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# Fort Calhoun Station Water Management Initiative

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GL 2004-02 Closure Strategy

# Ft. Calhoun Station - Water Management Relevant Design Features

- Containment coolers originally designed to be redundant to containment sprays
- HPSI pump run out flow of ~450 gpm
- 2006 outage modifications
  - Two 550 ft<sup>2</sup> strainers installed (one per train)
  - TSP replaced with NaTB

# Sources of Debris and Chemical Precipitants at Fort Calhoun

## Fiber & Particulate Debris

- Calcium Silicate
  - Asbestos and Cellulose Fibers
  - Particulate
- Fiberglass, Temp-Mat and NUKON
  - Glass Fibers
- Coatings
- Latent Debris

## Chemical Precipitants

- Sodium Aluminum Silicate
- Aluminum Oxyhydroxide

# Fort Calhoun Water Management Initiative

- Change ESFAS logic to only actuate containment fan coolers on LOCA (Sprays actuate on SLB)
- Credit existing EOP guidance for cooled HPSI suction to cool sump water
- Licensing Issues
  - Hydrogen generation resolved with revision to 10 CFR 50.44
  - Post LOCA Containment Pressure and Temperature
  - DBA LOCA Offsite and Control Room Dose
- GL 2004-02 closure
  - Little debris transported to strainers

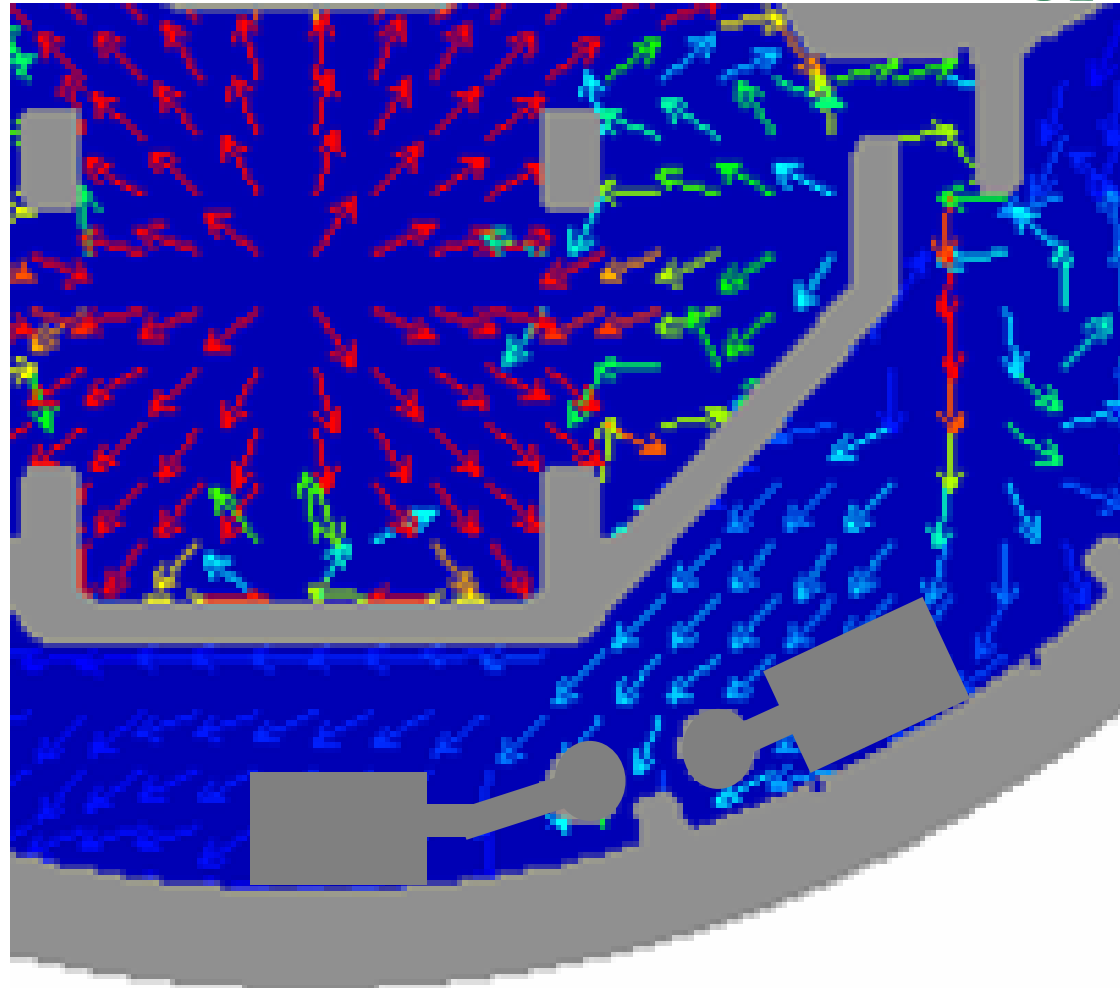
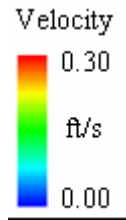
# Post LOCA Containment Pressure and Temperature

- GOTHIC model shows acceptable pressure response without CS
- Temperatures calculated using GOTHIC long term mass and energy release (M&E) model are overly conservative
  - Superheat calculated after transition from RELAP generated M&E
  - Model change required
  - Methodology change may be required
- Anticipate staying within existing EQ envelope

# GL 2004-02 Closure

- Strainers to be designed and tested for HPSI recirculation flow
  - CFD transport calculations show
    - Pool is essentially stagnant outside of steam generator bays
    - TKE insufficient to transport individual fibers to strainers
      - Fraction of individual fibers, dirt, dust, paint and Cal-Sil particulate transported to strainer to be determined
    - CFD model verified by testing
  - Head loss testing, including chemical effects, is planned

# Flow Velocity – HPSI Only (1350 gpm)



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# Benefits of Water Management

- ❑ Increased injection to core
  - Time to start of recirculation increased by ~50%
- ❑ Significantly decrease approach velocity to strainers
- ❑ Increased settling of debris
- ❑ Only submerged aluminum involved in generation of chemical precipitants



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# CONCLUSION

- Implementation of Water Management provides OPPD the best means of closing GL 2004-02

## QUESTIONS