

# 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

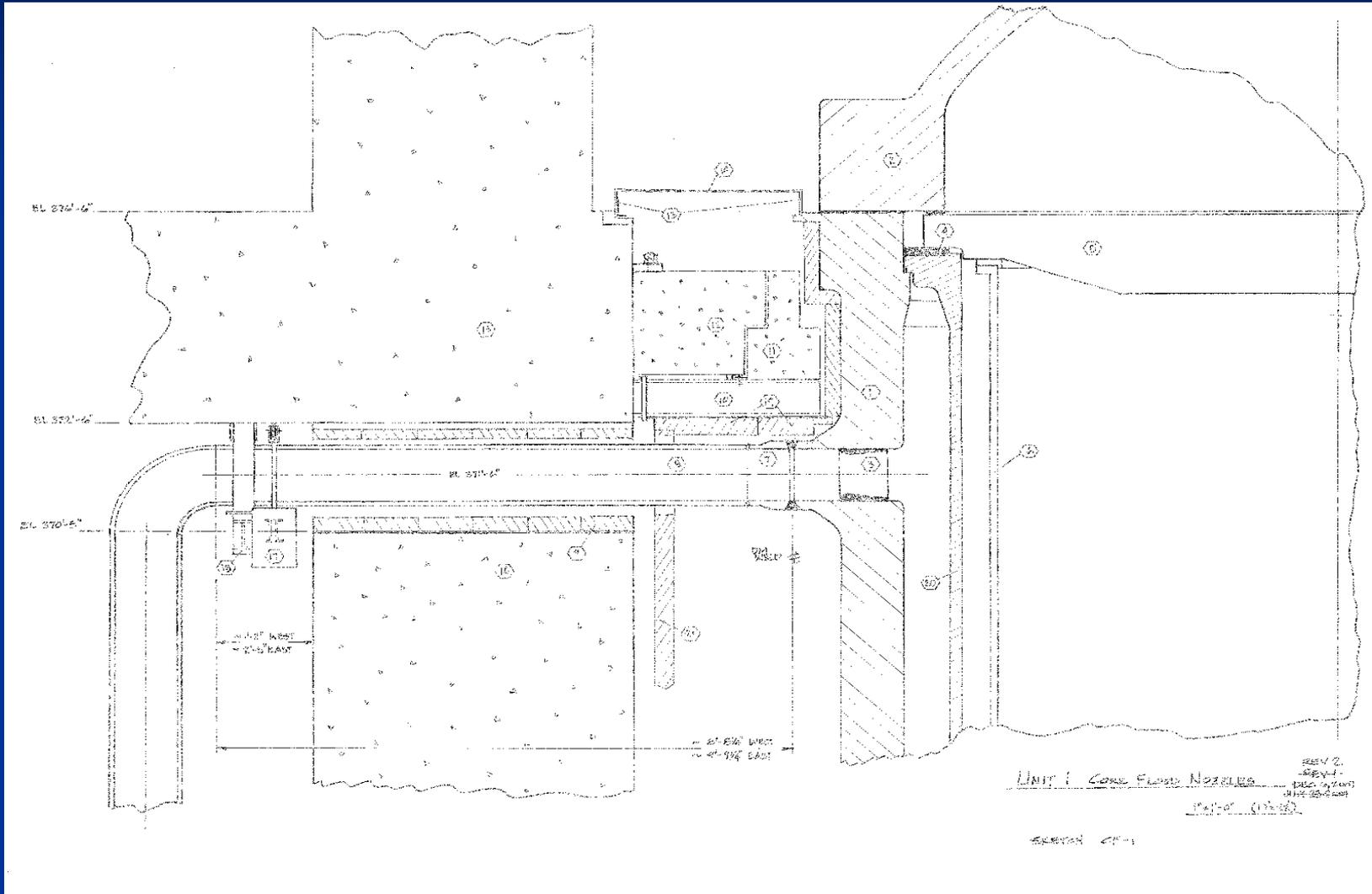
## Core Flood (CF) Dissimilar Metal Weld Mitigation

- 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

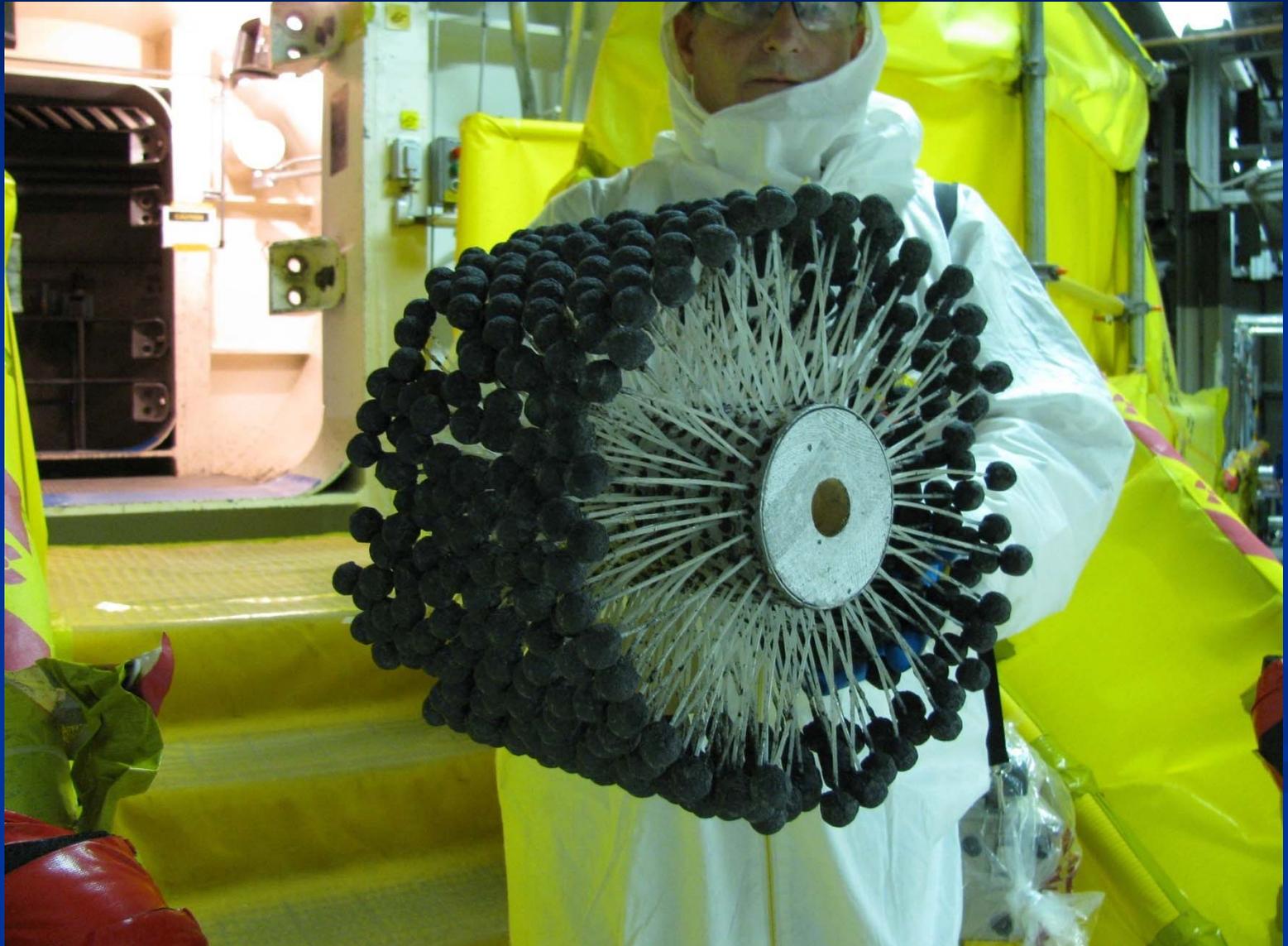
# Alloy 600 Project

- **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 cm<sup>2</sup>. 5 PCEs in 10,000 RWP-hrs.**

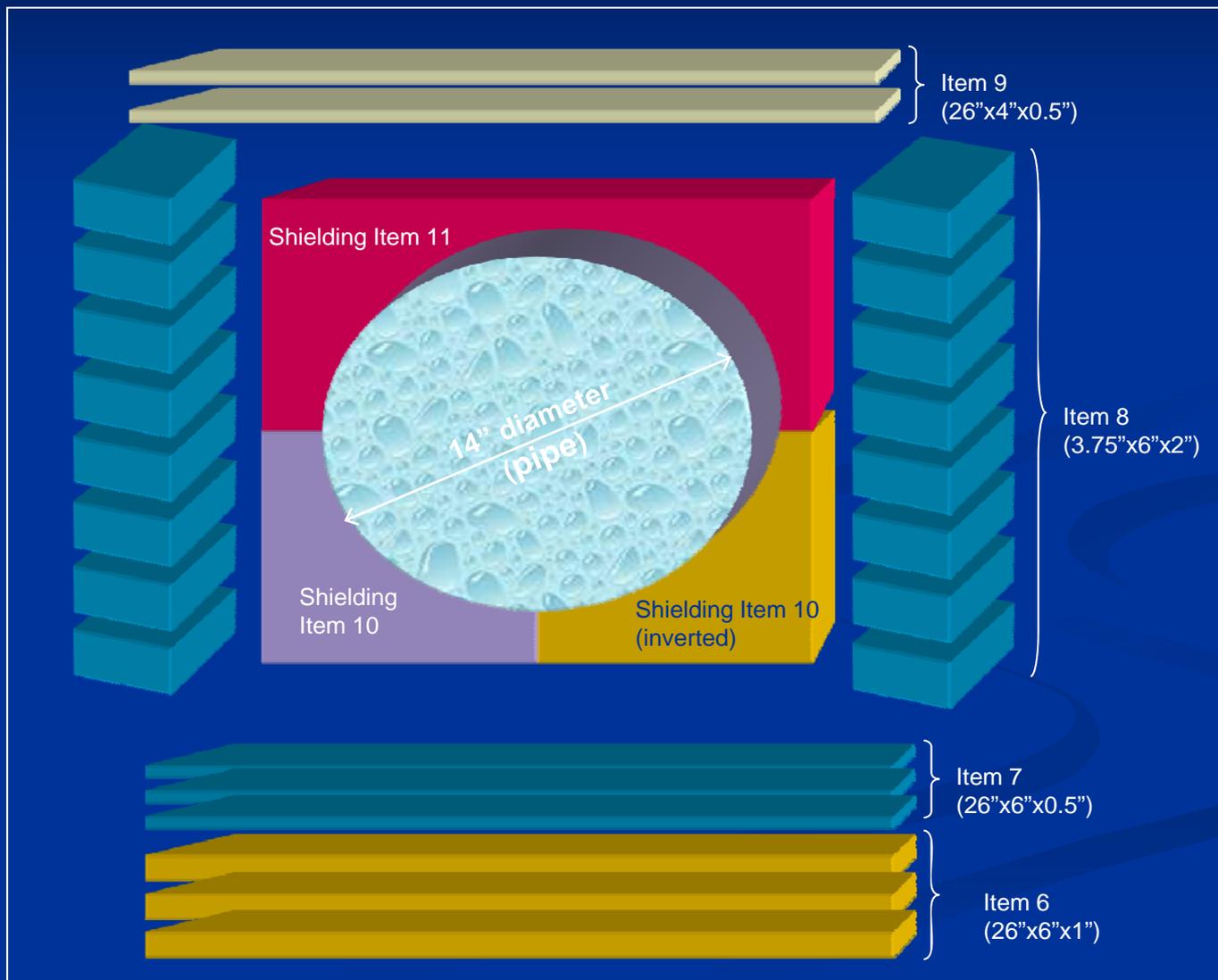
# Alloy 600 Project



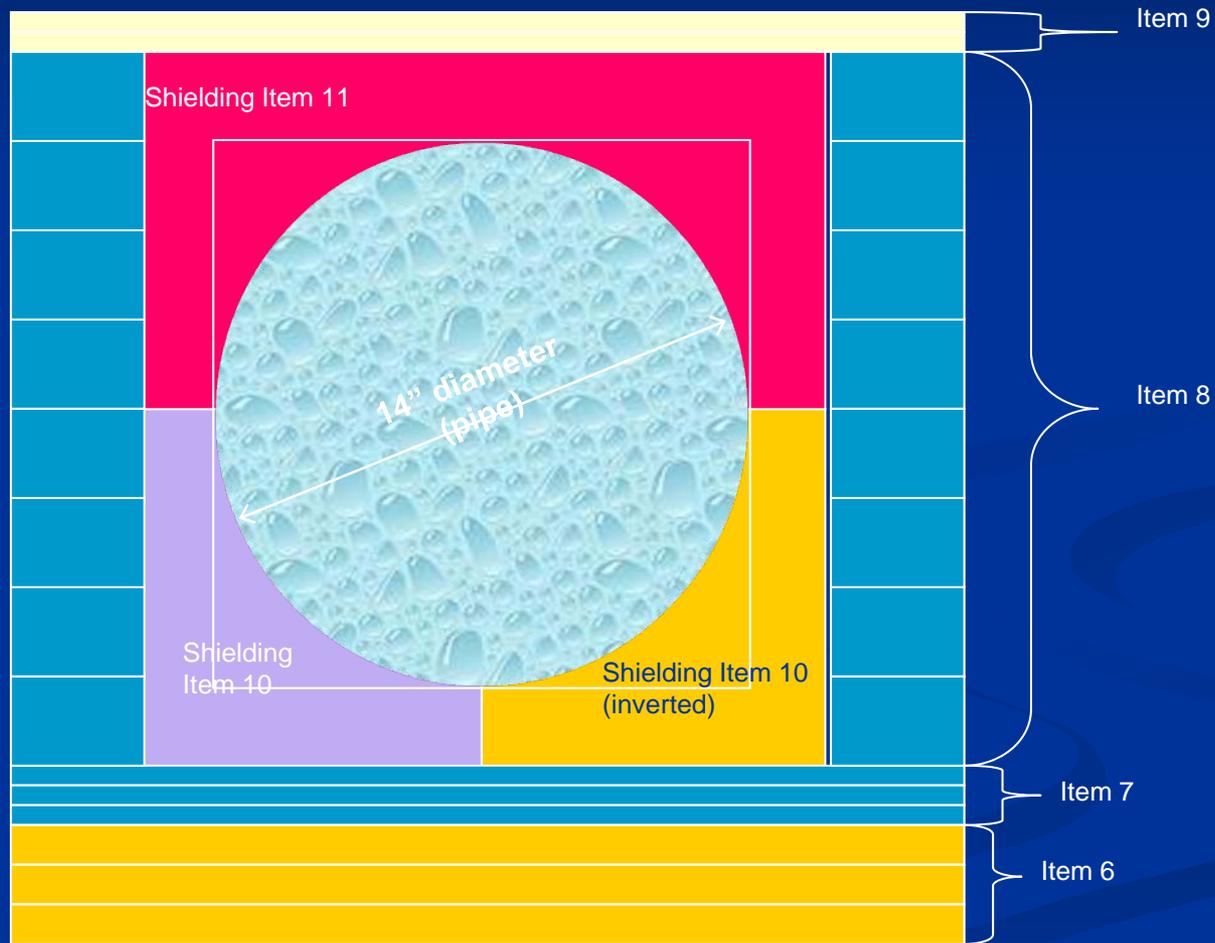
# Alloy 600 Project



# Alloy 600 Project



# Alloy 600 Project



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# Alloy 600 Project



# Incore Instrument Flange Integral Shielding and Insulation



# Decay Heat Piping Permanent Shield Rack



# Letdown Piping Shield Rack



