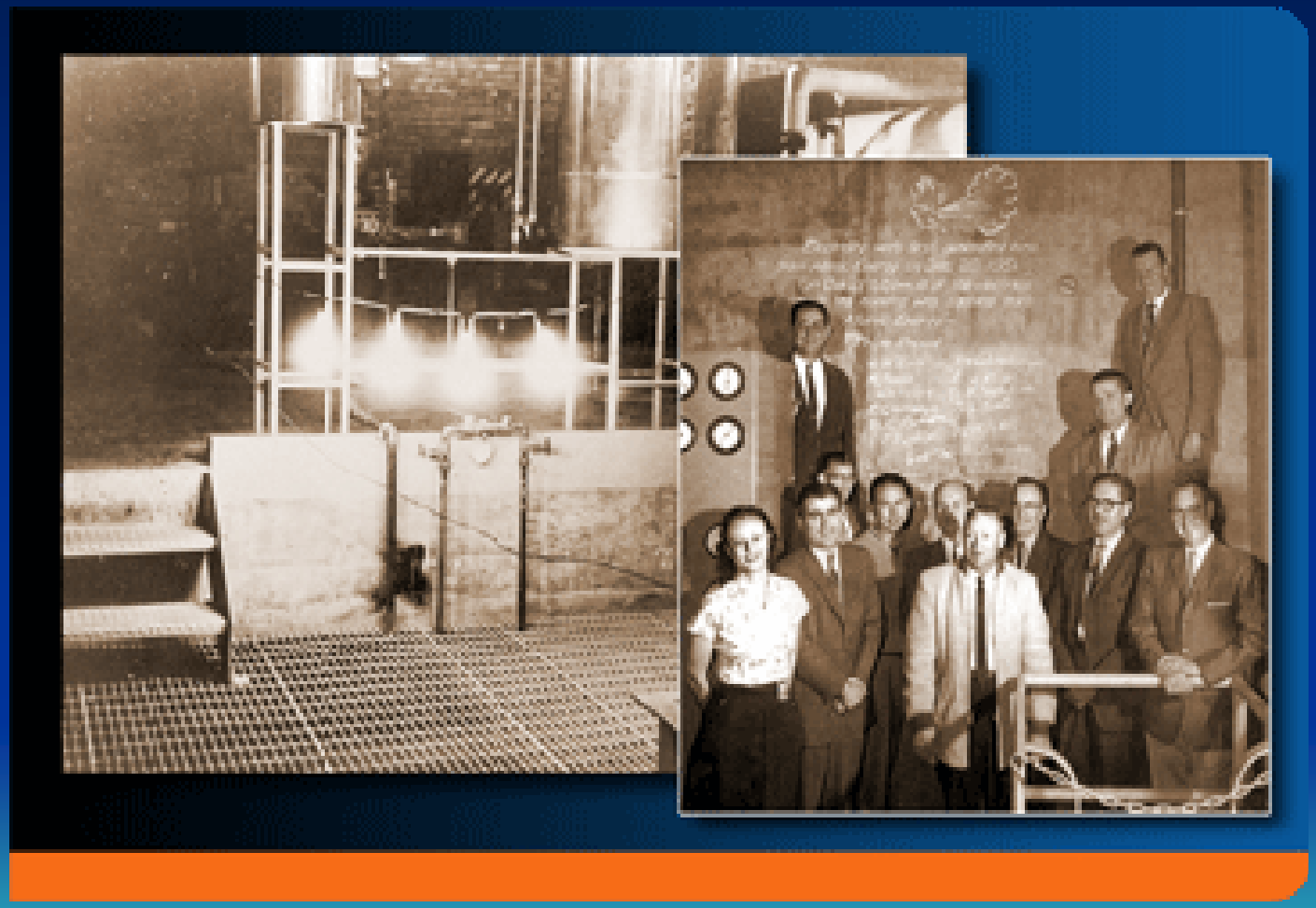
- 19 years in radiological control/health physics at the Idaho National Lab.
- NRRPT certified - National Registry of Radiation Protection Technologist.
- Completing a BS in Industrial Technology-Health and Safety. University of Idaho.

History

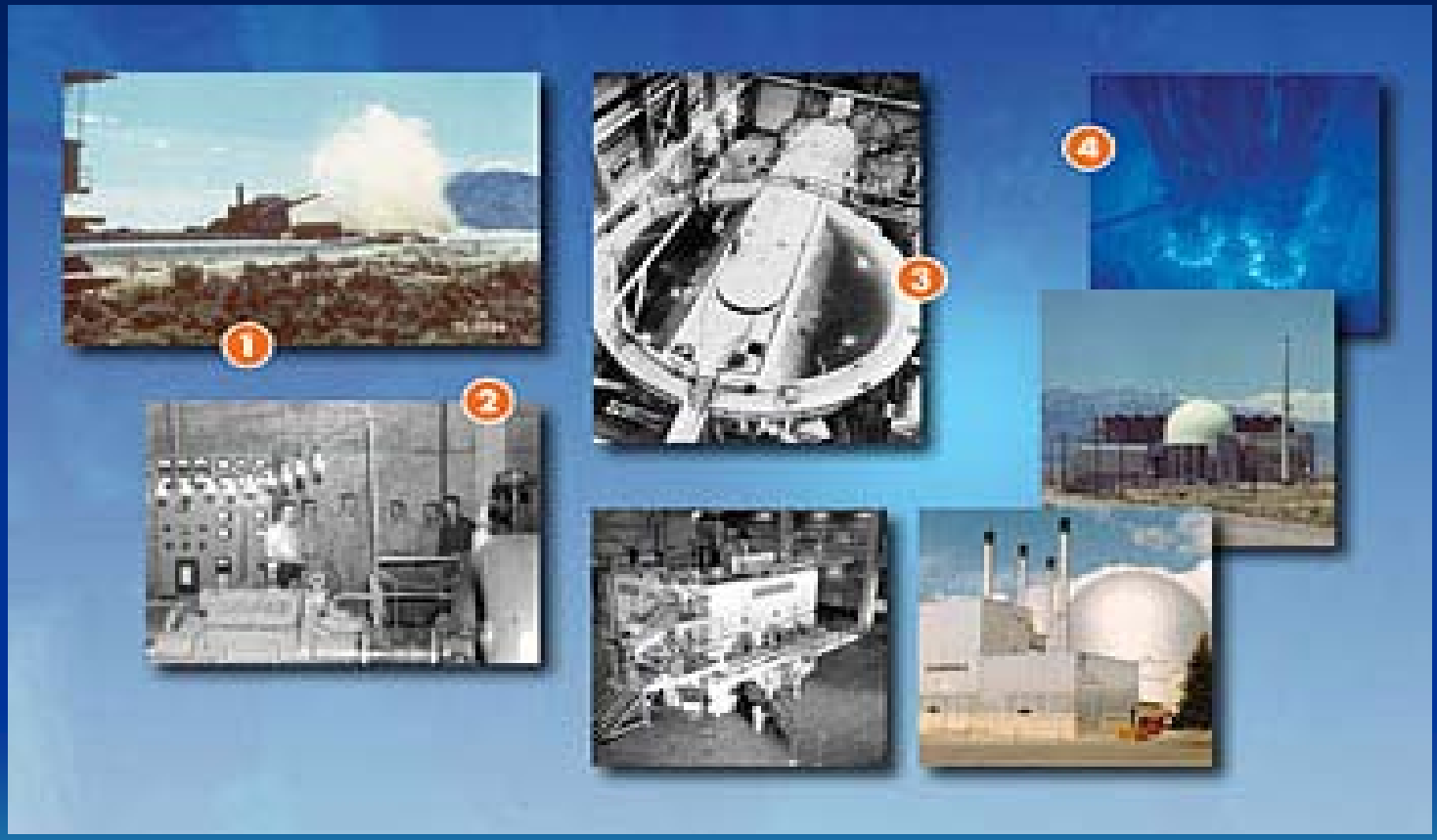
The Idaho National Lab has many areas of expertise in support of the US and the world in all types of energy research.

But we are primarily know for our work in regards to nuclear research, development and education.

The lighting of the first atomic light bulb.



History- Nuclear Energy



INL History

Naval Proving Ground

This area was first used by the U.S. government in the 1940s to test artillery. In 1949, the newly formed Atomic Energy Commission (AEC) established the National Reactor Testing Station. In the 1970s, the site was designated a national laboratory.

Nuclear Navy

The technology for the world's first nuclear-powered submarine was pioneered in Idaho. From 1953 to 1994, thousands of sailors in Admiral Rickover's Nuclear Navy trained here using full-scale submarine prototype reactors.

The World's Largest Concentration of Reactors

Over the decades, more than 50 nuclear reactors have been built and operated here.

- Experimental Breeder Reactor No. I (1951 - 1963)
- Materials Test Reactor (1952 - 1970)
- Boiling Water Reactor Experiment No. 1 (1953 - 1954)
- Boiling Water Reactor Experiment No. 3 (1955 - 1956)
- X-39 Aircraft Nuclear Propulsion reactors (1955 - 1960)
- Experimental Breeder Reactor No. II (1961 - 1994)
- Zero Power Physics Reactor (1969 - 1992)
- Power Burst Facility (1972 - 1985)
- Loss-of-Fluid Test Facility (1973 - 1985)
- Advanced Test Reactor (1967 - Present)

A few of the many nuclear facilities at the INL.

Material Fuels Complex- (MFC)

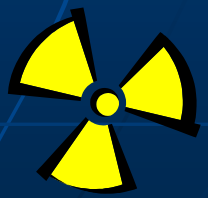
Advanced Test Reactor- (ATR)

How is radiological control implemented into the work process at the INL?

This presentation will outline the 5 Core Functions and how it correlates and works in my profession as a Health Physics Technician.

Scope of the work

The 4 primary questions asked by radiological control are:



What is the work?

*Maintenance
*Construction
*General operations
*Laboratory / analytical

Is it routine or new to the facility?
Is it planned (POD/POW)?
Is it urgent or an emergency?

Where is the work?

Building, floor, cell, lab, hood, or outside?

System, piping, ducting, sample, package, or cask?

MFC –Idaho National Laboratory

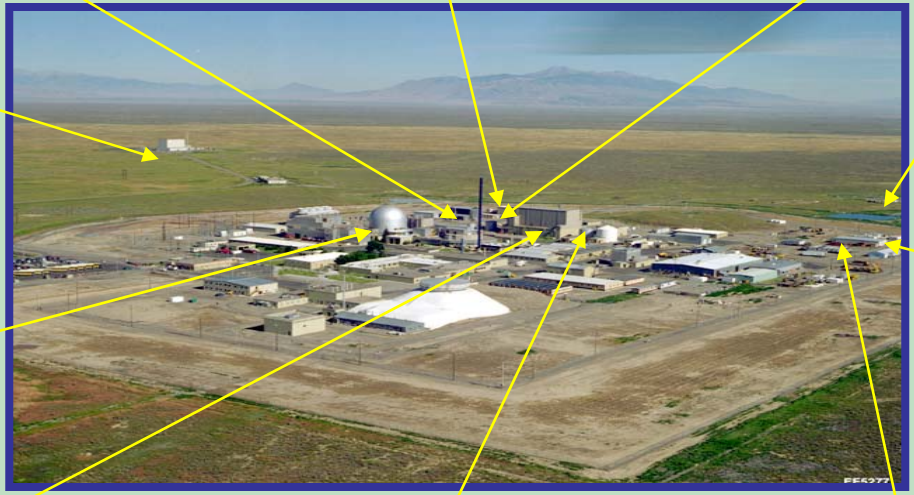
What is done is this facility?

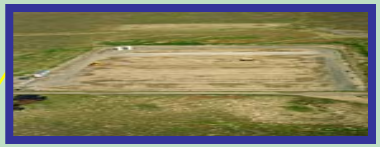
Sodium Components Maintenance Shop

Sodium Process Facility

Remote Treatment Facility

Transient Reactor Test Facility



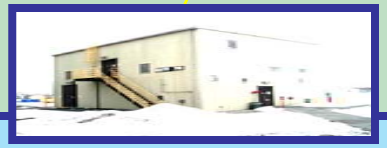


Radioactive Scrap and Waste Facility

Experimental Breeder Reactor II

Radioactive Sodium Storage Facility

Hot Fuel Examination Facility

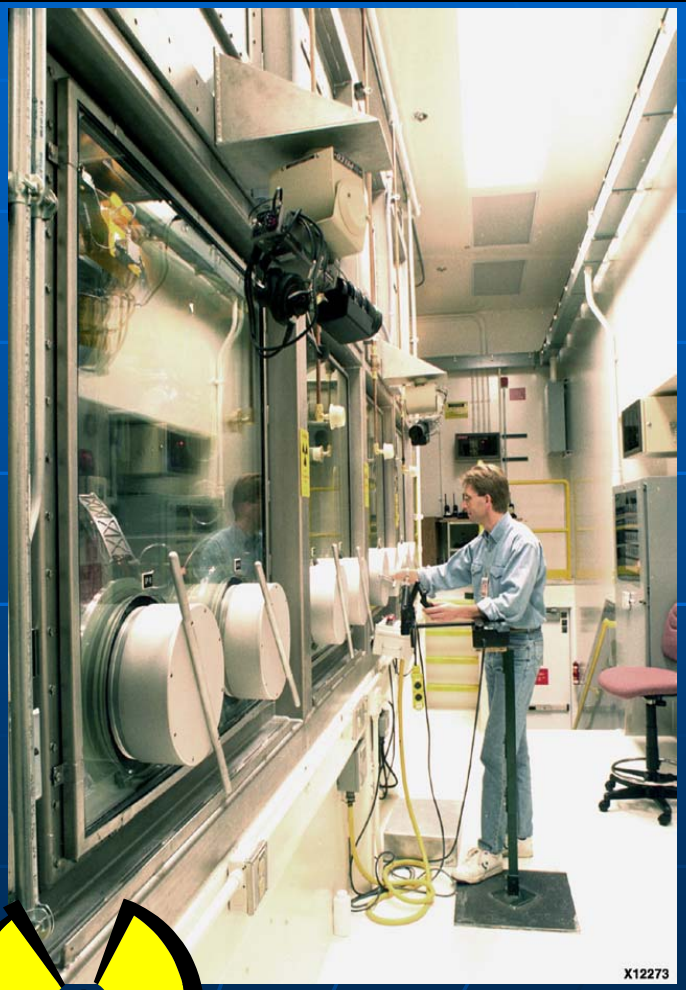


Radioactive Liquid Waste Treatment Facility

Sodium Storage Building

Who is performing the work?

Who is performing the work?



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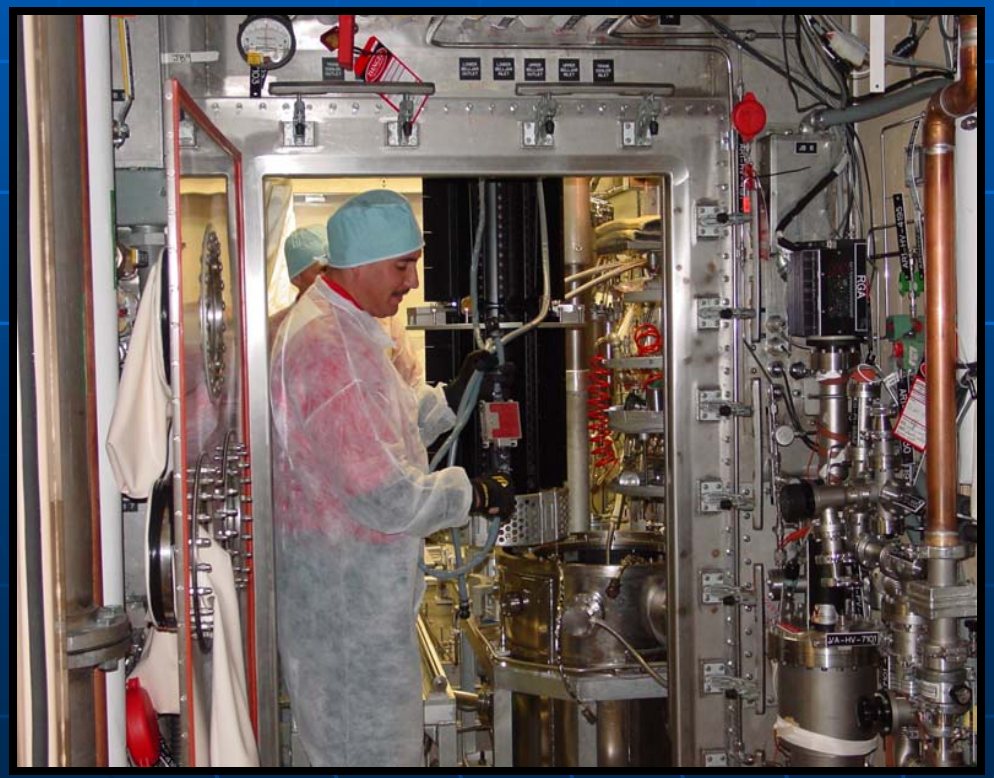


What is the outcome or scope of work?

To get it done!

Why are we doing this?

What are we hoping to achieve and have they been weighed out with the hazards of entering or working in an area?

What are the Hazards?

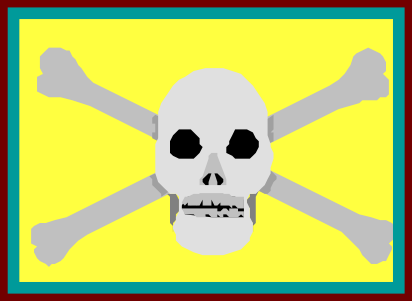
When the job is identified, RadCon performs duties such as:

- pre-job surveys,
- ALARA pre-job and engineering evaluations,
- investigation of historical data in regards to the area or facility

Hazards

Airborne contamination, heavy equipment, unknown history of items being opened.

Hazards



Hazards

Condition of waste drums.

Hazards

Environment

Cold and snow

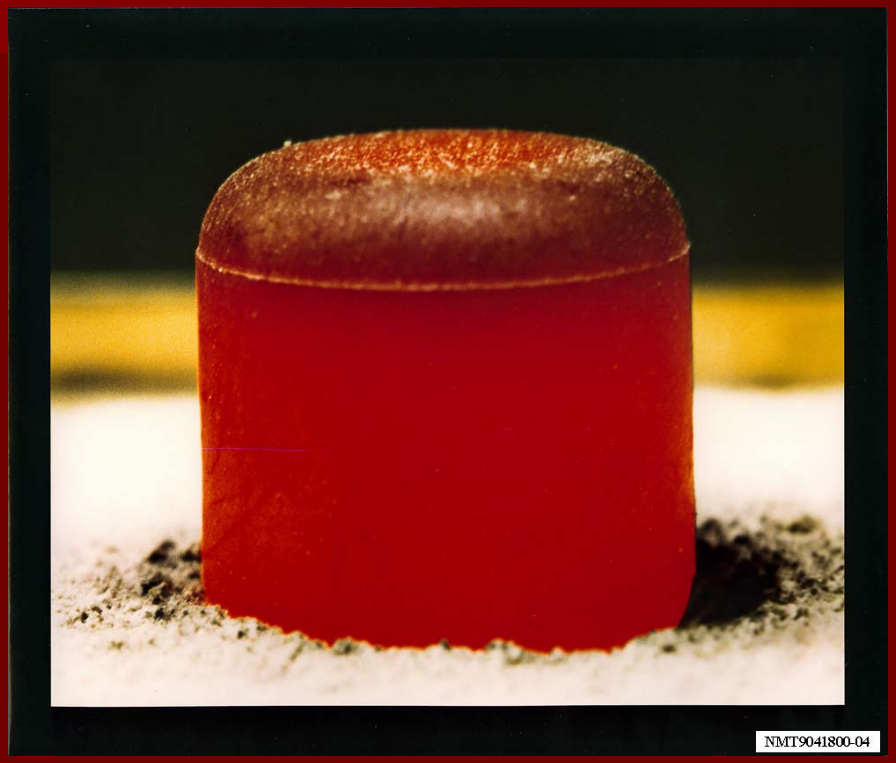
Heat and of course the wind.

Confined space

Heat Source Production for Space Missions

Thermal heat from decay.

But used for energy.

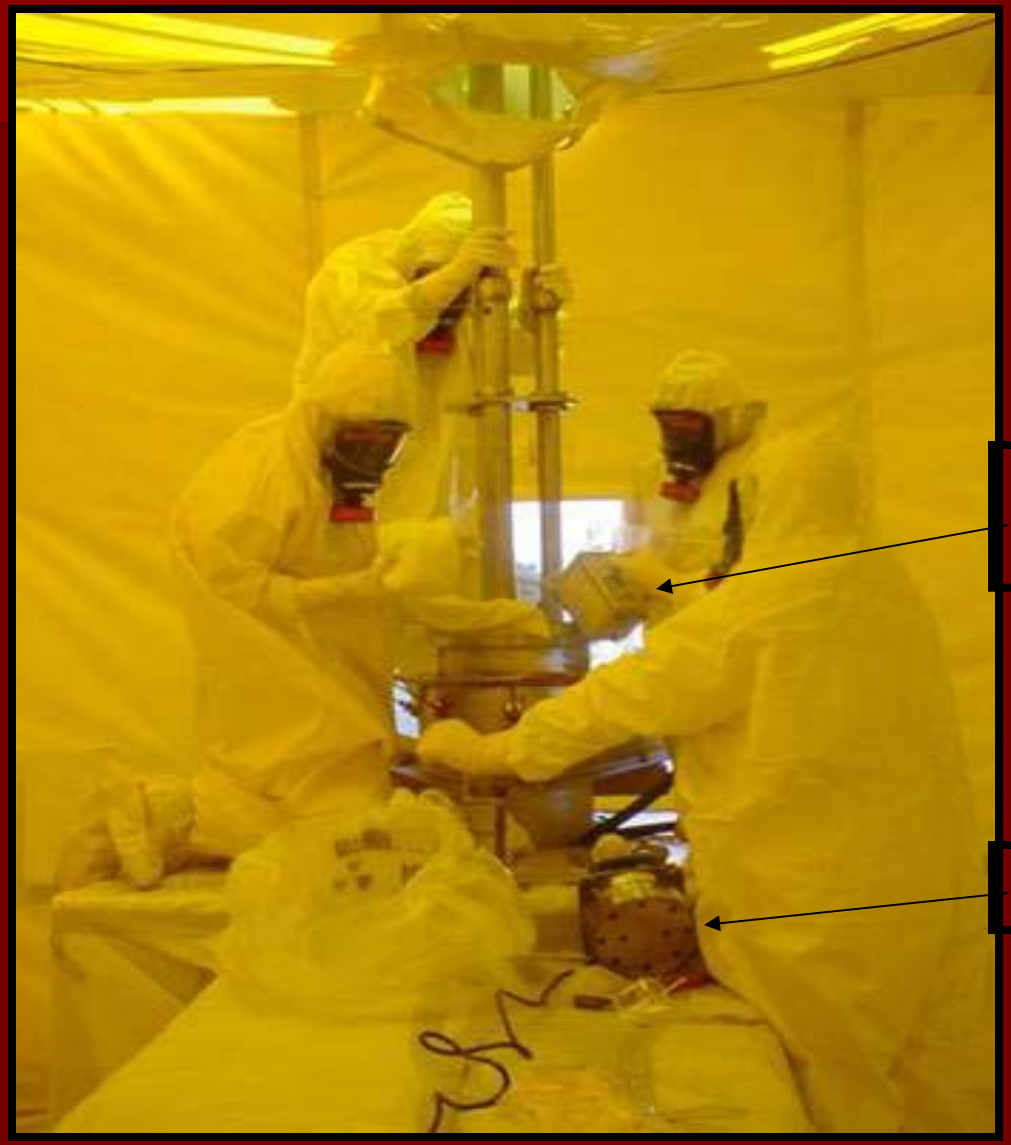


Los Alamos National Laboratory

Radcon Surveys

Radcon Surveys

Radcon Surveys



Direct radiation and contamination surveys

Air sampling

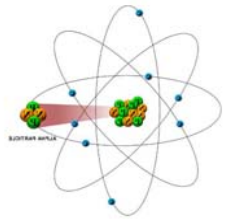
Radcon Surveys

Radcon Surveys

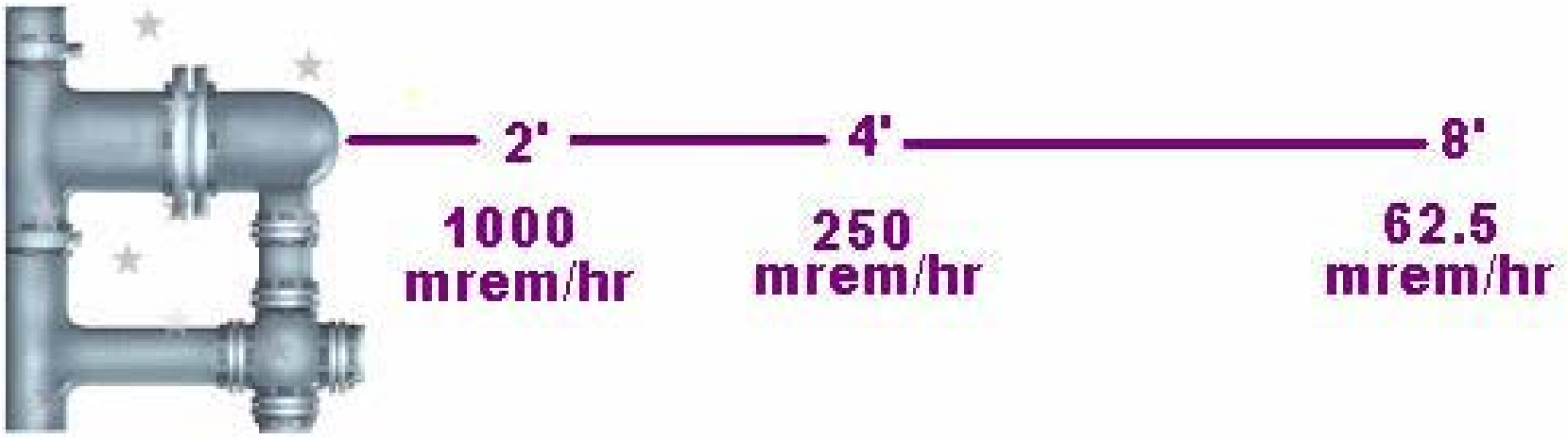
Posting and labeling of the radiological hazards

Mitigation of Hazards

- Engineering controls
  - Ventilation
  - Source removal
  - Shielding
  - Containments/hot cells

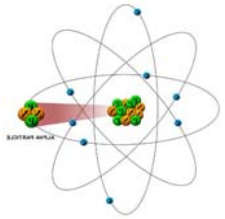


Mitigation- Distance



Mitigation

Shielding and distance



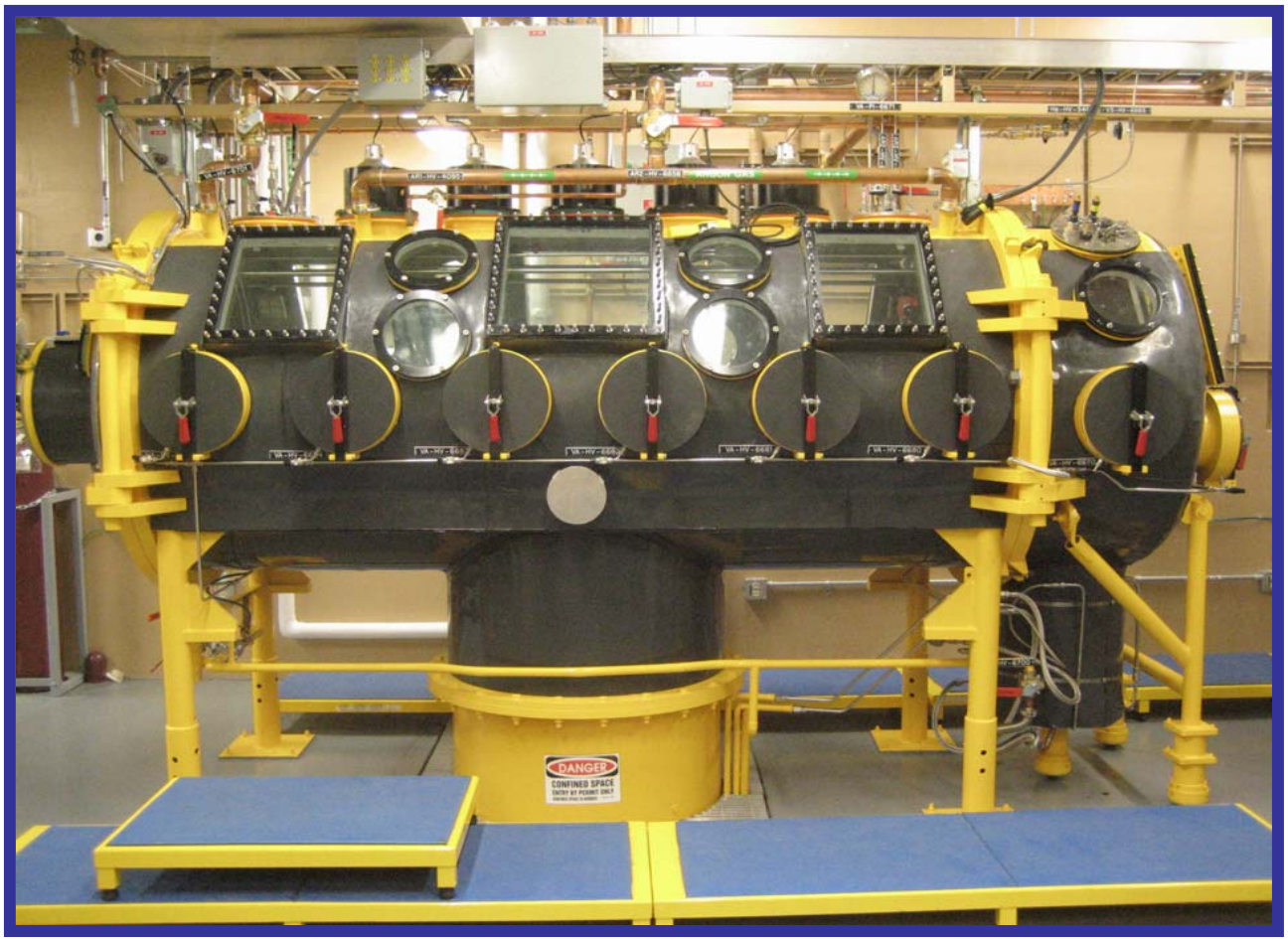
Mitigation
Engineering controls-

Gloveboxes

Mitigation

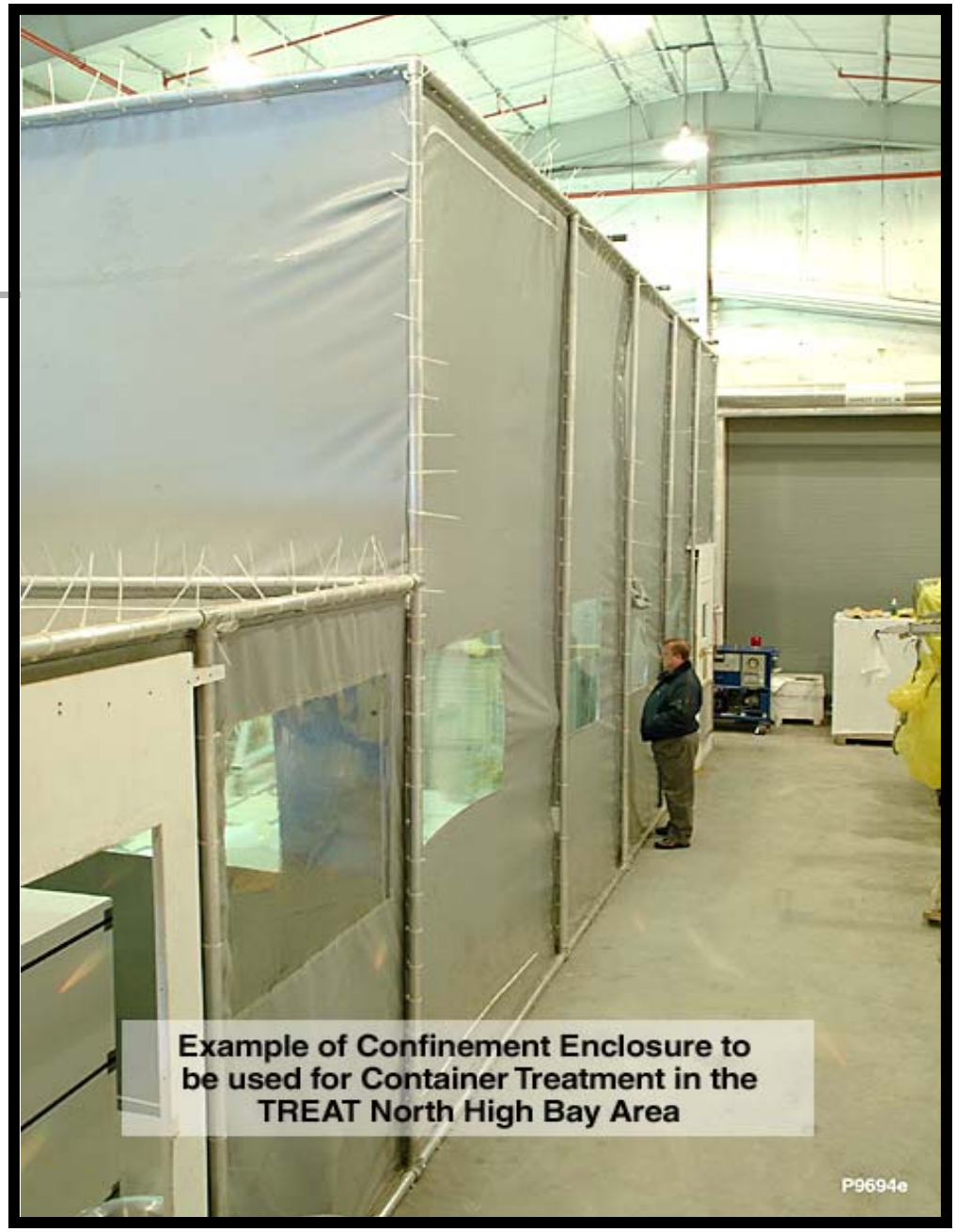
Engineering controls-

Glovebox with boranated poly for shielding of neutrons



Mitigation

Engineering controls



Mitigation
Engineering controls-

Excavation of soil at the INL.

Mitigation
Engineering controls- Glovebags

Mitigation- Engineering controls

24,000 Curie

Co-60 irradiator

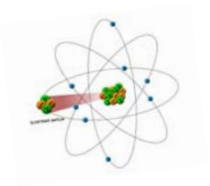
Interconnect automatic shutoffs.

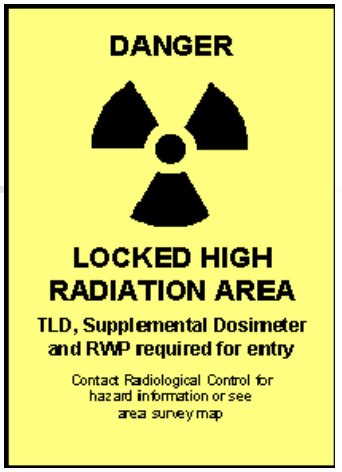
Shielding.

Mitigation of Hazards

- Administrative controls
  - Radiation Work Permits (RWP)
  - Training
  - Postings
  - PPE

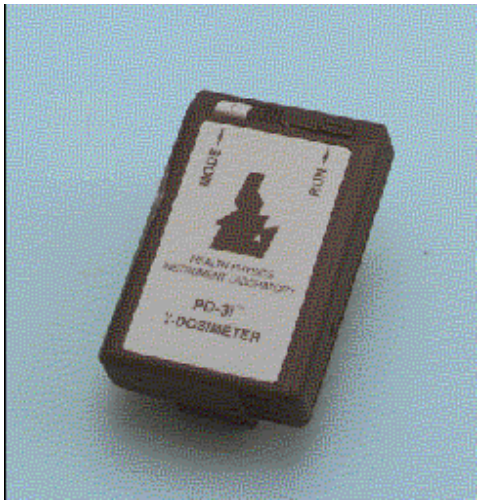
Mitigation

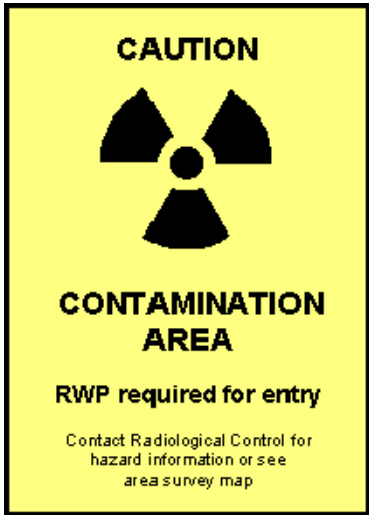




Dosimetry

Posting of the Radiological Hazards





ALARA and ISMS

Both programs go hand- in –hand.

They focus on the necessary elements of work planning and safety so that work can be conducted in a manner that ensures safety and protection while optimizing productivity and efficiency.

Performing the Work

Performing the Work

Survey during work evolutions

Performing the Work

Performing the Work

Performing the Work- Cask handling

Performing the Work- Fuel movement

Performing the Work- Underwater

Performing the Work-
Using tools and heavy equipment

Performing the Work- PPE hazards

Unloading in Florida at Kennedy Space Center

Use of PPE for keeping items clean

Performing the Work

Notice the guard.

Feedback and Lessons Learned

Feedback and Lessons Learned

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Future generations of nuclear workers

Future generations of nuclear workers