# Chemical Effects Resolution Activities

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# General Observation from Early Test Results

- Small portion of total predicted chemical precipitants results in significant headloss for screen that is fully encapsulated in fiber
- Further action/investigation needed in three areas
  - Chemical Source Term
  - Fiber Source Term
  - Strainer Headloss

# Chemical Precipitant Source Term

- Calculation Methodology
  - Accounting for inhibition effects
  - Alloy specific corrosion models
- Input/Boundary Conditions
  - Refinement of key parameters (temperature, pH)
  - Improved accounting for key constituents (aluminum)
- Design/Operational Modification
  - Buffer modification (pH modification)
  - Aluminum source term changes (relocation, removal, coating)
  - Containment spray operation changes
  - Increased shielding of reactant materials in containment

# Fiber Source Term

- Calculation Methodology
  - Refinement of debris generation methods
  - Debris size/transport
  - Greater utilization of “Section 6”
- Design/Operational Modification
  - Insulation removal/replacement
  - Insulation banding

# Strainer Headloss

- Testing Protocols
  - Prototypic testing
- Design/Operational Modifications
  - Pump stoppage/restart
  - Strainer backflush
  - Reserved screen area (sacrificial strainer concept)

# Refinements to the Chemical Effects Model

| **Refinements** | **Potential Reduction in Precipitates Reduction is plant specific** | **Considerations** |
|---|---|---|
| Silicate inhibition of aluminum corrosion | 50 - 95% reduction | Applicable for "high silica" plants |
| Corrosion for plant-specific aluminum alloys | 60 - 80% reduction | Need to identify alloy types in containment |
| Phosphate inhibition of aluminum corrosion | Reduction of 80-90% | Applicable for plants with TSP buffer |
| Inhibition of aluminum corrosion by a protective oxide coating | Rough estimate = less than 10% reduction | Need to determine degree of oxidation |

# Known Conservatism in Debris Generation and Transport Methods

- Break size and location
- Break opening time
- Spherical ZOI
- Damage Pressure determination
- Size distribution of debris
- Transport

# Discussion