A stylized atomic symbol is centered in the background. It consists of a central blue nucleus with four colored electrons (green, yellow, red, and purple) orbiting in elliptical paths. The background is a light blue circle on a yellow background.

# V. C. Summer Nuclear Station

## RF-16 Outage Information

**Alan Torres**  
**Manager, Planning and  
Scheduling**

Enclosure

# RF-16 Goals

- Outage goals
  - Nuclear safety
    - Protect the core and the public (conservative decisions)
    - Use N+1 (Safety Function Bar Chart)
    - Secondary side focus (use of secondary side outage manager)
    - Readiness reviews using Equipment Risk

# RF-16 Goals

- Radiological safety
  - ALARA (use one train of RHR for shutdown)
  - Dose control-use PRC resin
  - Control Crud Burst (24hr RCP run after peroxide injection)
  
- Industrial safety
  - Two minute drill
  - Pre-job briefs
  - Be smart- use OE (Book)

# RF-16 Goals

- Duration: 37 Days
- Budget projected at 25.7 m
- Human Performance Events:  $\leq 1$
- Recordable Injuries:  $\leq 1$
- Significant Safety Events: 0
- Post 100% - 90 Day Capacity:
- Dose: 70 REM

# RF-16 Major Modifications

- New Alternate AC supply to 1DX
  - Reduction in CDF of 31.8%
- Reactor Building Sump Redesign
  - Change out of SI Throttle valves
  - Addition of debris catchers
- Replacement of RV head nuts with Hydranuts
  - Significant Dose savings
- Replacement of B DG Governor
  - Improved reliability

# RF-16 RB Sump





# RF-16 Hydra Nuts



# RF-16 Items of Interest

- Reactor lower head visual inspection
- Upper head volumetric inspection
- B Hot leg volumetric inspection
- Containment tendon inspection
- LP A inspection and overhaul
- LP A condenser bellows replacement

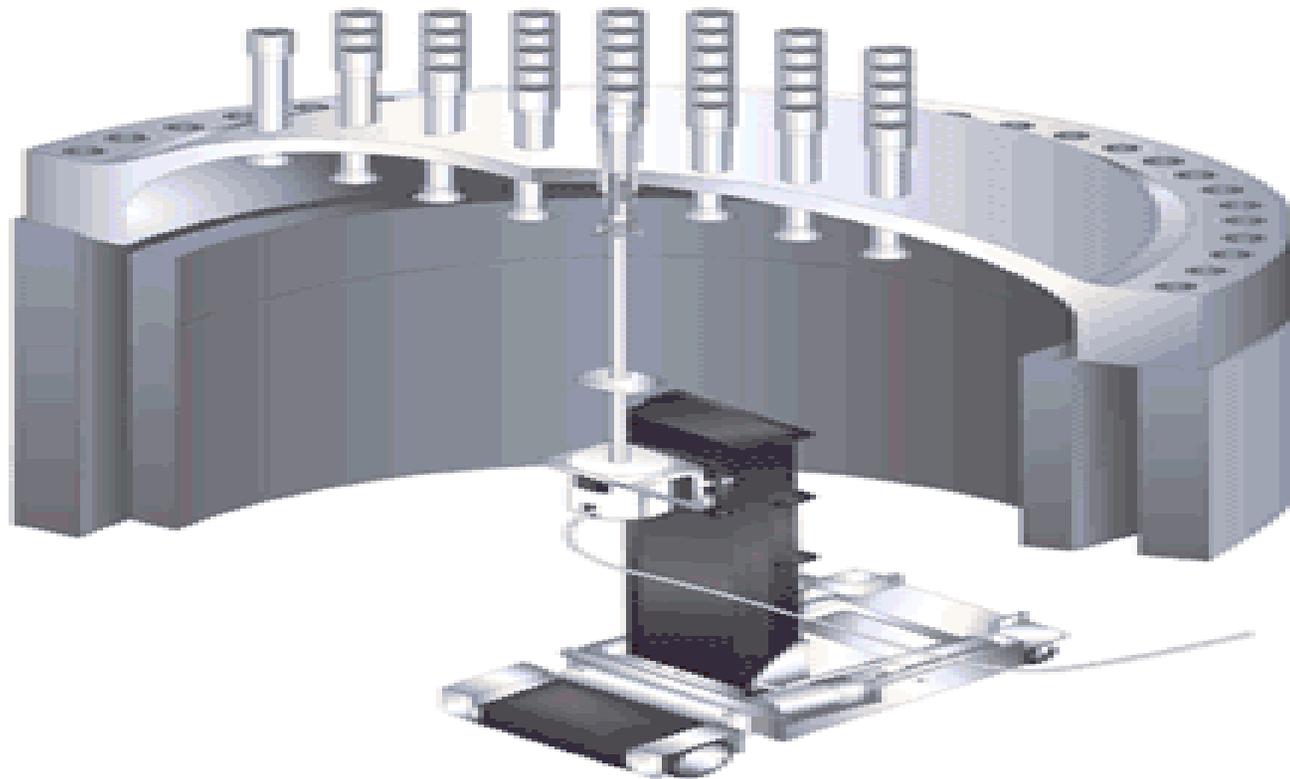
# RF-16 Expansion Bellows



**V.C. SUMMER NUCLEAR STATION**

# RF-16

## Reactor Head Volumetric Exam



# RF-16 Items of Interest

- Replacement of air disconnect 8903 on main out going bus
- Replacement of DC feedback cards on EX2000 excitation system

# Program Enhancements

# RF-16 Program Improvements

- Program Changes
  - Implementation of a new FME program
  - Use of new maintenance procedure format
  - Use of an integrated valve team for AOV/MOV'S

# RF-15 Carry over

- Operating Experience books
- Daily talking points
- Weekly outage newsletter
- Rewarded behaviors program utilizes human performance error reduction tools
- Outage observation blitz

# RF-16

- Challenges
  - RCS leakage identification plan
  - Identification and resolution of fuel leaker
  - Potential unknown on volumetric head inspection
  - SI flow balance
  - Alternate AC power retest

# Questions?



# V.C. Summer Station Recirculation Sump Design Changes

**Kirk Weir**  
**Design Engineering**

# Overview

- Analysis Results
- Ongoing Analysis Work
- Refuel 16 Activities

# Analysis Results

- ~930ft<sup>2</sup> strainer for each train
- 8.2 ft<sup>3</sup> fiber load on the sump
  - 1.5 ft<sup>3</sup> tempmat
  - 6.7 ft<sup>3</sup> latent fiber (105 lbs latent debris)
- 190 ft<sup>2</sup> unqualified tape, placards, stickers
- “Chemical Effects” account for <1% total particulate
- High particulate load
- Marinite insulation is not a problem

# Analysis Results

- 713.7 ft<sup>3</sup> of RMI (mirror insulation) debris
- 27.3 ft<sup>3</sup> transports to the sump
  - based on RMI debris transport testing
  - removed the need for debris interceptors

# Analysis Results

- Evaluation of sump level for break inside the primary shield was completed and is acceptable
- Evaluation of sump level for break inside the pressurizer cubicle was completed and is acceptable. the pressurizer cubicle door latching mechanism is assumed to fail.
- HHSI throttle valves will be replaced due to downstream effects
  - current valve opening is 1/32”
  - new valve opening is ~3/32”

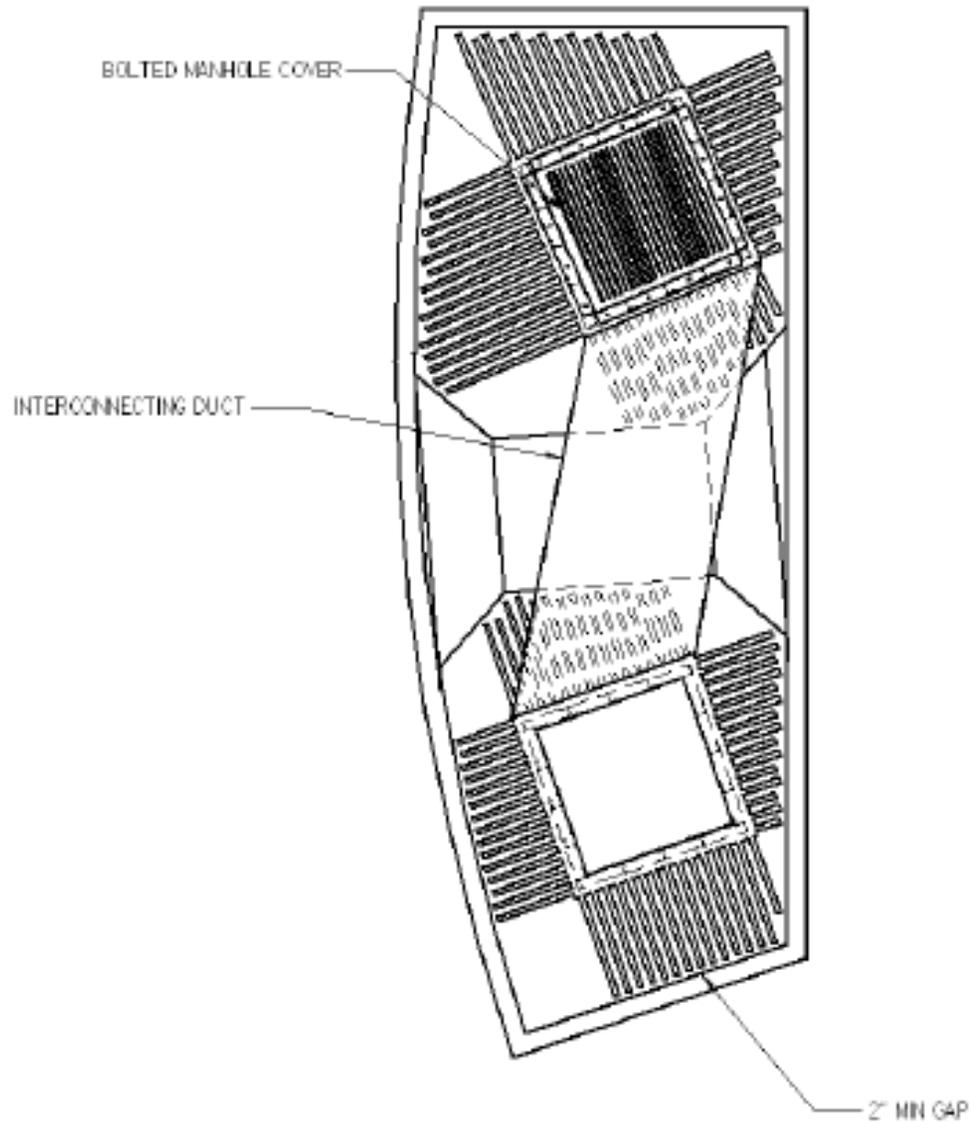
# Ongoing Analysis Work

- Cumulative effects program – calculations are being completed and procedure updates are prepared
- Evaluation of downstream effects
- Conducting large scale testing on strainers

# RF-16 Modifications

- Complete recirculation sump strainer replacement
  - 2400 ft<sup>2</sup> per train
  - RHR and spray pump strainers cross-tie
- Trash racks
- Block southern stairwell of 436 ft elevation
- Remove toe-kick plate on 436 ft elevation
- Installation of new HHSI throttle valves

# AECL Strainer Designs



# Review

- On track to meet the requirements of the Generic Letter
- Supplemental response to Generic Letter by 12/31/06
- Major modifications planned for RF16

# Questions?