

**Dose Reduction
Initiatives
at
Arkansas Nuclear One**

ALARA Initiatives

- Permanent Shielding and Supports
- Non Typical Shielding for:
 - › Typical Applications
 - › Non Typical Applications
- Alloy 600 Project Source Term Reduction

Permanent Shielding and Supports

- Reactor Vessel Closure Head Shroud Thickness
- Incore Instr. Flange Insulation/Shielding
- Modular Shielding Supports for Floor Applications
- Letdown Piping Shield Rack
- Decay Heat Cooler Shield Racks in Auxiliary Bldg
- Decay Heat Piping Shield Racks in Containment

Non-Typical Shielding

- Silicone Polymer impregnated with Tungsten, Iron or Lead Powder
- More efficient use of engineered weight than wool blanket
- Can be molded to fit specific geometry
- Flexible, dimensions are forgiving, easy to handle
- “Tape” form can be installed in congested areas.
- High temperature rating (250 C)

Typical Applications

- Floor of Main Refueling Bridge
- Small Bore Instrument Root Valves
- Decay Heat Piping (6" dia. cross-over pipe)
- Pre-formed for specific Pipe Diameter (2.5" dia. predominant)

Non Typical Applications

- Reactor Vessel Closure Head – magnetic shields
- Primary Shield Wall Penetrations (Alloy 600)
- Seismic Gap during Fuel Movement
- Control Element Assembly Motor Tubes – 6” wraps, multiple use.
- Control Rod Drive Work Platform

Alloy 600 Project

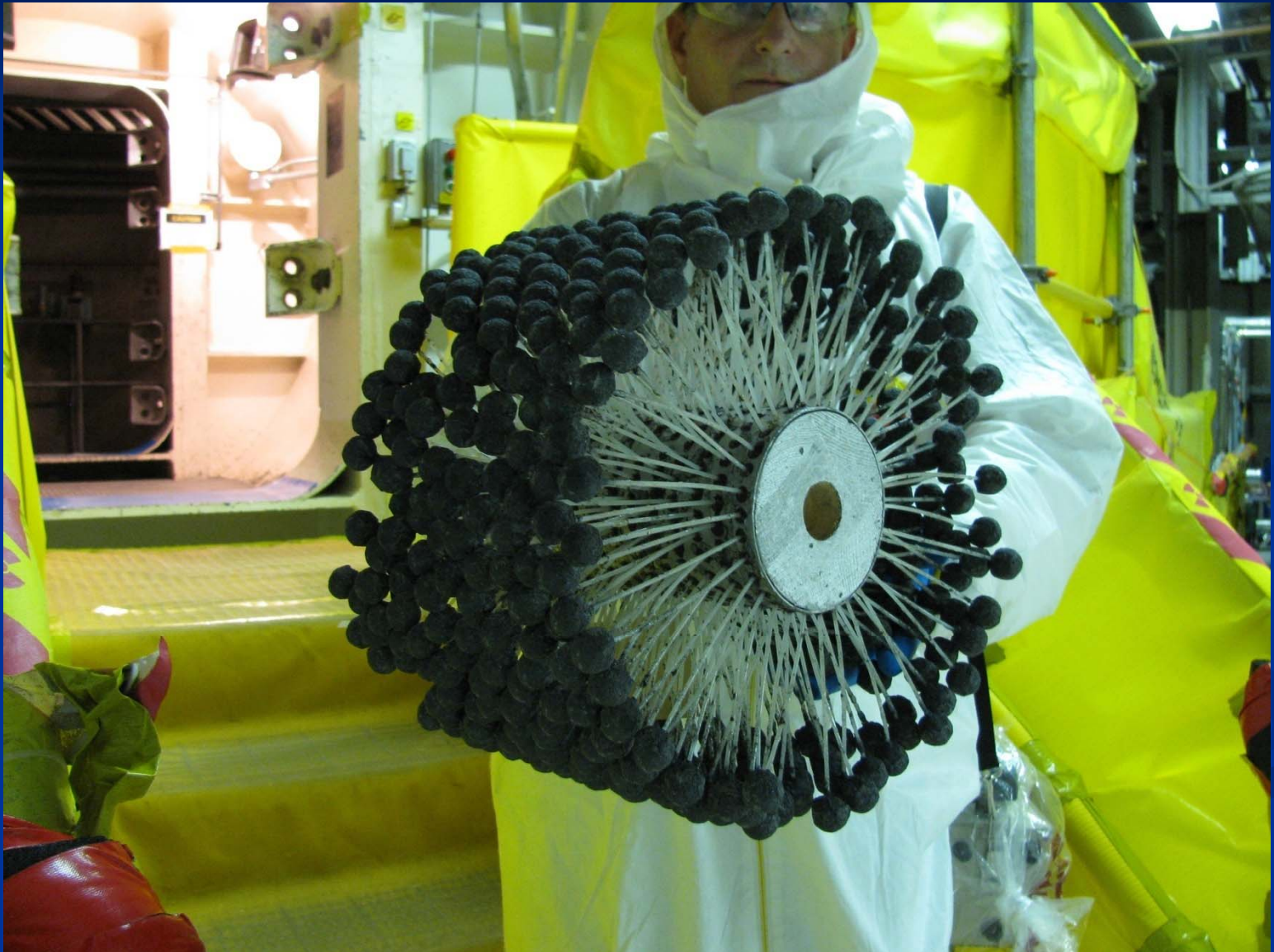
Core Flood (CF) Dissimilar Metal Weld Mitigation

- Most common DMW Mitigation method is Weld Overlay
- CF DMW general area dose rate is 1.5 R/hr (Preliminary est for WOL method 60 – 170 Rem)
- Weld “Onlay” to Pipe Inside Diameter was Low Dose Option (Actual dose = 48 rem)
 - “Onlay” method not used previously in US
 - Vendor developed equipment in 2008

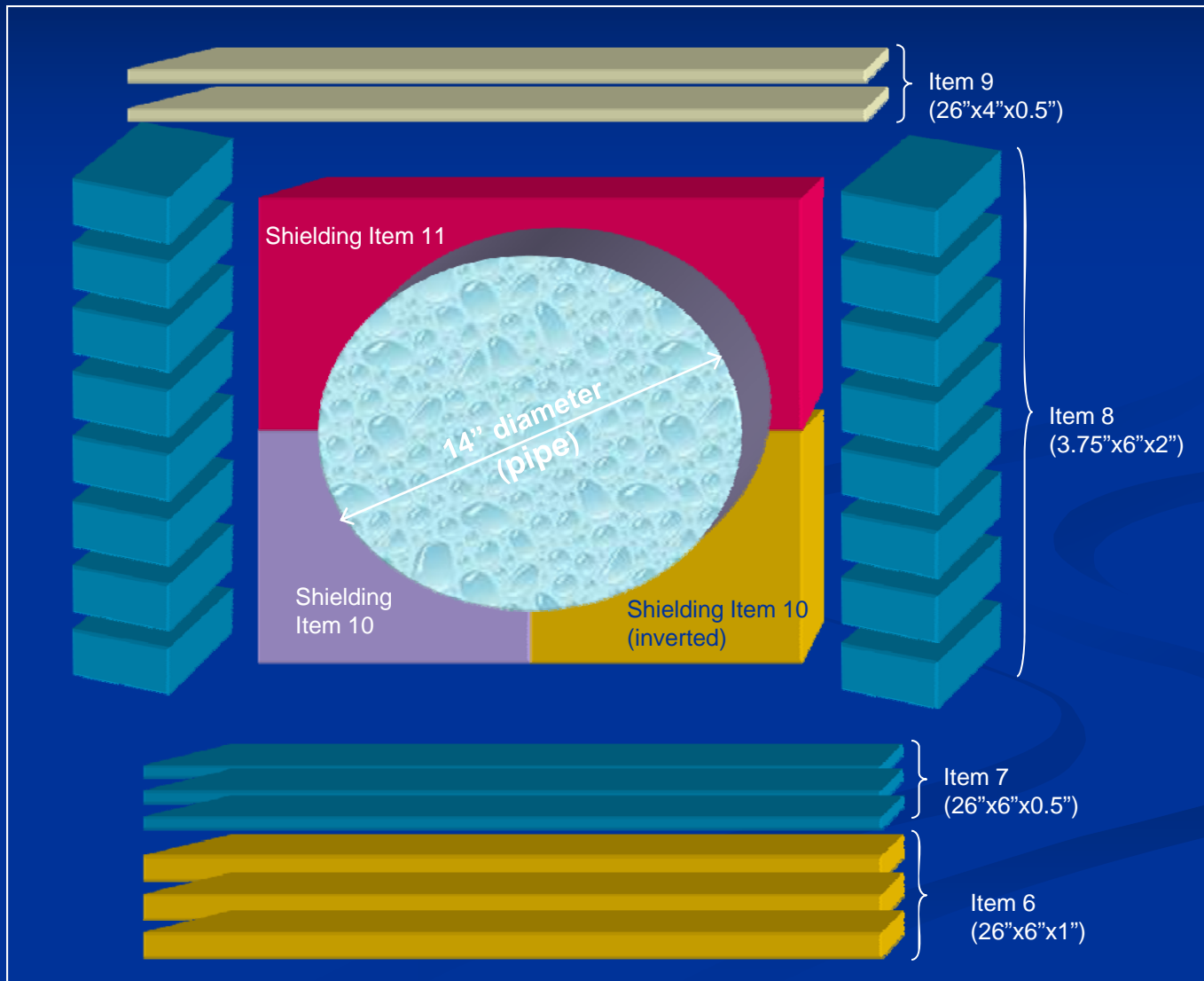
Alloy 600 Project

- Silicone / Tungsten Shielding
 - Primary Shield Wall Penetrations (Rx streaming)
 - Pipe ID Shield / FME Plug dual purpose
- Mechanical Honing of Core Flood Piping
 - Flexible Hones Removed Tenacious Oxide Layer
 - Reduced Dose Rates from 700 to 120 mrem/hr
 - Reduced Contamination levels from 2 Rad/hr to 30K dpm/100 cm². 5 PCEs in 10,000 RWP-hrs.

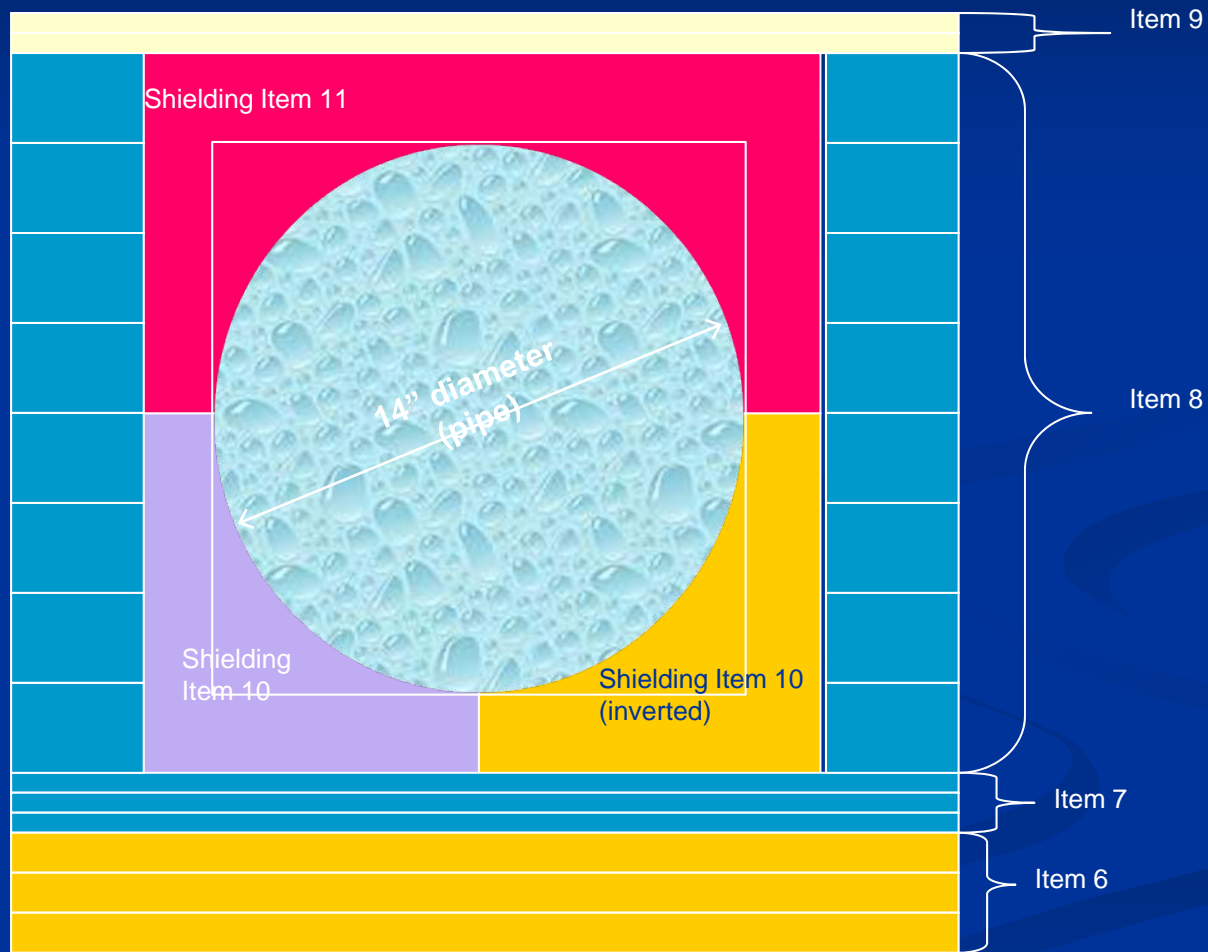
Alloy 600 Project



Alloy 600 Project



Alloy 600 Project



Alloy 600 Project



Alloy 600 Project



Incore Instrument Flange Integral Shielding and Insulation



Decay Heat Piping Permanent Shield Rack



Letdown Piping Shield Rack



Floor / Piping Shield Rack

