GSI-191 - Chemical Effects

Regulatory Information Conference

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Paul Klein – NRR/DCI

Outline

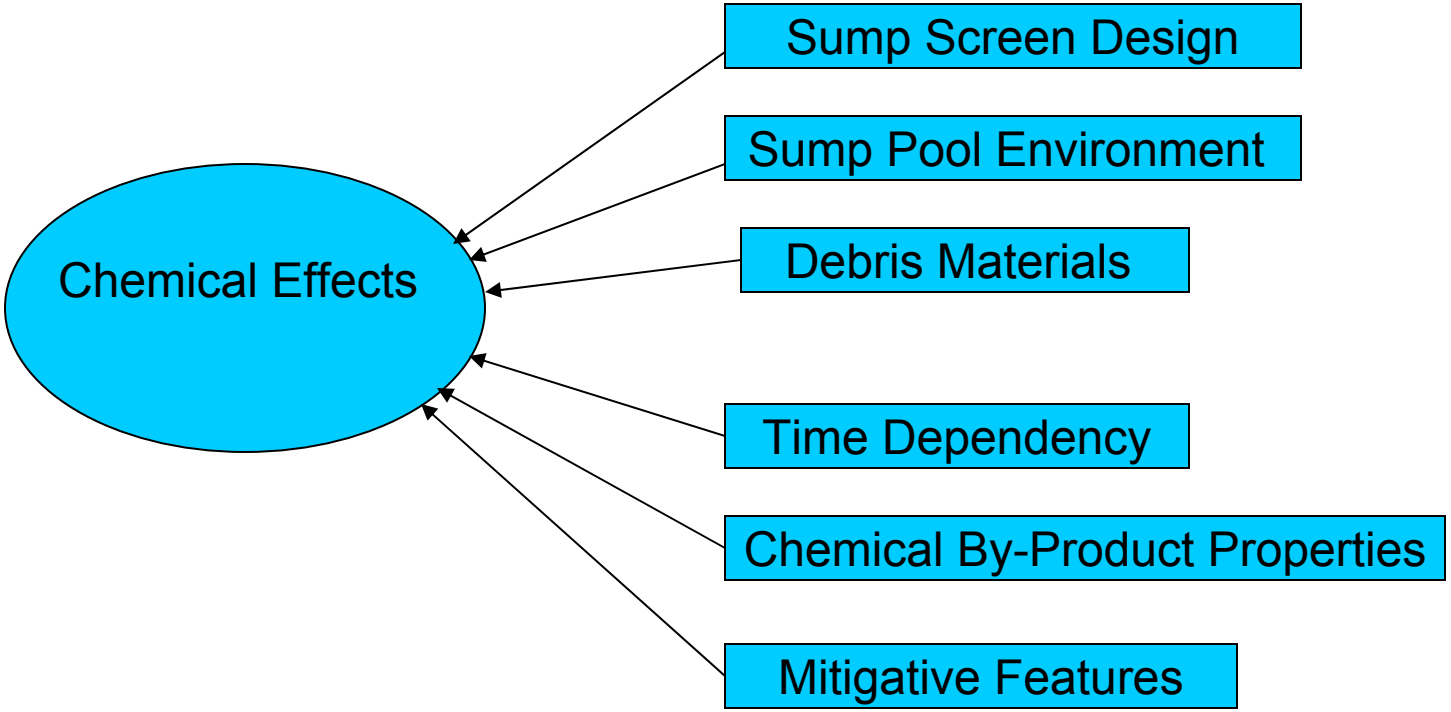
- Description of issue
- Implications from chemical effects tests
- Path forward

Chemical Effects – Description of Issue

- Issue – interaction between plant materials and the post-LOCA containment environment may produce chemical products that could contribute to head loss across the sump screen.

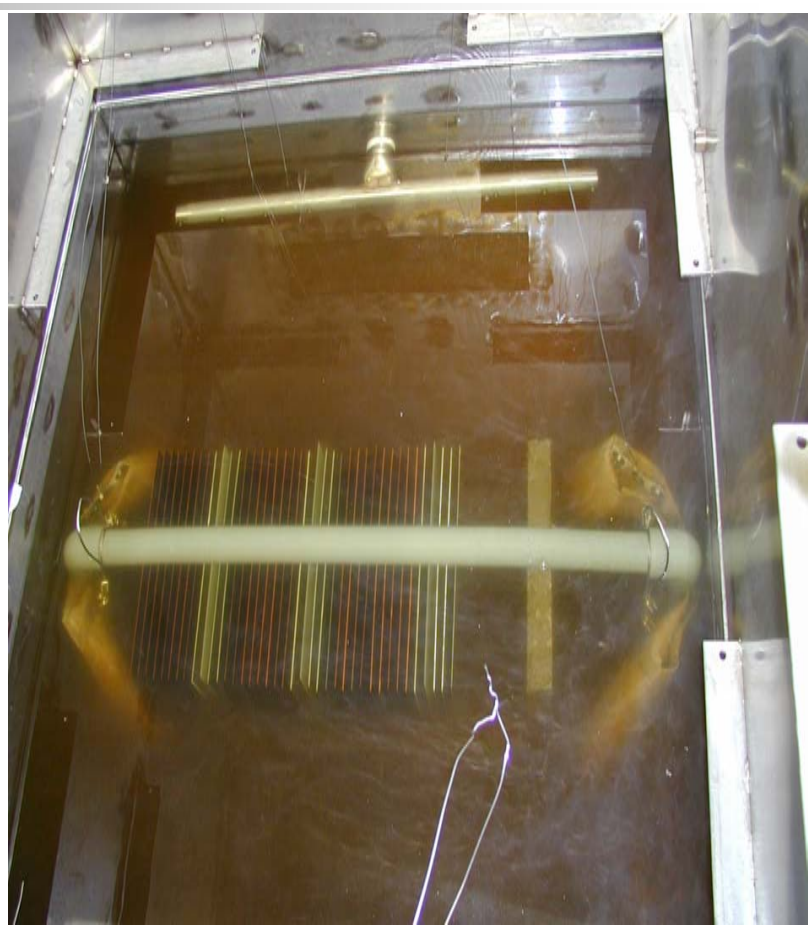
Chemical Effects Evaluations

- Many factors involved in chemical effects evaluation
- Chemical effects are **one part** of GSI-191 evaluation
- For some by-products, potential for significant head loss



ICET Tank

Submerged Test Rack



Implications From RES Results

ICET

- Variations in insulation materials or chemical buffering agents produced significantly different chemical effects:
  - Plant specific conditions differ from ICET and may lead to products different than those observed in the ICET tests
  - Testing is needed to determine head loss consequences
- Chemical products formed at different times:
  - Timing of chemical product formation is important, plants gain significant pump NPSH margins with time after a LOCA
- Some results raise questions about downstream effects
  - Temperature dependence for precipitant formation in ICET 1, 5
  - Calcium phosphate deposits affected flow meter in ICET 3

Implications From RES Results

Head Loss

- TSP buffered environment - significant head loss may result from calcium phosphate if it forms within a containment pool or from continued cal-sil dissolution within a sump screen debris bed
  - Initial TSP test environment was selected based on ICET observations concerning early product formation and product characteristics

- Head loss test results from sodium hydroxide and sodium tetraborate buffered environments expected within months

NRC Interactions With Industry

- GL 2004-02 response
- Public meetings
- Information Notices 2005-26 and Supplement 1
- Staff feedback on industry's chemical effects test plan
- Staff visit to observe industry chemical effects testing
- Interaction with screen vendors
- Plant audits

Path Forward

- Licensees have a number of options available to address chemical effects:
  - Change plant materials,
  - Change pH buffering chemical
  - Over-design screen area
  - Screen cleaning, screen back-flush
  - Active strainer design
  - Redundant sumps
  - Formation of some chemical products is time dependent

Path Forward - Chemical Effects Evaluations

- Licensees must demonstrate sufficient pump NPSH margin exists for all postulated debris sources, including plant specific chemical effects, for the entire ECCS mission time.

- NRC to rely on information from confirmatory RES work to perform independent evaluation of licensee chemical effect evaluations.