Advanced Test Reactor

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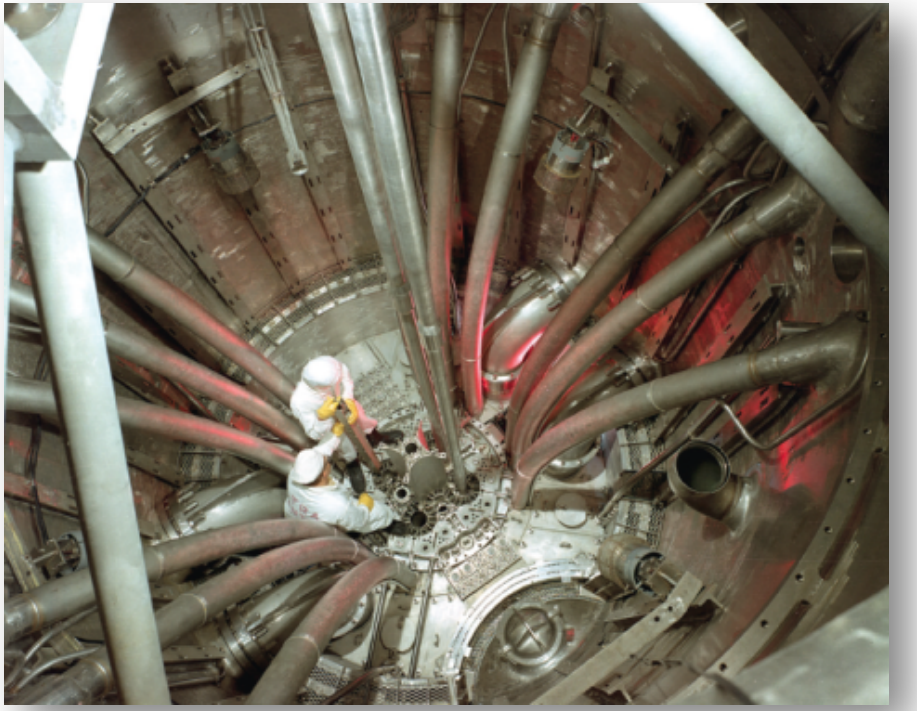
Two Reactors

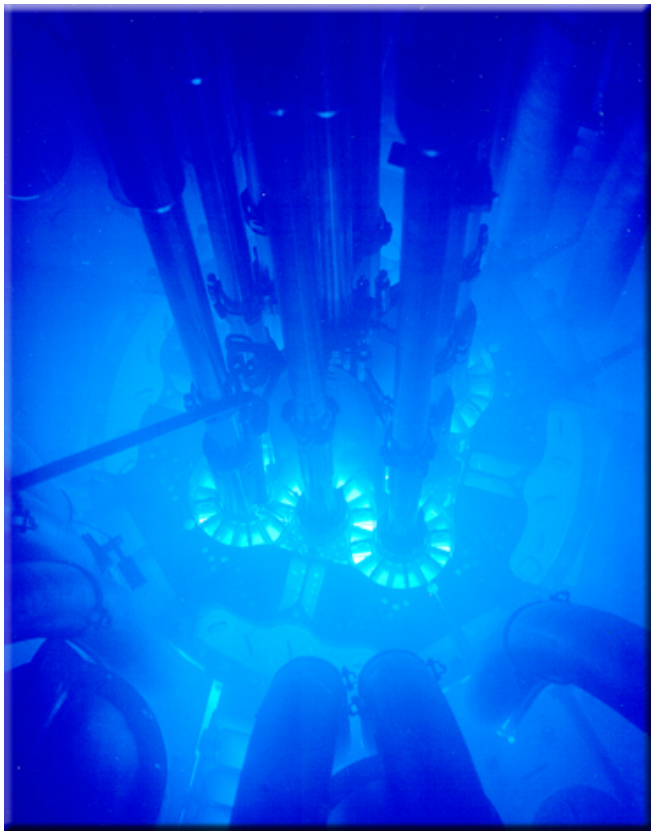


Advanced Test Reactor (ATR)

Advanced Test Reactor Critical Facility (ATRC)

ATR Design

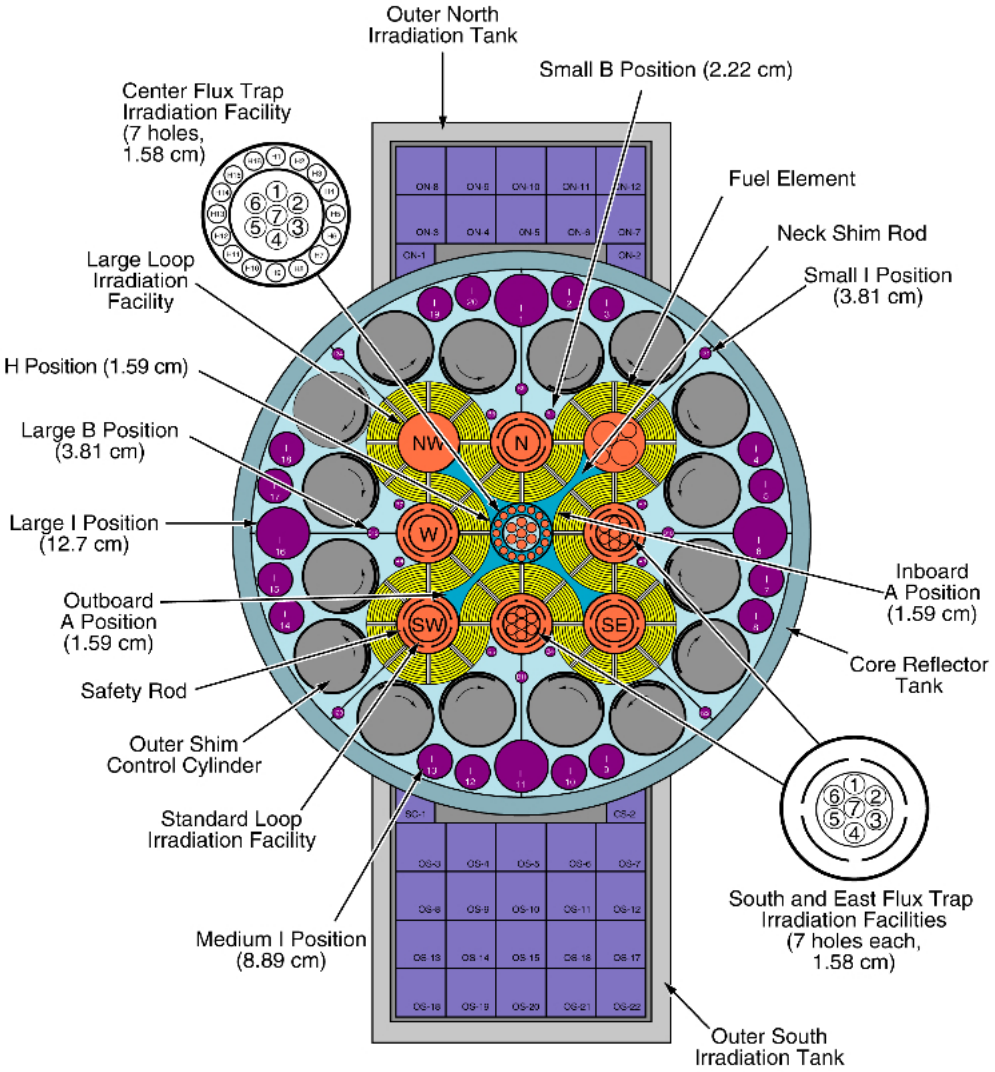
- The ATR is a pressurized, light water-moderated, beryllium – reflected reactor
- Operates at nominally 2.5 Mpa (360 psig) and 71°C (160°F).
- Maximum operating power is 250 MW
- 40 fuel elements, each containing 19 curved aluminum-clad Uranium plates
- Able to provide the customer's desired neutron flux in the test position during cycle operation



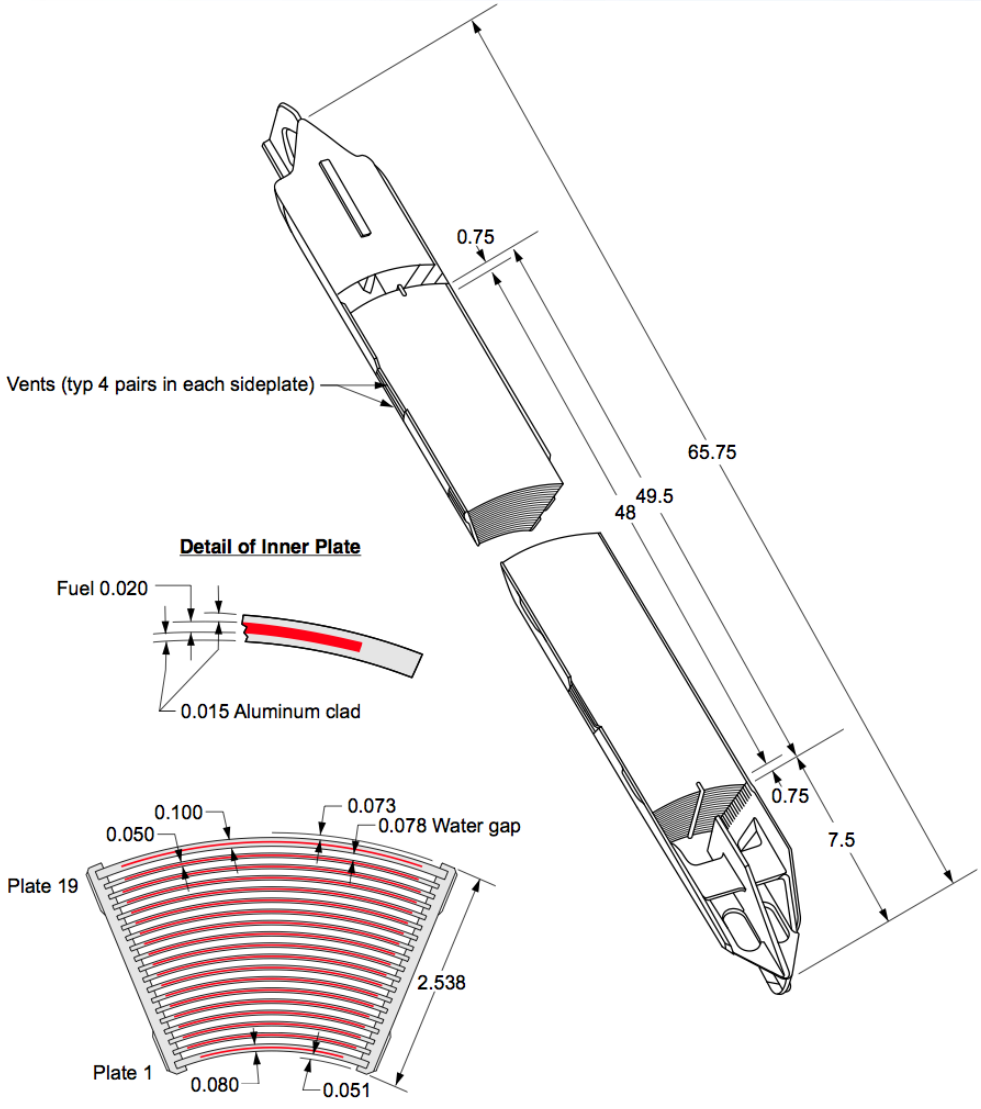
Important Features

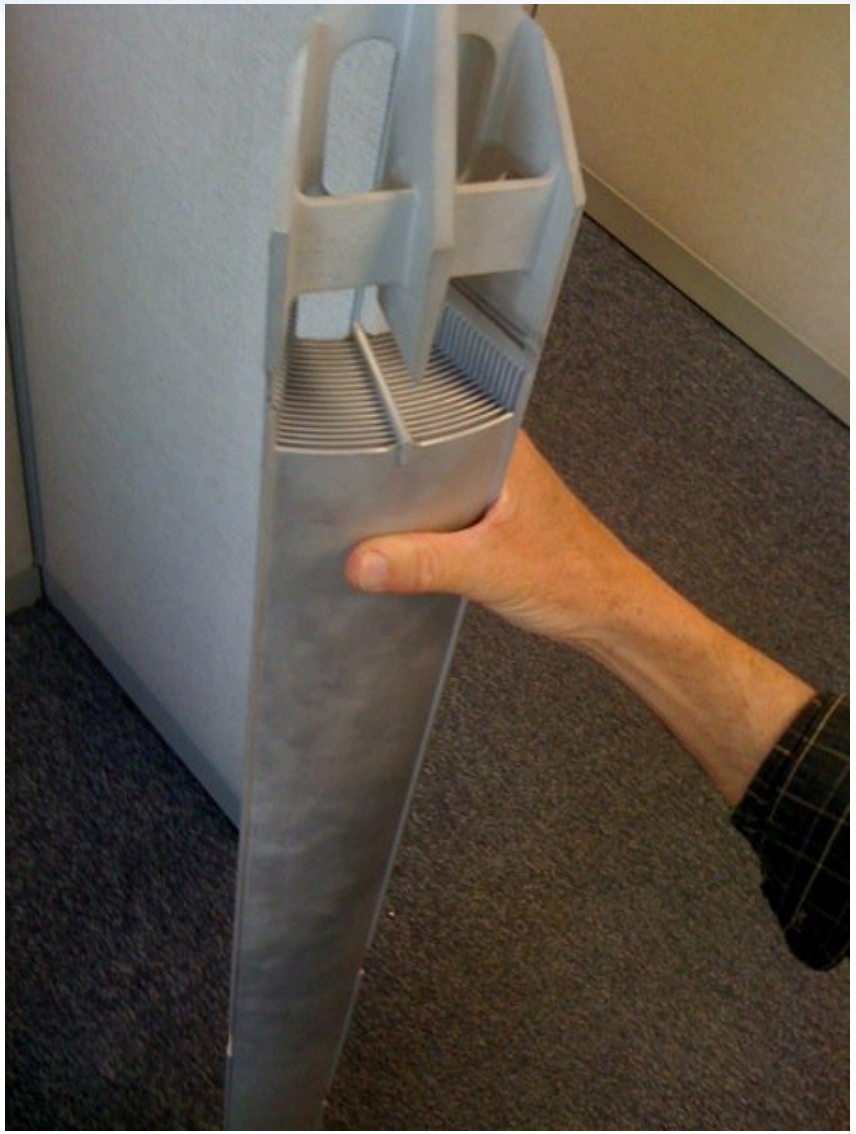
- **Test volumes – 1.2 m long and up to 13 cm diameter**
- **Total of 77 testing positions**
- **High neutron flux – 1E15 n/cm2-s thermal and 5E14 n/cm2-s fast**
- **Variety of fast/thermal flux ratios**
- **Constant axial power profile – rotating control drums instead of vertical control rods**
- **Power allocation capability- different power levels for experiments in same operating cycle**
- **Individual experiment control**
- **Simultaneous experiments in different test conditions**
- **Frequent experiment changes**
- **Accelerated fuel and materials testing**

ATR Core Overview

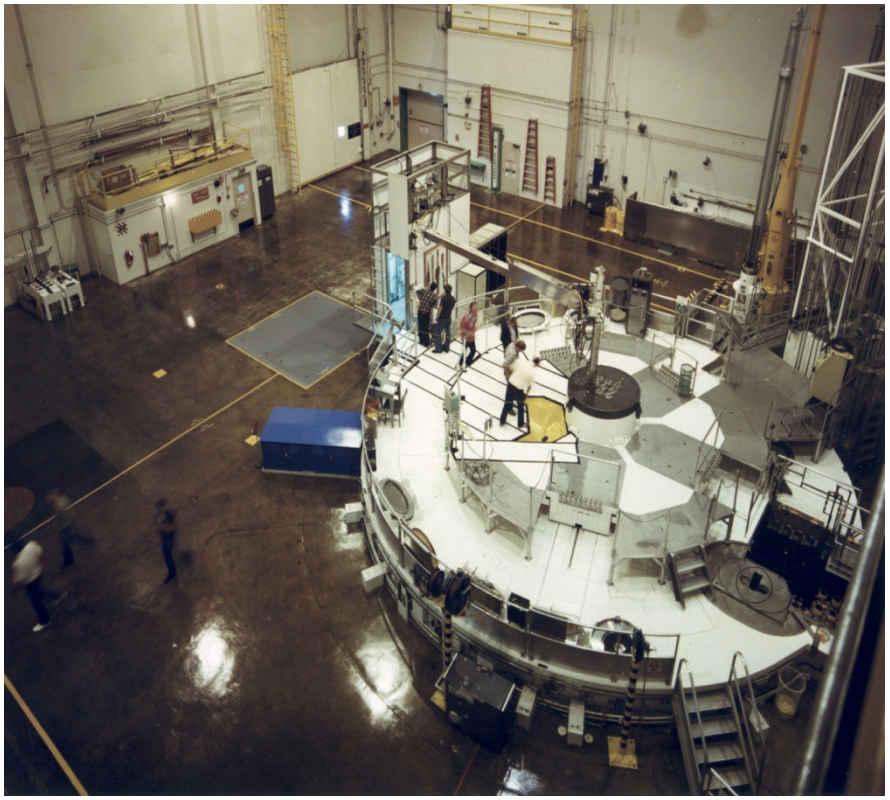


ATR Fuel Element

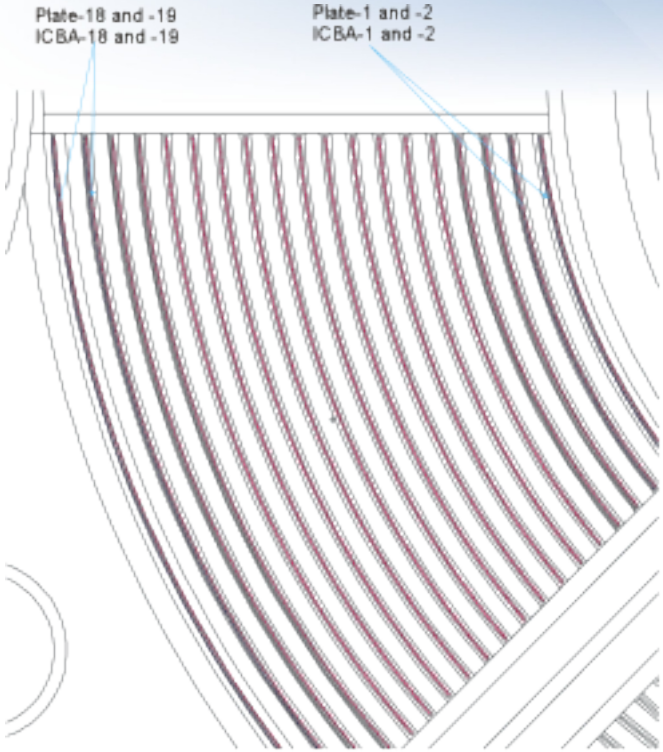


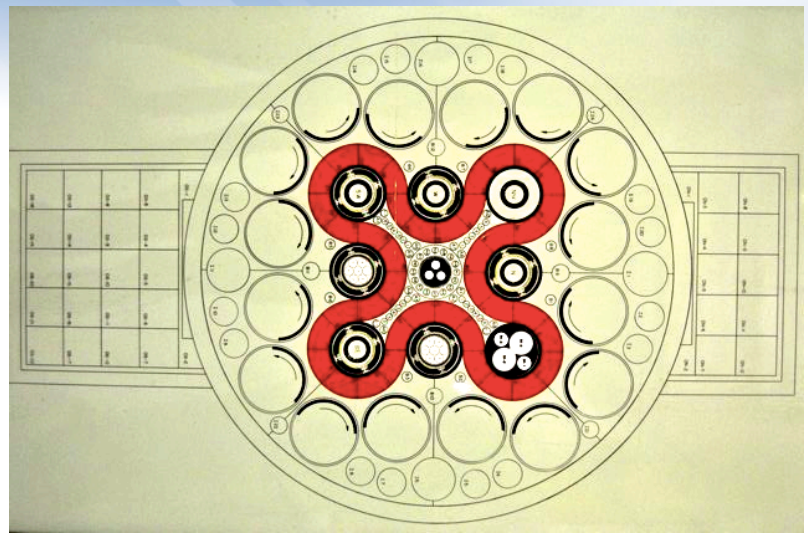


ATR Operations

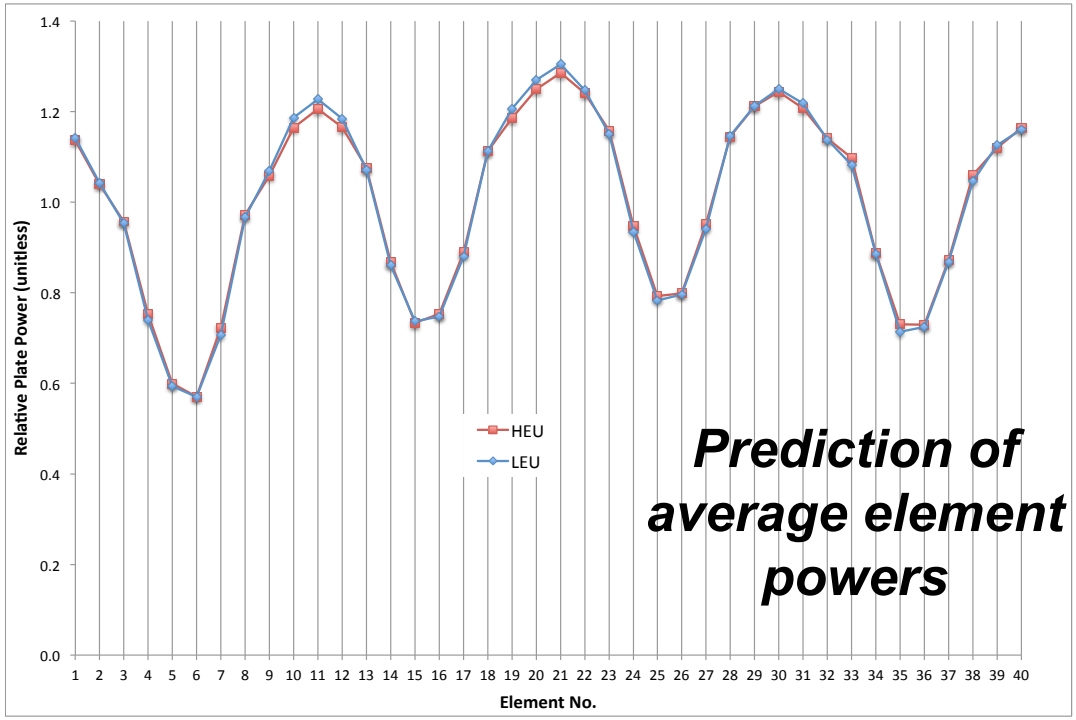


- Operating Cycles
  - Standard operating cycle is 6 to 8 weeks
  - Occasional short high power cycles of 2 weeks
  - Standard reactor outages are 1 or 2 weeks
  - Operations for approximately 250+ days per year
- Core Internals Change-out every 7 to 10 years

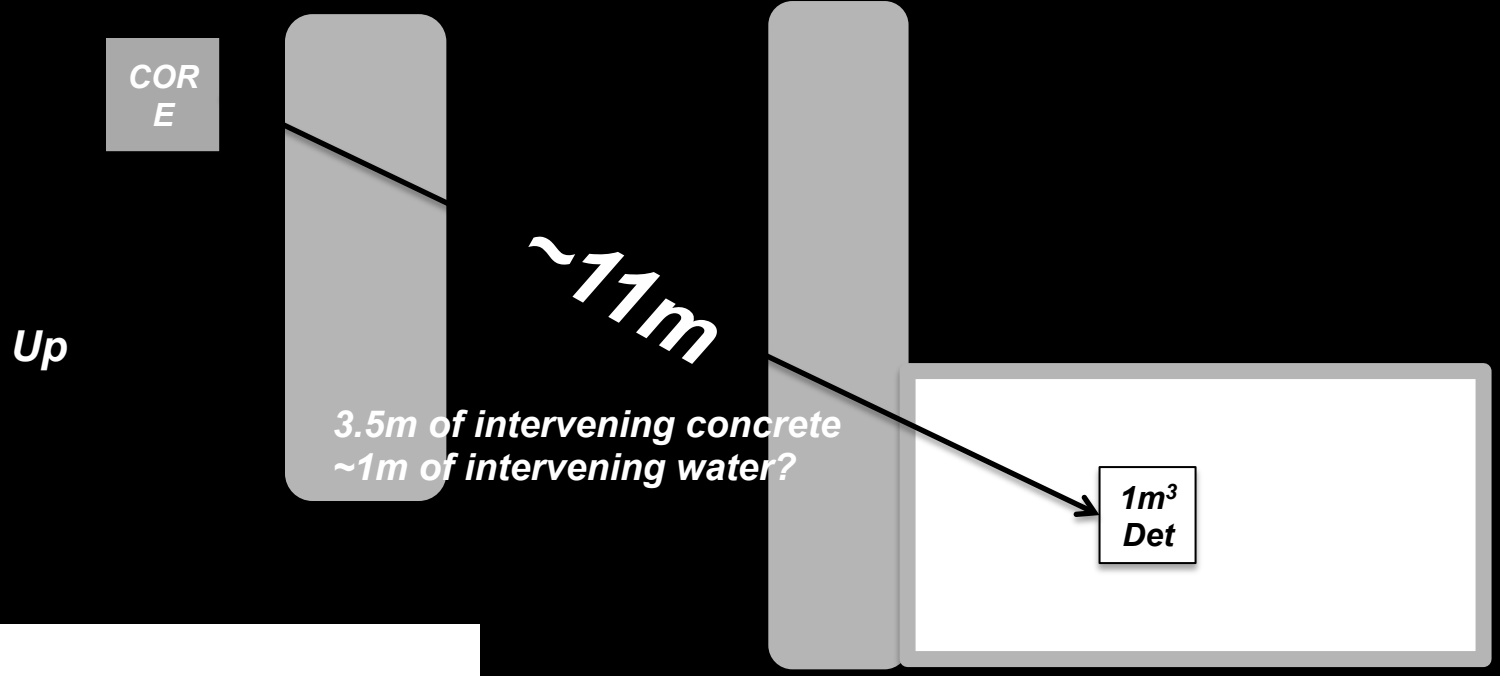


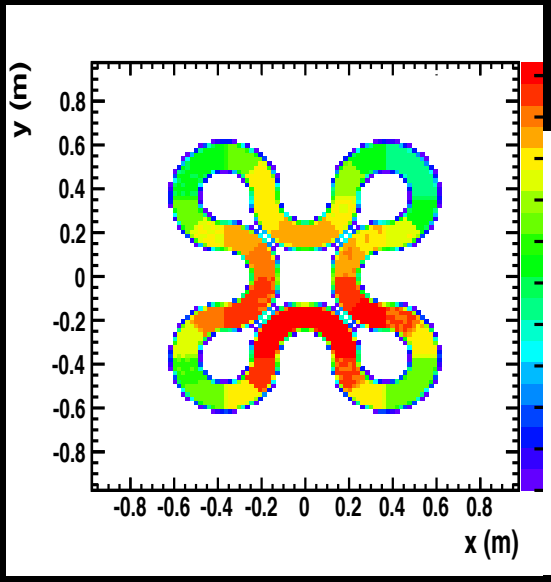


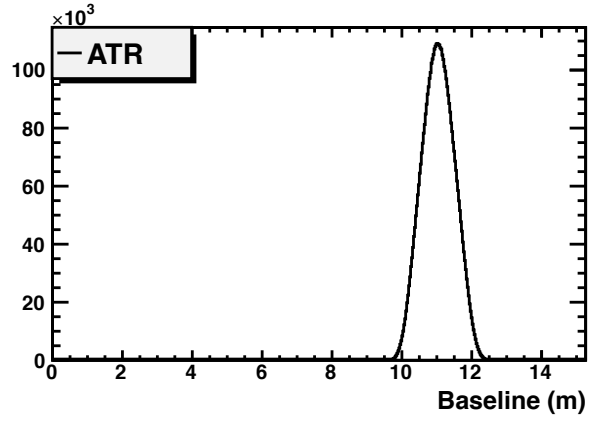
Monolithic foil-type with ICBA fuel element detailed configuration

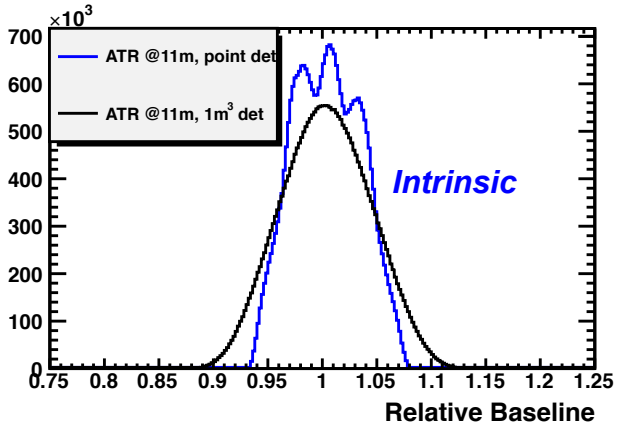


Prediction of average element powers

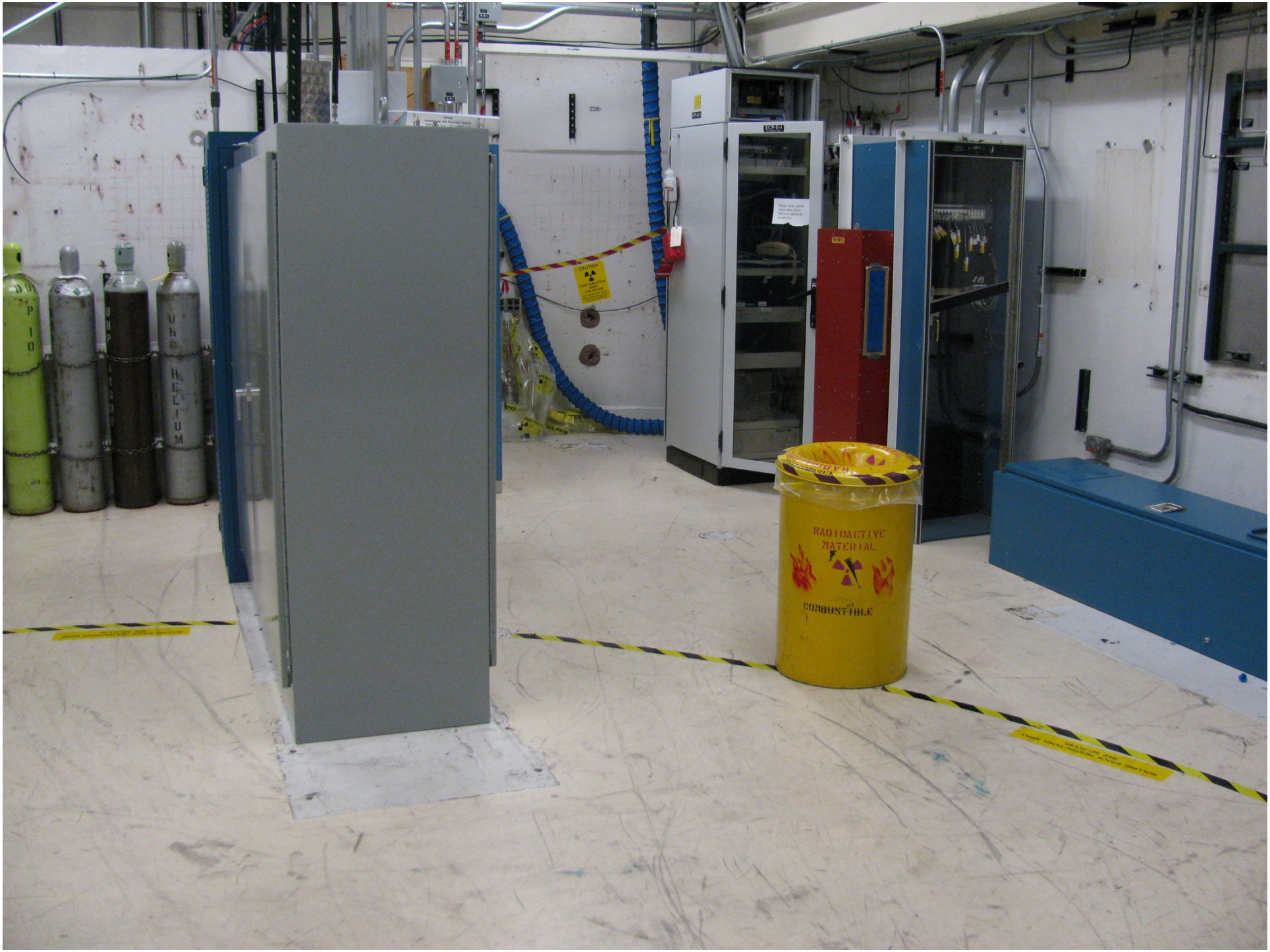

COR
E
~11m
Up
3.5m of intervening concrete
~1m of intervening water?
1m³
Det


y (m)
x (m)
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8


×10³
ATR
100
80
60
40
20
0
0 2 4 6 8 10 12 14
Baseline (m)


×10³
ATR @11m, point det
ATR @11m, 1m³ det
Intrinsic
700
600
500
400
300
200
100
0
0.75 0.8 0.85 0.9 0.95 1 1.05 1.1 1.15 1.2 1.25
Relative Baseline


Genie GS-1930
MLE
IC20
MLE


RADIOACTIVE
MATERIAL
COMBUSTIBLE
HELIUM

Questions ?