Radiation Protection

A profession devoted to protecting people and their environment from potential radiation hazards, while making beneficial uses of radiation and radioactivity possible.

We ensure compliance with NRC licenses

- Environmental sampling (soil, grass, water, air emissions)
- Reactor surveys (radiation surveys, swipes for contamination)
- Survey Instruments (evaluate, purchase, service, calibrate)
- Hazard analysis
- ALARA Planning
- Analyze & Ship samples
- Process waste
- Perform non-routine emergency responses

How do we protect people from Radiation?

- Two general Radiation Safety concepts
  - No exposure without a net benefit
  - ALARA (As Low As Reasonably Achievable)

- Good Conduct of Operations ensures safety:
  - agreeing to follow rules (Teamwork)
  - use administrative controls (procedures, work permits, configuration change control)
  - Create/use engineered safety features (glove boxes, hoods, gate switches, shielding, well-conceived equipment design, lockouts)
  - take appropriate training
  - performing hazard analysis, accident analysis (root cause, etc.)
  - other elements

What equipment is used?





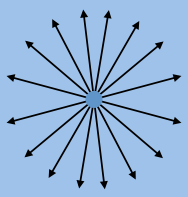




Shape of sources

Broad field

Point source



What is a Research Reactor?

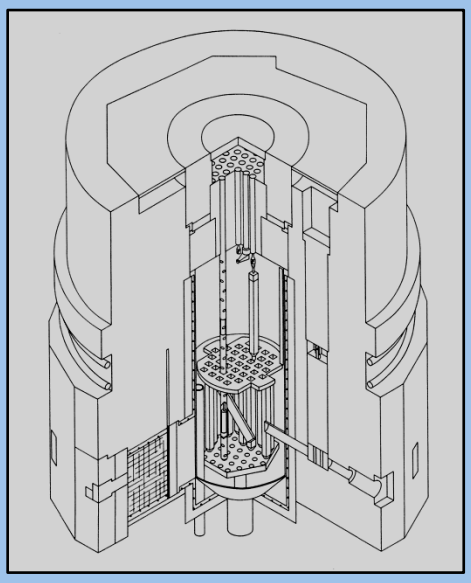
- A device to produce neutrons, γ's
  - particles and energy created by fissioning U-235
  - the reactor is small (compared to those producing power)
  - operates at a low temperature (< 100/114 °F degrees)

Uses?

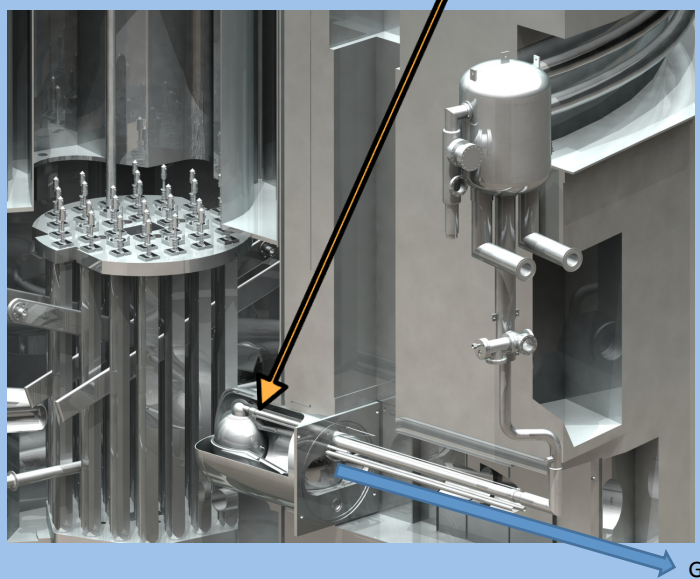
- Research
  - neutron activation analysis
  - neutron radiography
  - neutron scattering
- Training
- Materials testing
- Production of radioisotopes for medicine and industry.

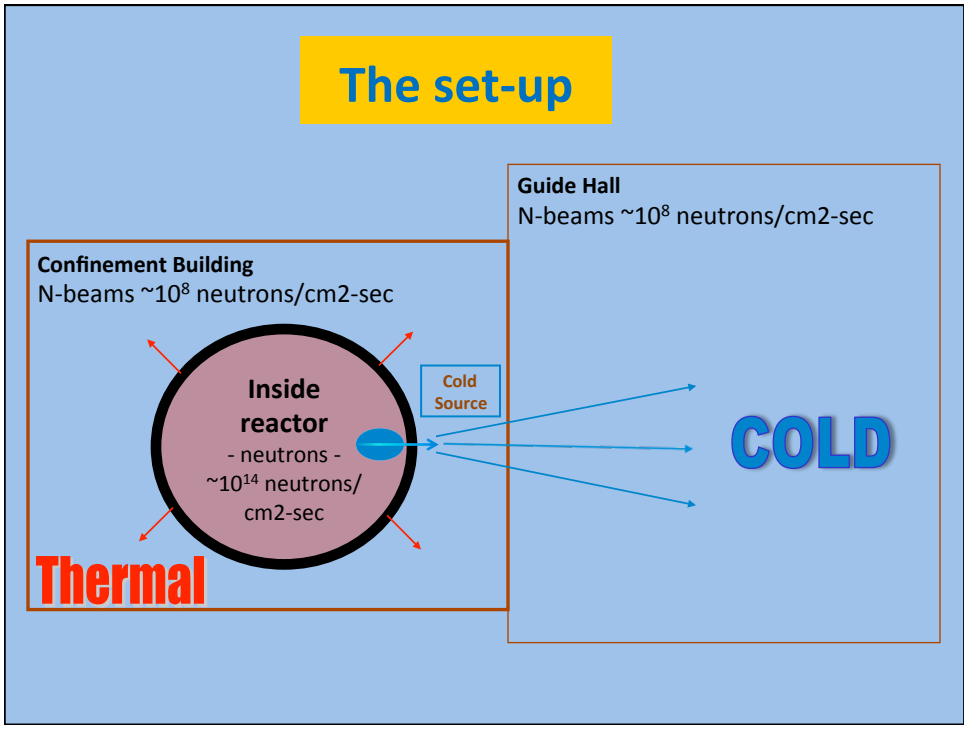
The NIST Reactor

20 million watts thermal power



Cold Source




The set-up
Guide Hall
N-beams ~10^8 neutrons/cm2-sec
Confinement Building
N-beams ~10^8 neutrons/cm2-sec
Inside reactor
- neutrons -
~10^14 neutrons/ cm2-sec
Cold Source
COLD
Thermal