NRC AUGMENTED INSPECTION TEAM EXIT MEETING

DAVIS-BESSE REACTOR VESSEL HEAD CORROSION

APRIL 5, 2002

NRC Augmented Inspection Team Exit Meeting

Agenda

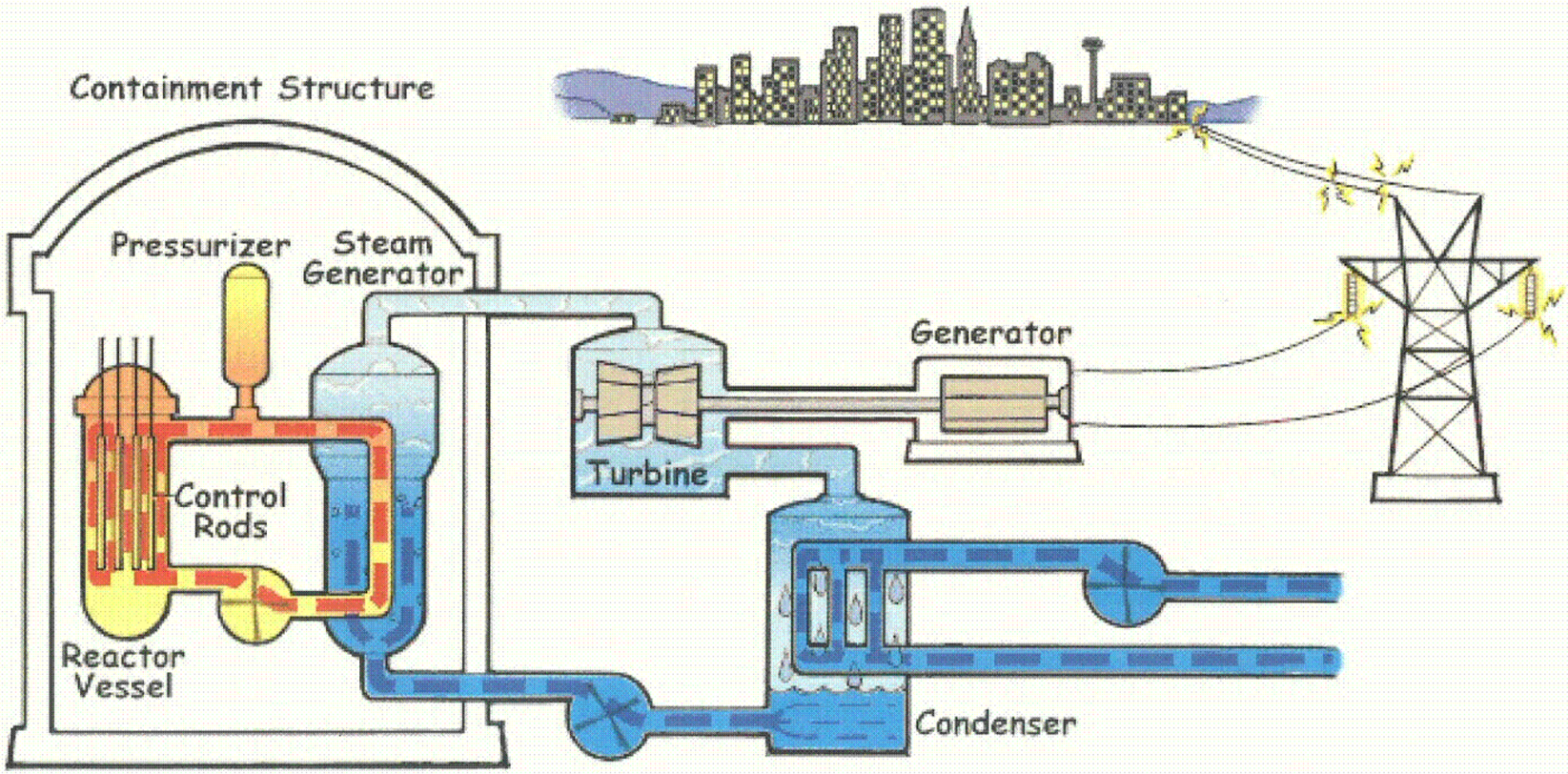
- Welcome
- Meeting Agenda and Structure for Public Involvement
- Introduction of NRC and DB Personnel
- Purpose of an Augmented Inspection Team
- Background on Boric Acid Corrosion and Reactor Head Penetration Cracking

NRC Augmented Inspection Team Exit Meeting

Agenda

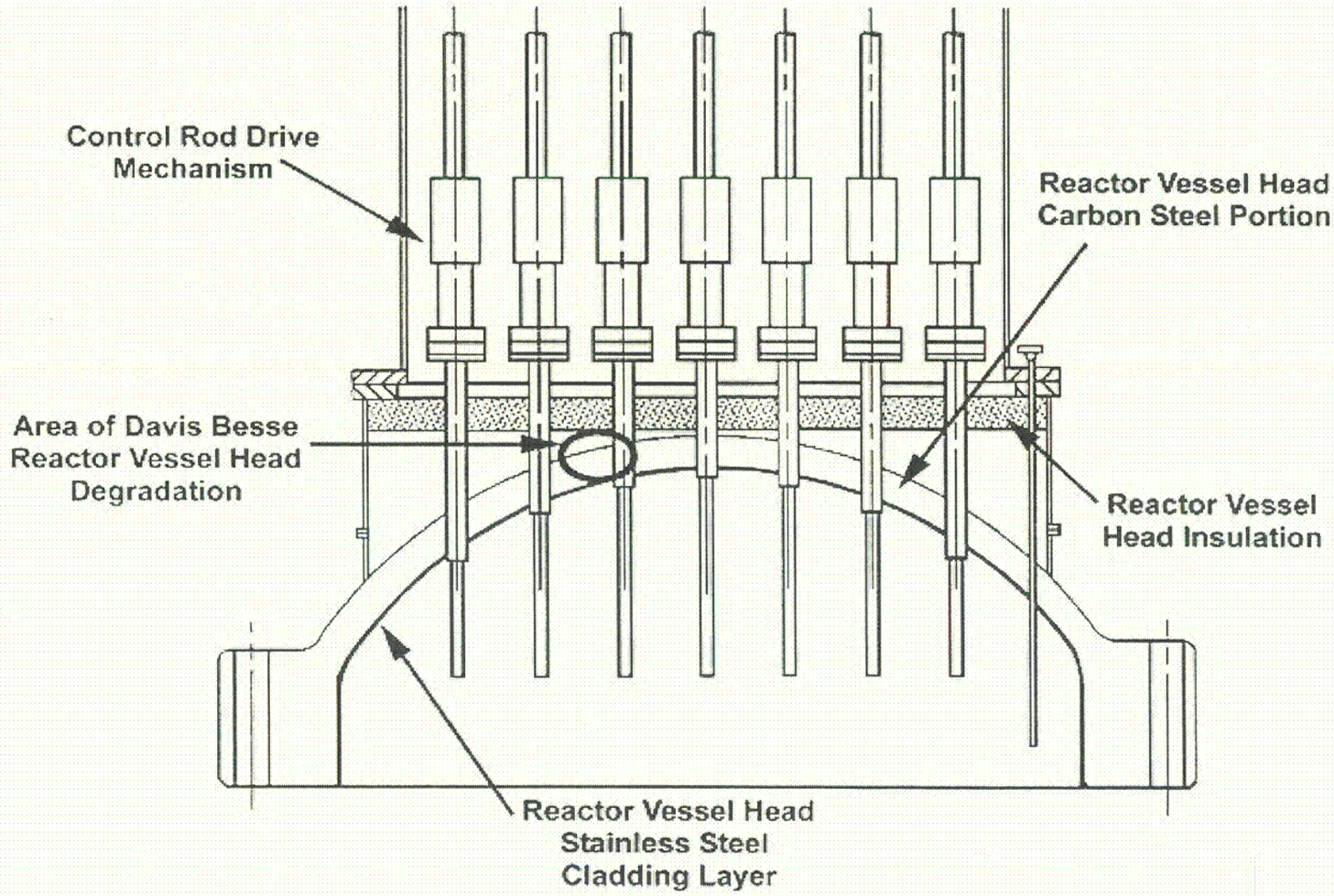
- Characterization of Reactor Head Inspection Results
- Methods and Results for Identifying Reactor Head Corrosion
- Preliminary Causes for Reactor Head Corrosion
- NRC Further Actions
- Concluding Remarks
- Response to Public Questions

Typical Pressurized Water Reactor



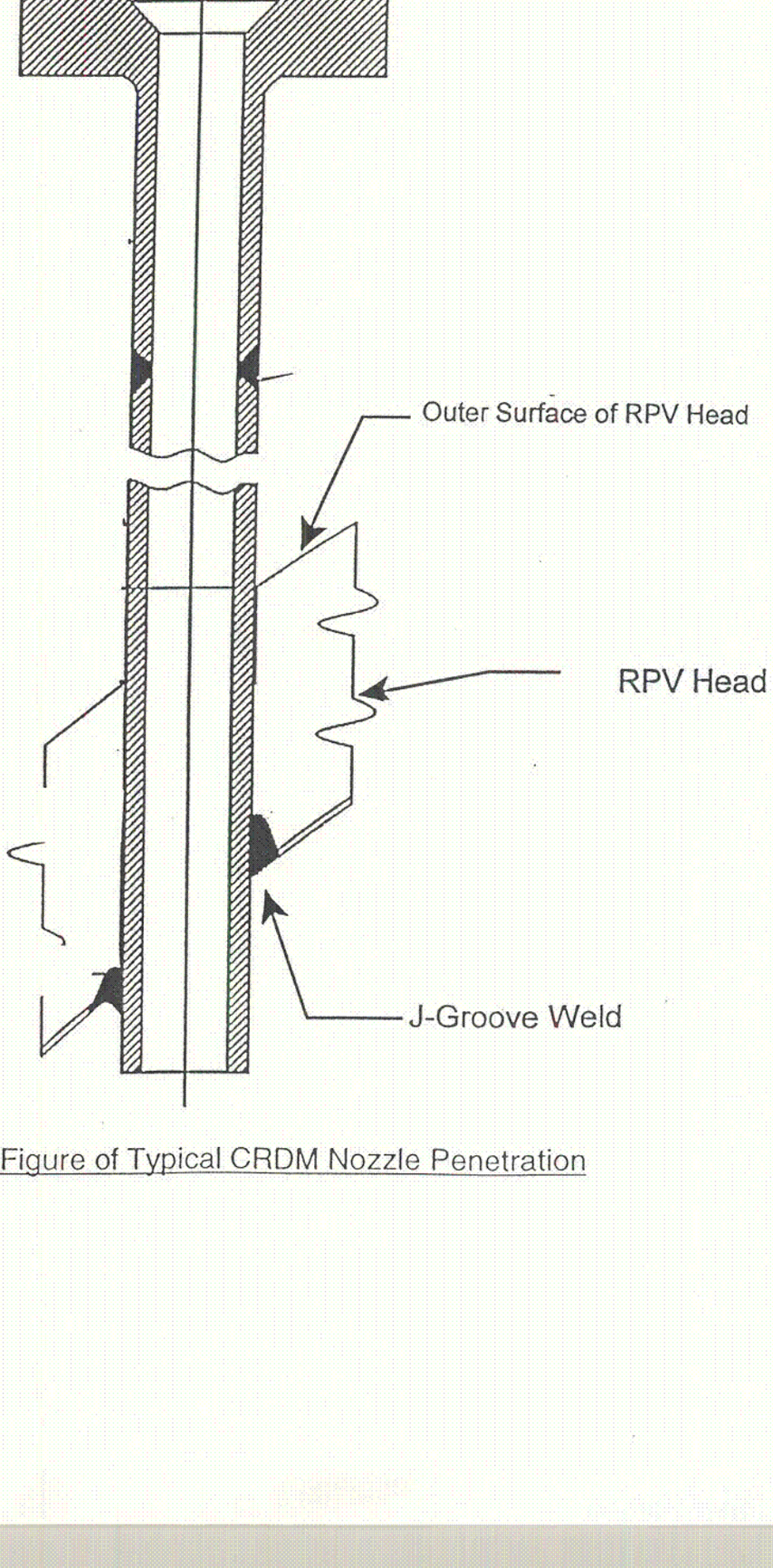
NRC Augmented Inspection Team Findings

Reactor Vessel Head Degradation Location

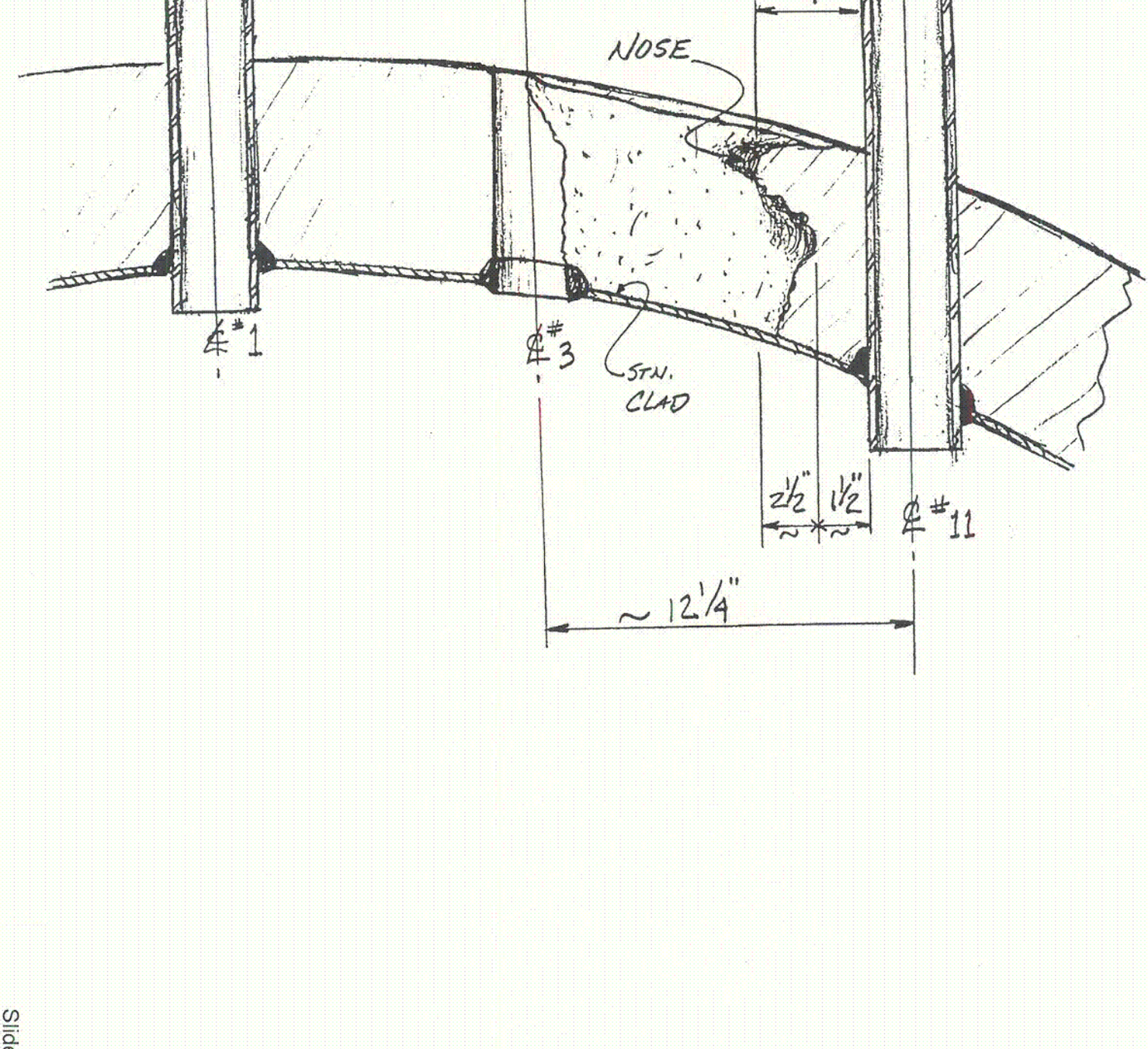


Reactor Vessel Head Cavities

- 5 Nozzles Cracked; 3 Went All the Way Through the Nozzle Wall
- Description of Cavity Near Nozzle #3
- Metal Loss Near Nozzle #2



Schematic Figure of Typical CRDM Nozzle Penetration



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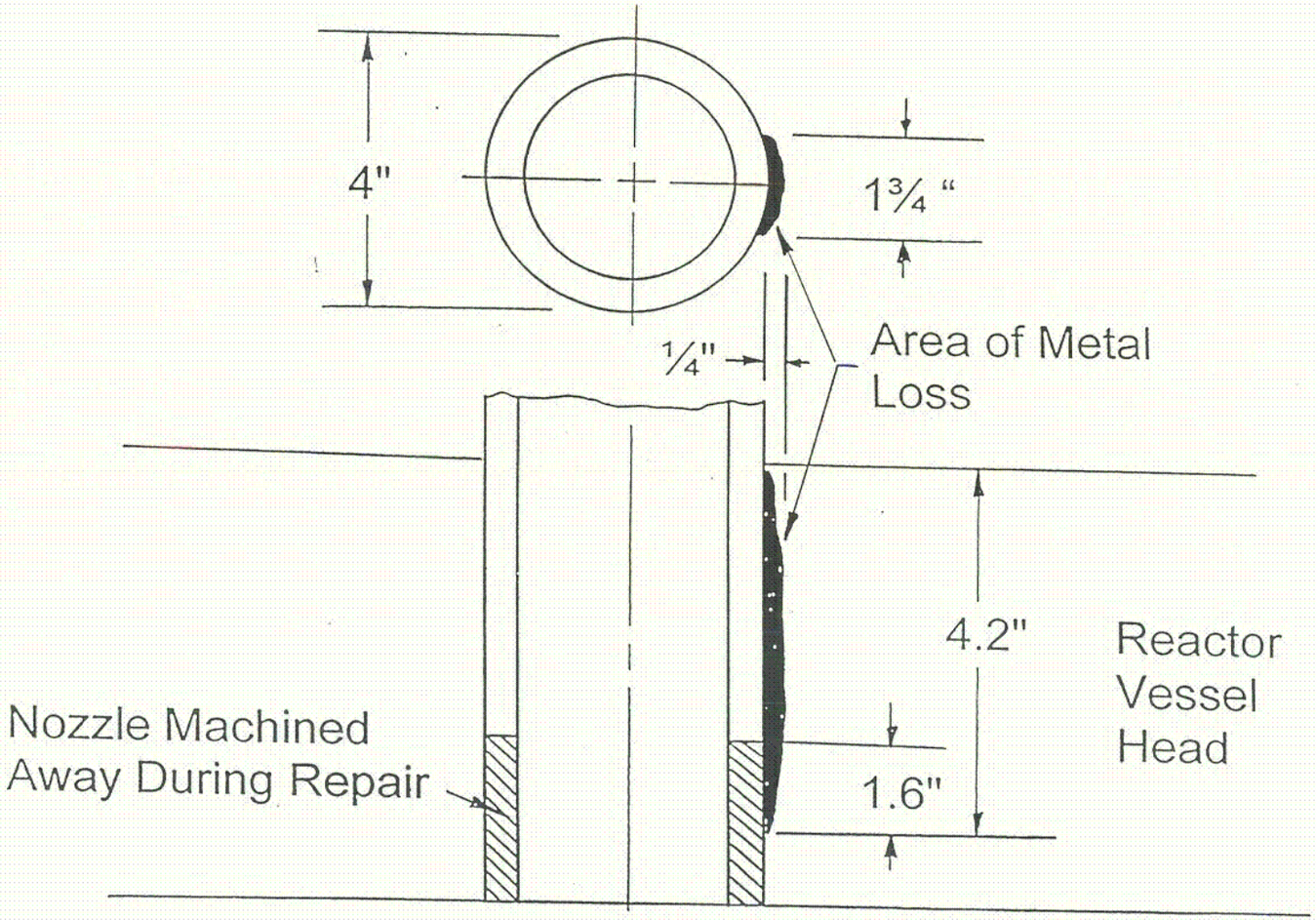
11:35:20 03/08/02
DAVIS BESSE NOZZLE 3
RFO 13 QUAD B
11:36:06 3/8/02

Nozzle 2 Metal Loss



Missed Opportunities to Identify Corrosion

- Containment Air Cooler Clogging
- Containment Radiation Monitor Filter Clogging
- Boric Acid Buildup and Corrosion on Reactor Head

Containment Air Cooler Clogging

- Safety System Used to Cool Containment
- Increase in Boric Acid Collected on Cooling Coils in 1999
- Change in the Color of Boric Acid Deposits in 1999
- DB Staff Assumed Changes in Volume of Boric Acid Deposits Due to Flange Leakage
- DB Staff Assumed Changes in Boric Acid Color Due to Corrosion of Air Cooler

Containment Radiation Monitor Filters

- Detect Radioactivity in Containment Air from Reactor Coolant Leakage
- Beginning in May 1999, Frequency of Filter Changes Increased from Monthly to Every Other Day
- Filters Clogged with Corrosion Products from Reactor Coolant Leakage

Boric Acid Corrosion Control Program

- Required By NRC in 1988
- Sensitive and Reliable Indicator of Reactor Coolant System Leakage
- One Drop per Second (≈0.001 gpm) Will Leave 15 Pounds of Boric Acid in 1 Year

Boric Acid Program Activities

- Ongoing Nozzle Flange Leakage Continued to be a Source of Boric Acid Deposits
- 1990 Modification to Improve Reactor Vessel Head Access Was Not Installed
- Reactor Vessel Head Boric Acid Deposits Were Not Completely Removed
- Indications of Reactor Vessel Head Corrosion Were Not Recognized or Evaluated

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Preliminary Root Cause

- Cavity Caused by Boric Acid Corrosion From Leakage Through Cracks in the Nozzle
- Significant Corrosion Began at Least 4 Years Ago

Root Cause Areas Yet To Be Addressed

- Determination of Corrosion Process (Chemistry)
- Role of Deposits Left on Reactor Head
- Role of Reactor Head Temperature on the Rate of Corrosion
- Rate at Which Cracks and Corrosion Progressed
- Correlation of Davis Besse and Industry Experience

Confirmatory Action Letter

- Determine the Root Cause
- Evaluate the Reactor Coolant System for Other Corrosion
- NRC Must Approve Any Repair or Modification
- Obtain NRC Restart Approval

NRC Further Actions

- Special Inspections for Compliance Issues
- Special Inspections for Modifications, Repair or Replacement
- Evaluating Implications on Other Plants
- NRC Identifying Improvements to Regulatory Processes and Inspection Programs

- Summary and Concluding Remarks

- Public Questions and Answers

For Additional Information

- NRC Website: www.nrc.gov
- Headquarters Operator
  - 1-800-426-8096
  - 1-800-368-5642
  - Tony Mendiola