

# Electrical Distribution and Safety Features Actuation System Relays

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**Jim Powers**  
Director - Engineering

# Electrical Distribution

## Emergency Diesel Generator (EDG) Issues/Resolution

- Completed
  - Operations accepted Operability Evaluation on May 15
  - EDGs operable for all Modes
- Plant Start-up
  - Revise EDG Steady State Loading Calculation
  - Revise EDG Transient Loading Calculation
  - Prepare and issue USAR change; in draft
  - Define acceptance criteria for EDG voltage and frequency response
- Post-restart
  - Evaluate actions to improve EDG voltage and frequency response during Safety Features Actuation System load sequencing

# Electrical Distribution

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## AC System Issues/Resolution

- First Mode 4
  - Prepare Electrical Transient Analysis Program (ETAP) calculation
  - Complete Evaluation Impacts of plant equipment
  - Complete independent industry team review of ETAP analysis
  - Evaluate conditions with unusual lineups to determine actions necessary going forward

# Safety Features Actuation System Relays

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- Originally Characterized as an Obsolescence Issue
  - Supplier stopped manufacturing replacements
- Reviews Found the Predominant Reason for Replacement was Coil Related
  - Replacements were random with respect to age
- Testing of Installed Relays has been Conducted
  - Outliers were removed and will be replaced
  - Relay population will gain improved reliability
- Action Plan has been approved
  - Obtain replacement relays from another utility

# Safety Features Actuation System Relays

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- Technical Evaluation (TE) is in Progress
  - Industry experts are reviewing maintenance history
    - Average replacement rate has been at relatively the same level of 2% per year for about the last 20 years
  - Temperature related aging does not appear to be an issue; further tests are under way to confirm
  - Relay material condition is being assessed to further confirm suitability to function for another fuel cycle
  - Independent review of TE will be conducted
- Conclusion
  - Operability evaluation will contain technical evaluation and confirm operability
    - Confirm that relays are acceptable for operation through the next operating cycle

# High Pressure Injection Pump Modification and Corrective Action Program Performance

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**Bob Schrauder**  
**Director -Support Services**

# High Pressure Injection Pump Modification

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- Background
  - Identified an issue that fine debris could impact the existing internal pump clearances
- Selected Approach
  - Modify the existing pump to add internal strainer to prevent debris from entering hydrostatic bearing
  - This will allow the pumps to perform all design functions without replacement
- Project Milestones
  - Strainer design and testing
  - Pump performance validation
  - Field implementation

# High Pressure Injection Pump Modification

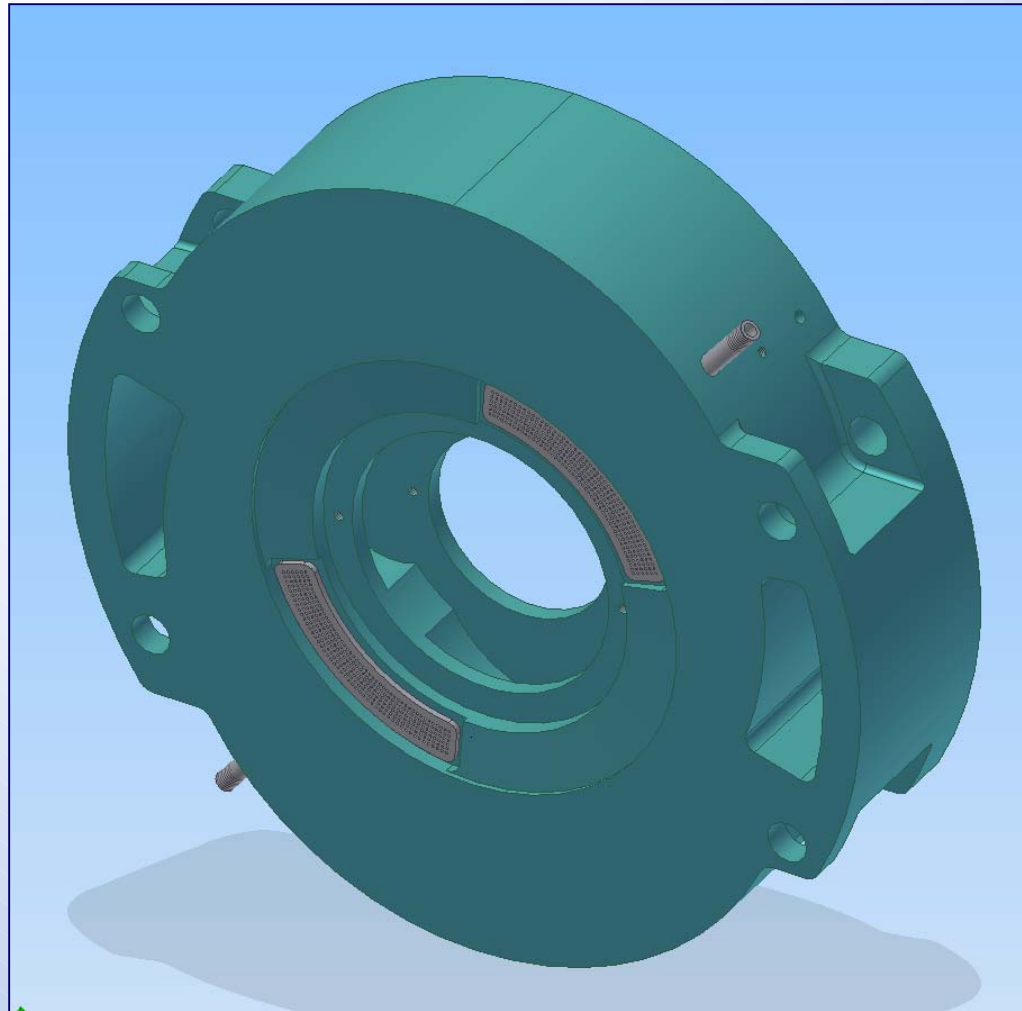
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- Strainer Design and Testing
  - Strainer allows water to pass through and supply the hydrostatic bearing and seal
    - flushes strainer surface
  - Relocate ports that supply water to the hydrostatic bearing
    - supported by testing performed by pump manufacturer, Pump Guinard of France
    - reduce debris concentration at strainer
  - MPR Associates performing design work
    - mock-up testing at Wyle Labs to verify performance



# High Pressure Injection Pump Modification

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# High Pressure Injection Pump Modification

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- Pump Performance Validation
  - Rotordynamics analysis performed to predict satisfactory pump operation
    - includes worn condition after debris service
  - In-plant testing is being performed to validate rotordynamics model
  - Post-modification testing will be performed prior to returning the pumps to service

