

**NRC AUGMENTED
INSPECTION TEAM
EXIT MEETING**

**DAVIS-BESSE REACTOR
VESSEL HEAD CORROSION**

APRIL 5, 2002

NRC Augmented Inspection Team Exit Meeting

Agenda

P Welcome

P Meeting Agenda and Structure for Public Involvement

P Introduction of NRC and DB Personnel

P Purpose of an Augmented Inspection Team

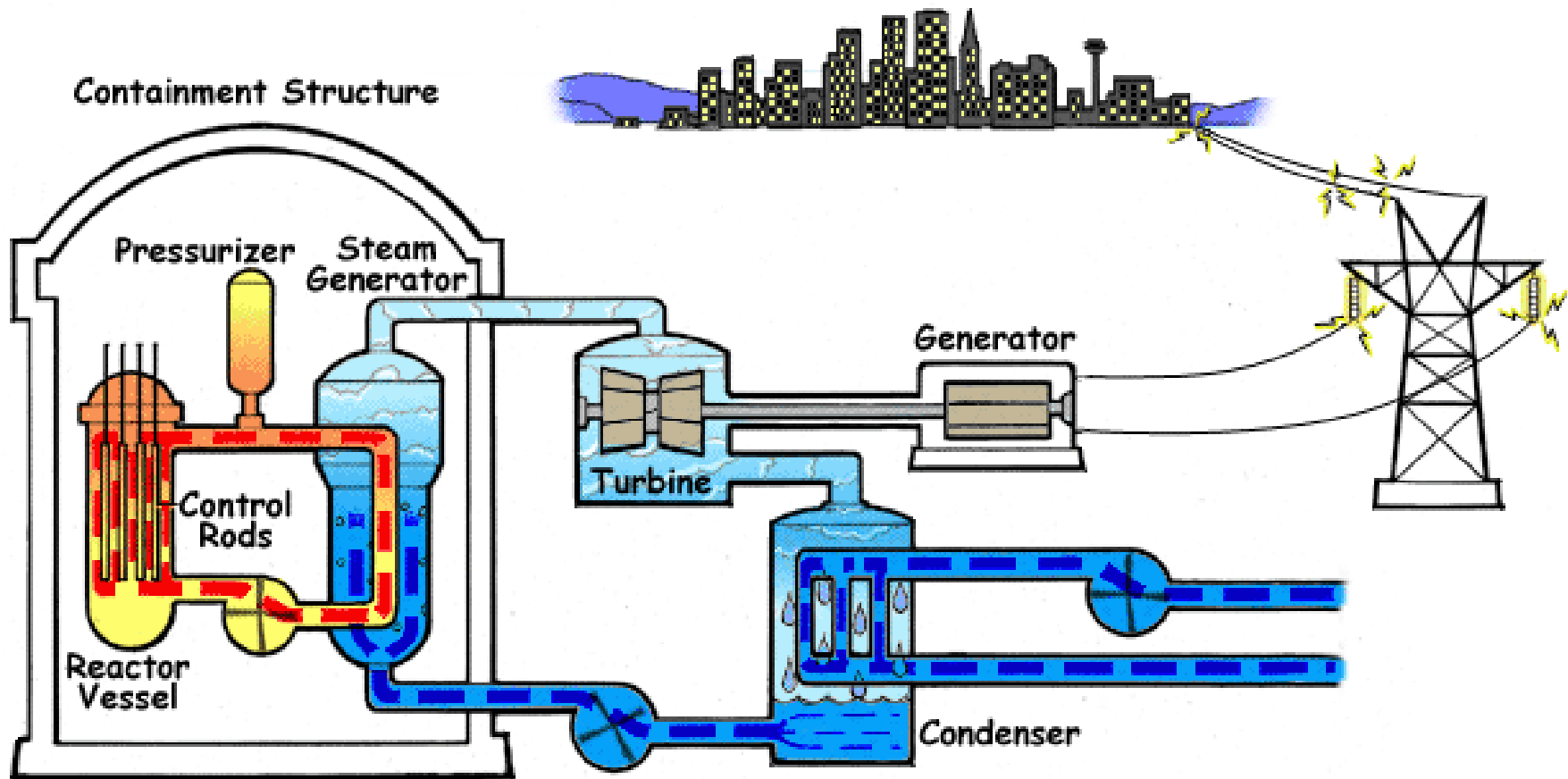
P Background on Boric Acid Corrosion and Reactor Head Penetration Cracking

NRC Augmented Inspection Team Exit Meeting

Agenda

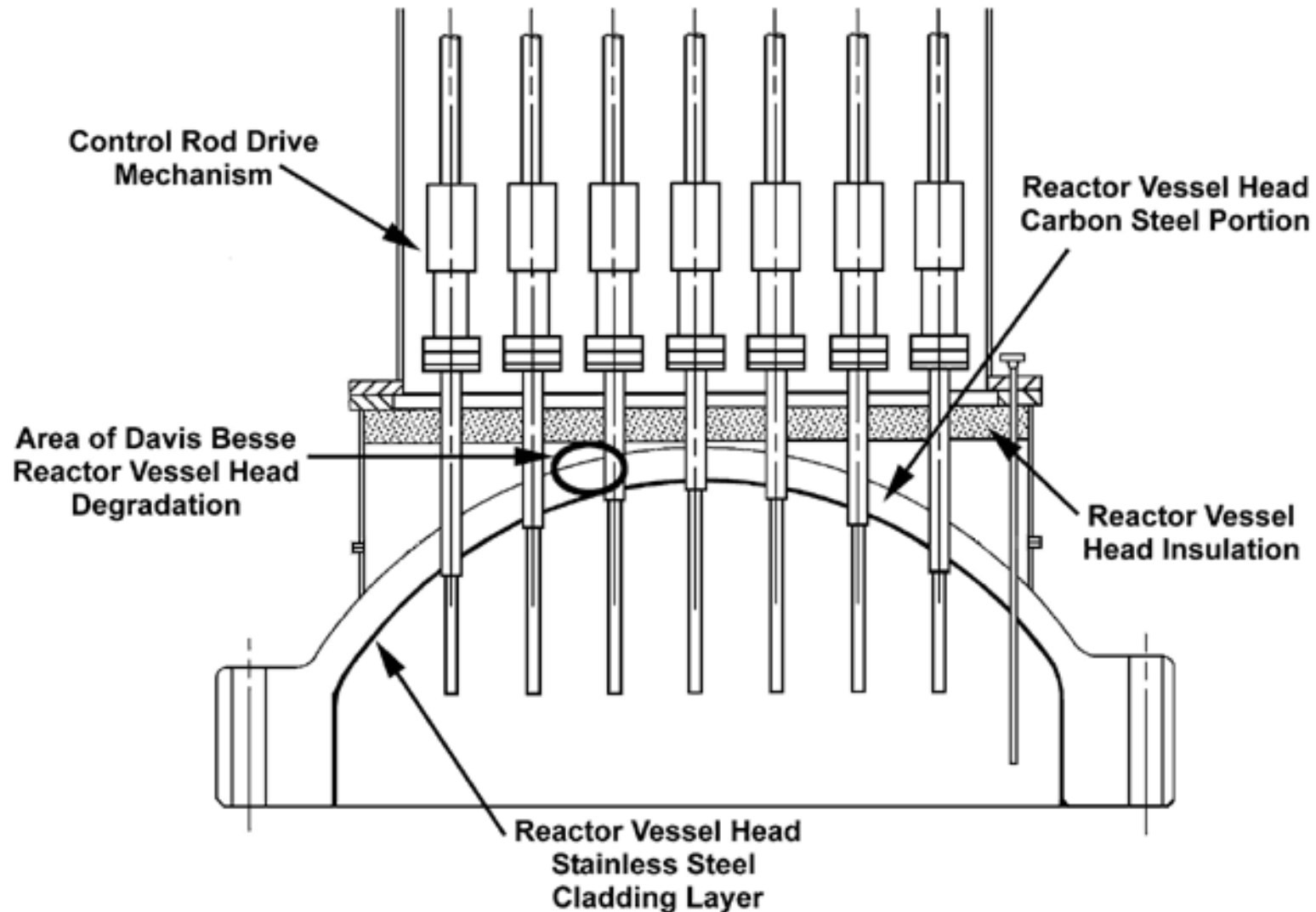
- P Characterization of Reactor Head Inspection Results
- P Methods and Results for Identifying Reactor Head Corrosion
- P Preliminary Causes for Reactor Head Corrosion
- P NRC Further Actions
- P Concluding Remarks
- P Response to Public Questions

Typical Pressurized Water Reactor



NRC Augmented Inspection Team Findings

Reactor Vessel Head Degradation Location

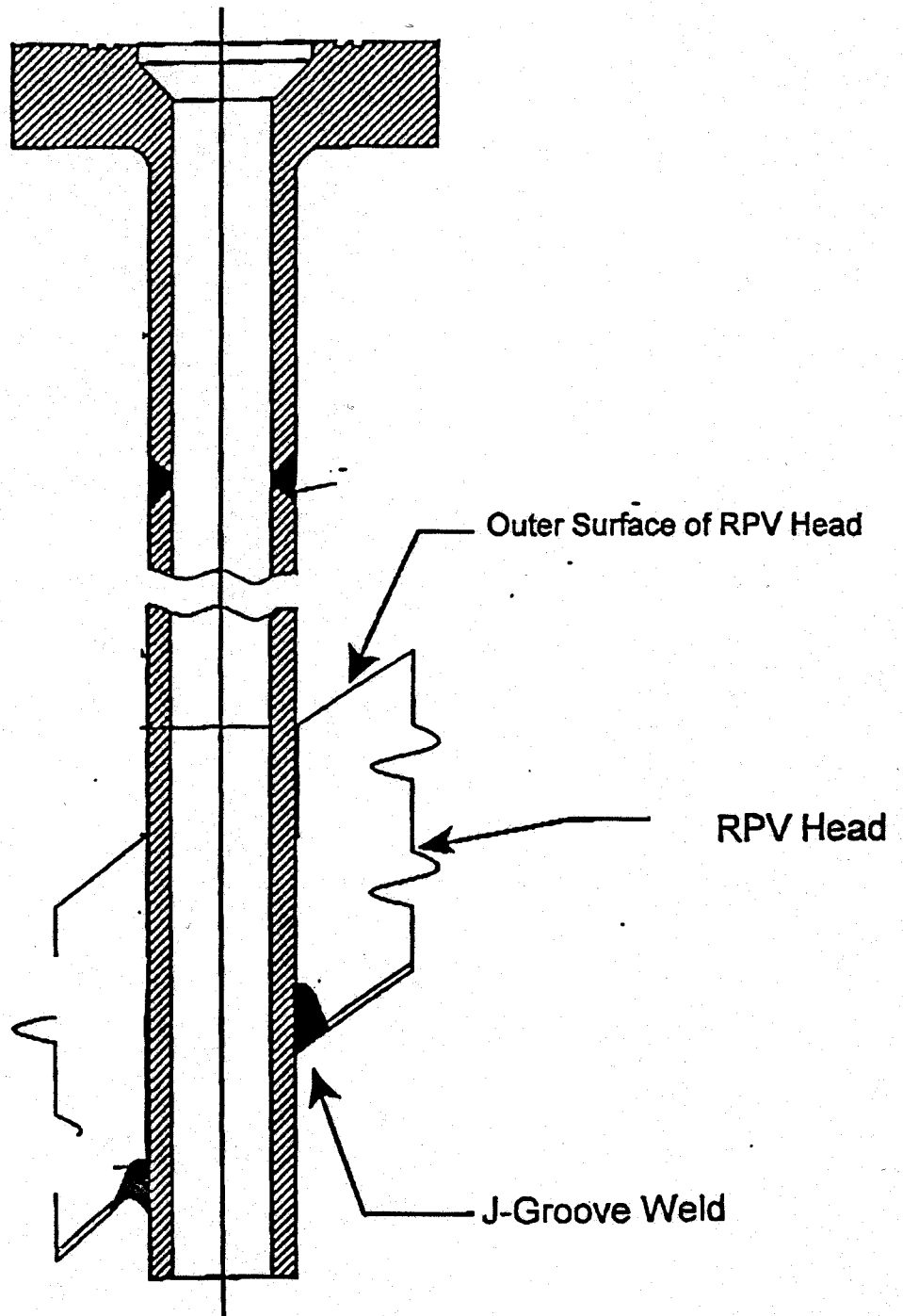


Reactor Vessel Head Cavities

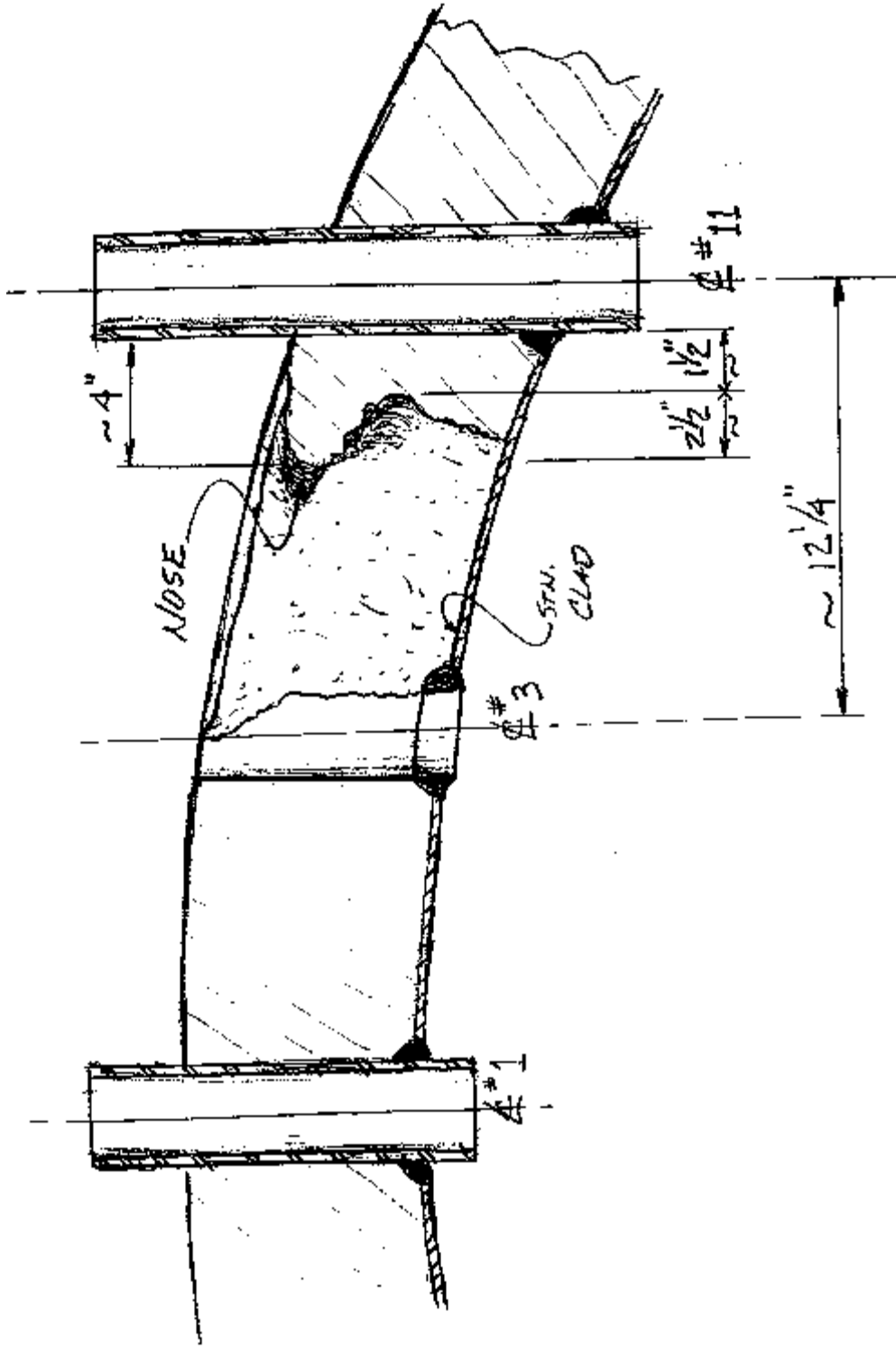
P 5 Nozzles Cracked; 3 Went All the Way Through the Nozzle Wall

P Description of Cavity Near Nozzle #3

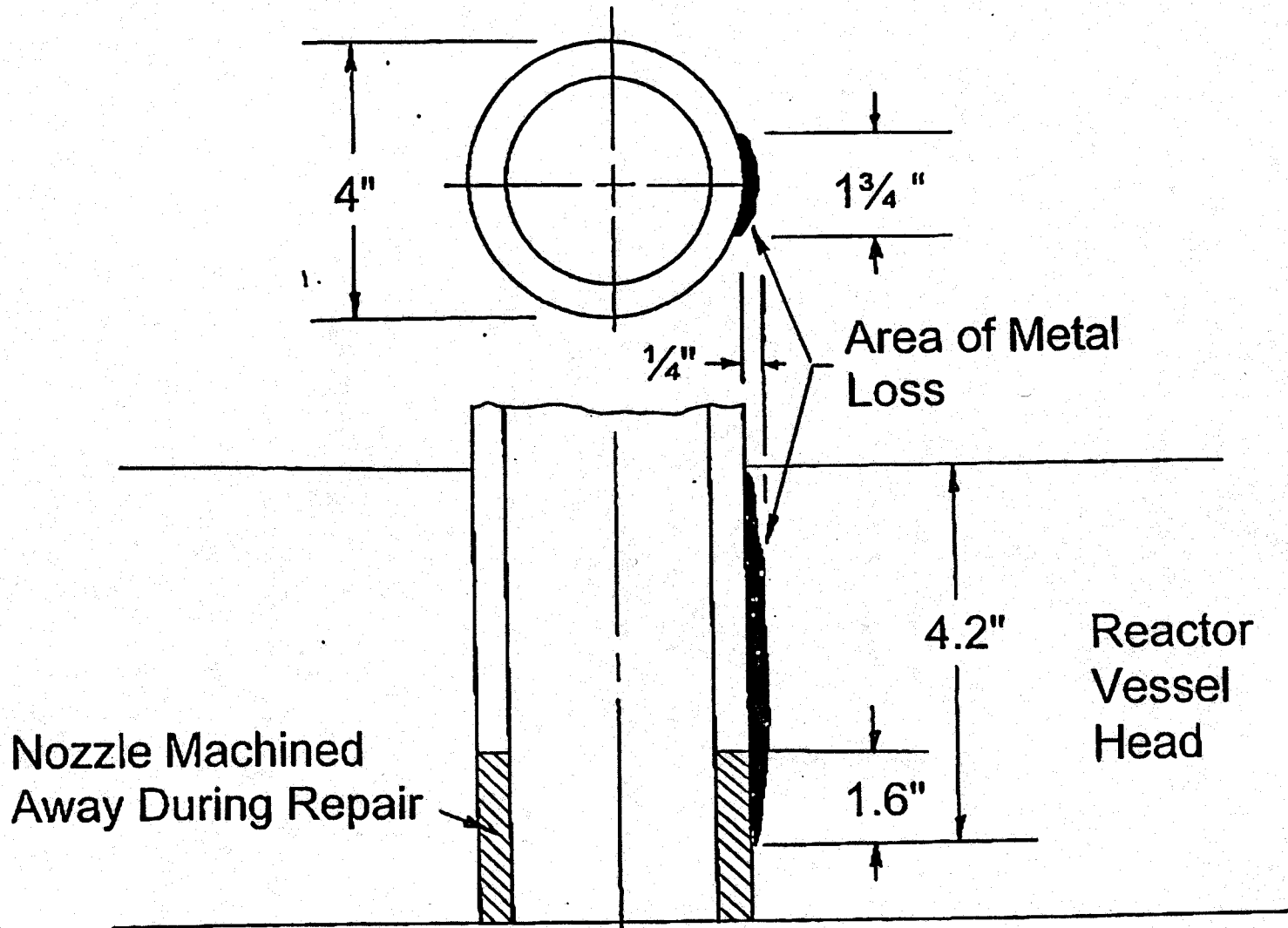
P Metal Loss Near Nozzle #2



Schematic Figure of Typical CRDM Nozzle Penetration



Nozzle 2 Metal Loss



11:35:20 03/08/02

DAVIS BESSE

NOZZLE 3

RFO 13

QUAD B

11:36:06 3/8/02



Missed Opportunities to Identify Corrosion

P Containment Air Cooler Clogging

P Containment Radiation Monitor Filter Clogging

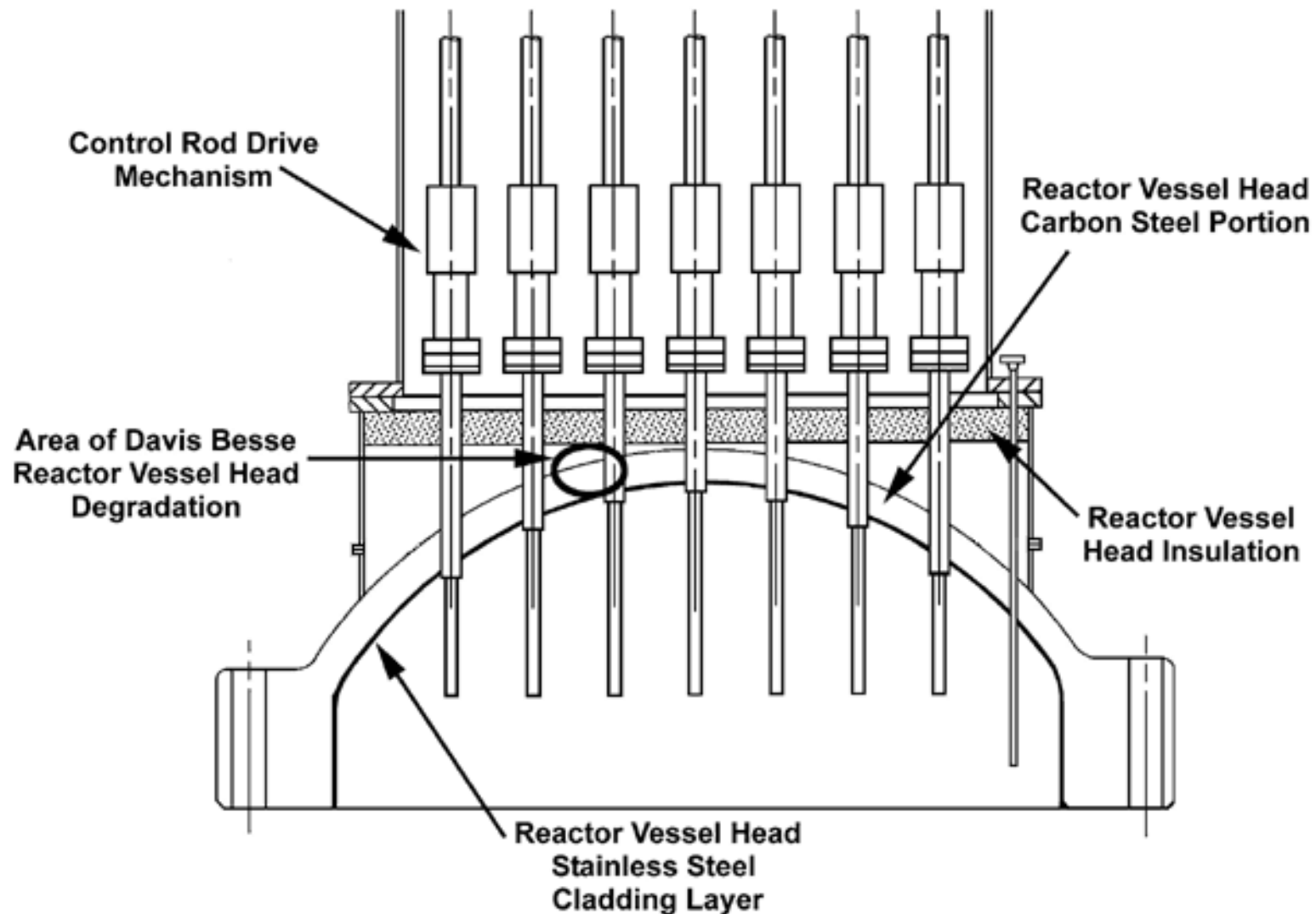
P Boric Acid Buildup and Corrosion on Reactor Head

Containment Air Cooler Clogging

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

NRC Augmented Inspection Team Findings

Reactor Vessel Head Degradation Location



Containment Radiation Monitor Filters

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

Boric Acid Corrosion Control Program

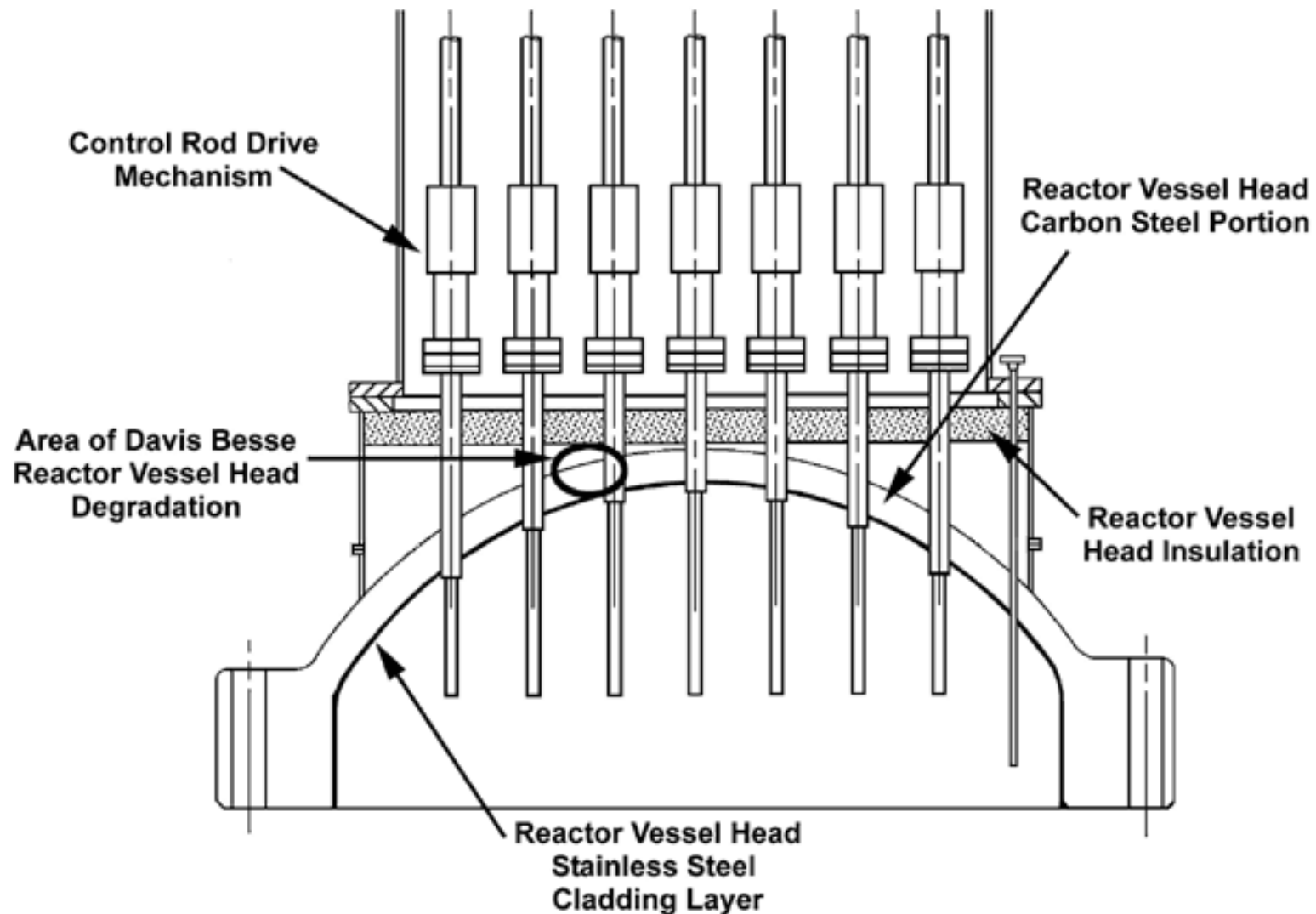
P Required By NRC in 1988

P Sensitive and Reliable Indicator of Reactor
Coolant System Leakage

P One Drop per Second (≈ 0.001 gpm) Will Leave
15 Pounds of Boric Acid in 1 Year

NRC Augmented Inspection Team Findings

Reactor Vessel Head Degradation Location



Boric Acid Program Activities

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



Preliminary Root Cause

P Cavity Caused by Boric Acid Corrosion From Leakage Through Cracks in the Nozzle

P Significant Corrosion Began at Least 4 Years Ago

Root Cause Areas Yet To Be Addressed

P Determination of Corrosion Process (Chemistry)

P Role of Deposits Left on Reactor Head

P Role of Reactor Head Temperature on the Rate of Corrosion

P Rate at Which Cracks and Corrosion Progressed

P Correlation of Davis Besse and Industry Experience

Confirmatory Action Letter

PDetermine the Root Cause

PEvaluate the Reactor Coolant System for Other Corrosion

PNRC Must Approve Any Repair or Modification

PObtain NRC Restart Approval

NRC Further Actions

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

P Summary and Concluding Remarks

P Public Questions and Answers

For Additional Information

P NRC Website: www.nrc.gov

P Headquarters Operator

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