



SLOWPOKE-2

31 YEARS AND STILL GLOWING

Canadian Nuclear Society Conference
2012



SRC's SLOWPOKE-2 Reactor

31 Years and Still Glowing

Safe LOW POWER Kritical Experiment



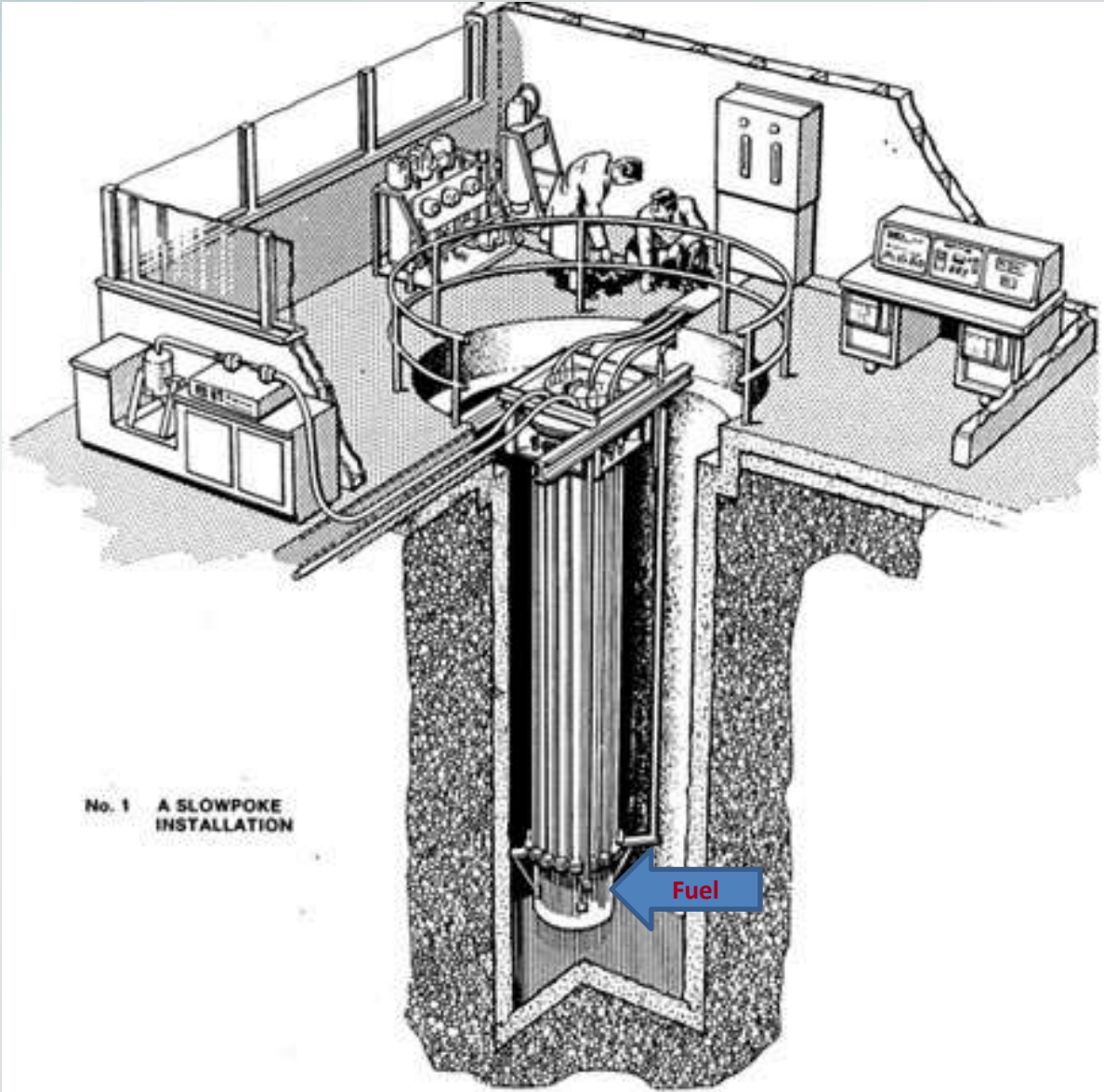
SLOWPOKE History

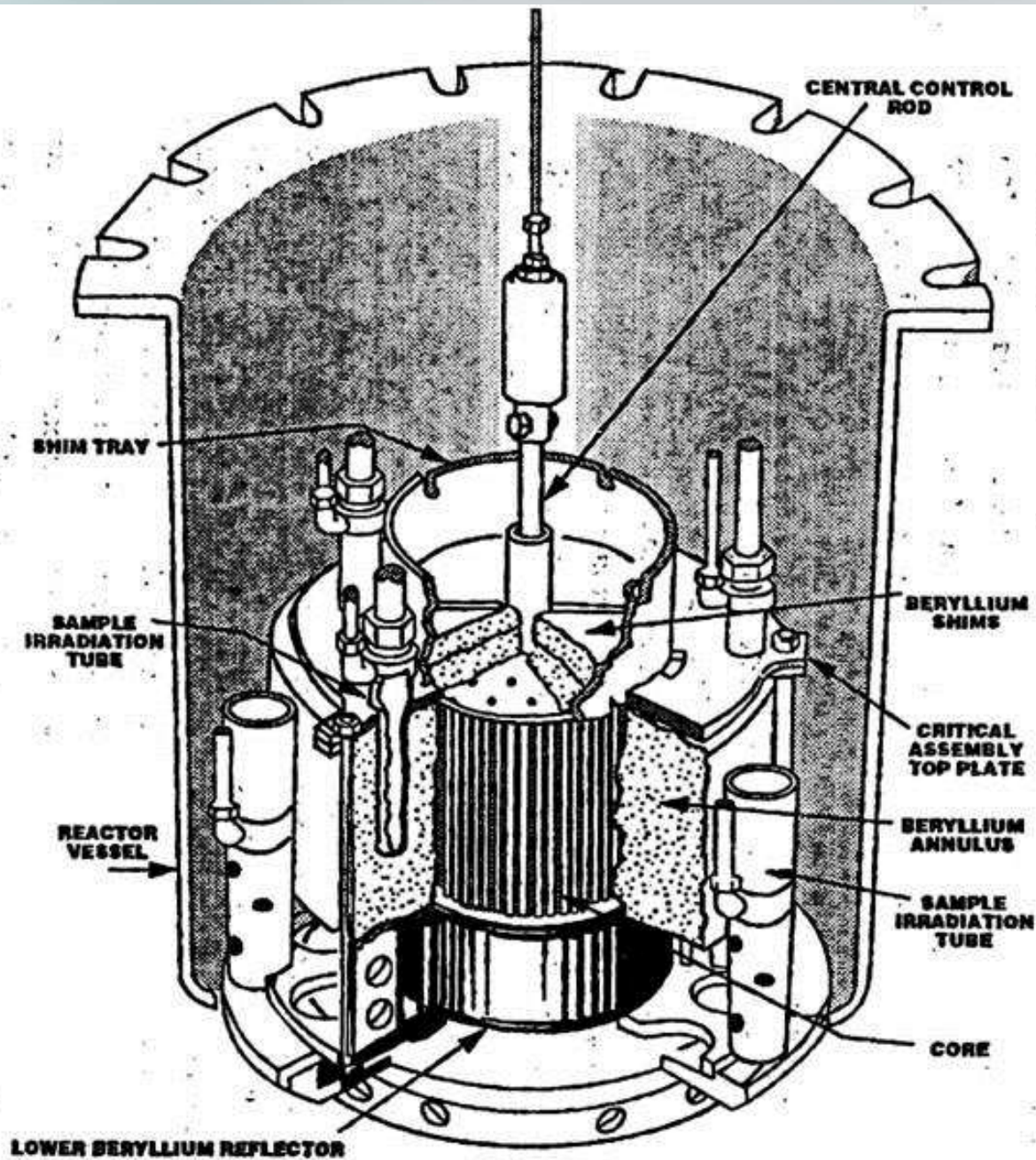
- 1967 Conceived
- 1970 Prototype (AECL)
- 1971 SLOWPOKE-1 at U of T
- 1976 SLOWPOKE-2 at U of T
- 1976-1984 7 units
- 1981 SRC
- 1985 LEU unit at RMC, Kingston
- Mid-1980's SLOWPOKE-3

SLOWPOKE-2s

still in operation:

- Saskatchewan Research Council
- University of Alberta
- Royal Military College
- Ecole Polytechnique
- Kingston, Jamaica





SLOWPOKE-2

Control and Auxiliary Systems

- Control Console
- Water Purification
- Pool Water Cooling
- Headspace Purge
- Irradiation Controllers
- Radiation monitoring





ATOMIC ENERGY OF CANADA LIMITED
COMMERCIAL PRODUCTS
URANIUM ANALYSIS SYSTEM



IRRADIATION TIME



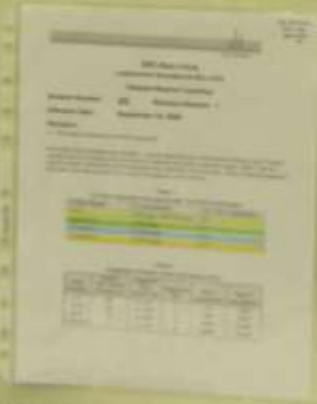
DELAY TIME



RELOAD TIME



RECYCLE COUNTER



SLOWPOKE
IRRADIATION CONTROLLER
ATOMIC ENERGY OF CANADA LIMITED
COMMERCIAL PRODUCTS

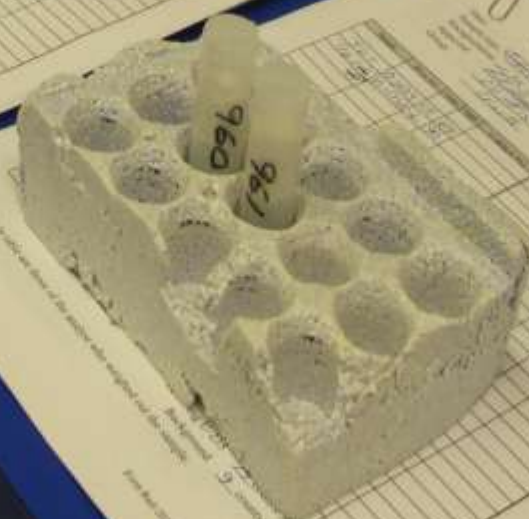
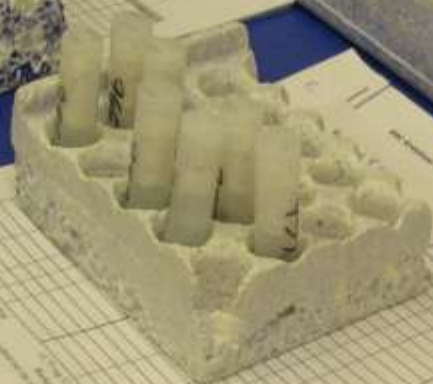
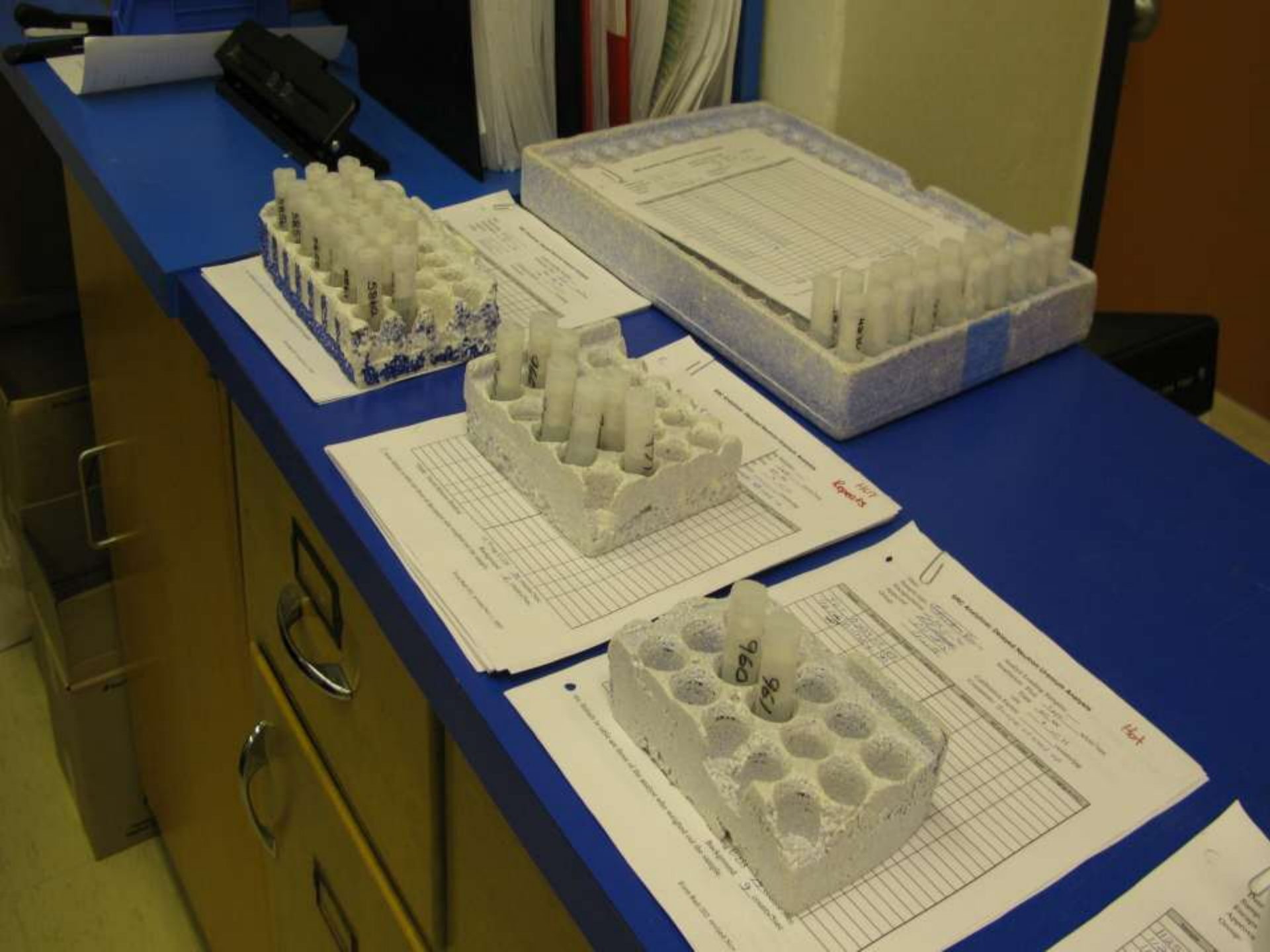
1
2
3



DO NOT
REPAIR THIS
EQUIPMENT

1048 100.05





Lab
Date
Time
Operator
Sample ID
Sample Name
Sample Type
Sample Source
Sample Location
Sample Date
Sample Time
Sample Status
Sample Notes
Sample Results
Sample Comments

Lab
Date
Time
Operator
Sample ID
Sample Name
Sample Type
Sample Source
Sample Location
Sample Date
Sample Time
Sample Status
Sample Notes
Sample Results
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Sample Date
Sample Time
Sample Status
Sample Notes
Sample Results
Sample Comments

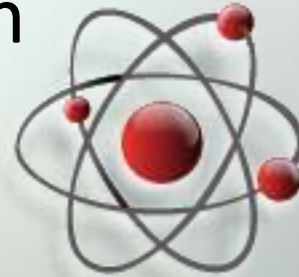


Safety and Security

- Inherently safe due to
 - Large negative temperature coefficient of reactivity
 - Limited excess reactivity (4 mk)
- Separate & independent control by
 - Single Cd shutdown rod
 - Cd capsule insertion into sites
 - Remote shutdown button outside reactor room
- Licensed by Canadian Nuclear Safety Commission

SLOWPOKE-2 Applications

- Radioisotope Production for tracers
- Neutron Radiography
- Neutron Activation Analysis (NAA)
- Teaching and research



Radioisotope Production

- Clinical production not possible
- Small amounts for clinical research
- Tracer production
 - Sodium- 24
 - Argon-41
 - Technetium-99m
 - various others used in biological pathway studies

Neutron Radiography

- RMC open pool reactor
- 2-Dimensional structural fault analysis

Neutron Activation Analysis

- SLOWPOKE reactor used to irradiate sample with neutrons

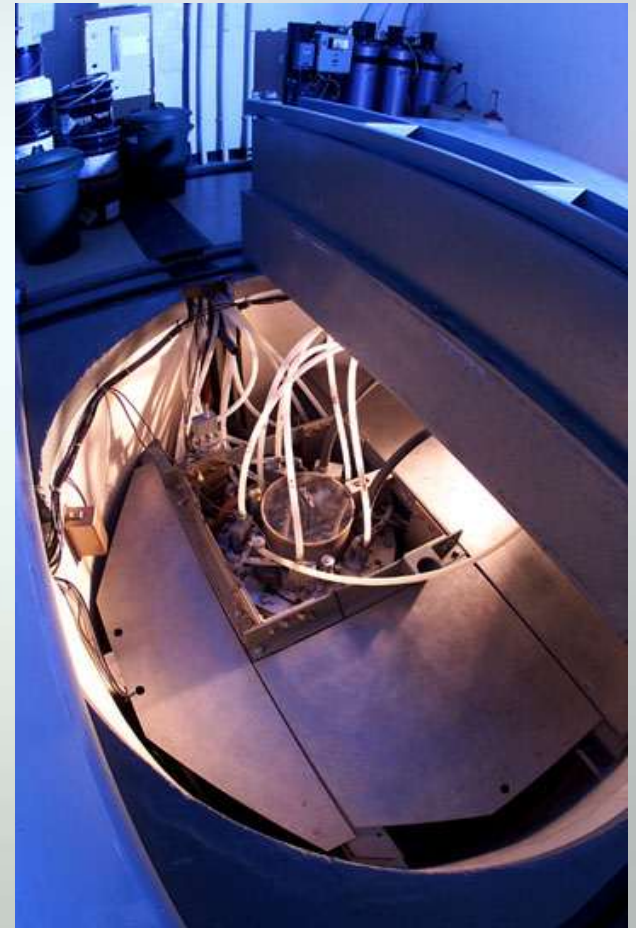


NAA Applications

- Neutron Activation Analysis for elemental analysis
 - Mainly for Organic Halogens (Cl, Br, I)
- Thorium-232 by mass using NAA
- Uranium by Delayed Neutron Counting

Advantages of NAA

- Little sample preparation required
- Non-destructive technique
- Multi-element technique
- Not compound specific



Education and research

- Project with U of S students
- Training tool
- Research

