



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-4005

July 31, 2003

James J. Sheppard, President and  
Chief Executive Officer  
STP Nuclear Operating Company  
P.O. Box 289  
Wadsworth, Texas 77483

SUBJECT: SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION, UNIT 1 -  
SUMMARY OF EXIT MEETING FOR SPECIAL INSPECTION OF BOTTOM  
MOUNTED INSTRUMENTATION NOZZLE LEAKAGE IN SOUTH TEXAS  
PROJECT, UNIT 1 (NRC INSPECTION REPORT 05000498/2003008)

Dear Mr. Sheppard:

This refers to the public exit meeting conducted at the Civic Center in Bay City, Texas, on July 28, 2003, between your staff and the NRC. The participants discussed the results of the special inspection conducted between May 5 and July 28, 2003. The final inspection results will be available in NRC Inspection Report 05000498/2003008 within 30 days. Additionally, your staff presented the status of your root cause assessment, repairs made, readiness for restart of Unit 1, and plans for future condition monitoring in both units.

The list of attendees is enclosed with this summary (Enclosure 1). Copies of the NRC presentation slides and your staff's presentation slides are also enclosed (Enclosures 2 and 3).

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Anthony T. Gody, Acting Director  
Division of Reactor Safety

Docket: 50-498;  
License: NPF-76

Enclosures:

1. Attendance List

2. NRC Presentation
3. Licensee Presentation

cc w/enclosures:

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Engineering & Technical Services  
STP Nuclear Operating Company  
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Wadsworth, Texas 77483

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Electric Utility Department  
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Public Utility Commission  
William B. Travis Building  
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Environmental and Natural  
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Boiler Program  
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Susan M. Jablonski  
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Texas Commission on Environmental Quality  
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Electronic distribution by RIV:

Acting Regional Administrator **(TPG)**

DRP Director **(ATH)**

Acting DRS Director **(ATG)**

Senior Resident Inspector **(GLG)**

Branch Chief, DRP/A **(WDJ)**

Senior Project Engineer, DRP/A **(TRF)**

Staff Chief, DRP/TSS **(PHH)**

RITS Coordinator **(NBH)**

Mel Fields **(MBF1)**

STP Site Secretary **(LAR)**

ADAMS: G ☒ **Yes**    G No    Initials: \_\_\_\_\_

G ☒ **Publicly Available**    G Non-Publicly Available    G Sensitive    G ☒ **Non-Sensitive**

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RIV:EMB	SRA/TL	D:DRS		
NFO'Keefe	RLBywater	ATGody		
<b>/RA/</b>	<b>/RA/</b>	<b>/RA/</b>		
07/30/03	07/31/03	07/31/03		

OFFICIAL RECORD COPY

T=Telephone

E=E-mail

F=Fax

ENCLOSURE 1

MEETING ATTENDANCE LIST

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## 1

Name:	Organization:	Name:	Organization:
1. Wayne S. Fra	US NRC	15. Ed Lowmeyer	STPNOC
2. Wayne Harmon	STPNOC	16. David Rebernd	STPNOC
3. Steve Thomas	STPNOC	17. Bill Sunst	City Public Service
4. Chris Anderson	Express-News	18. Larry Blaylock	City Public Service
5. Matt Daily	Reuters	19. K. Lott	McG SFD
6. Peter Strubhar	Framatome ANP	20. David H. Tice	STPNOC
7. Frank Mallen	STPNOC	21. George Meyer	Washington
8. Basel Djaizmat	Framatome ANP	22. GARY MIBUDGA	FRAMATOME-ANP
9. Ron Dorman	Framatome ANP	23. John Conly	STPNOC
10. BOB BRWST	FRAMATOME-ANP	24. LURINDA BARON	STP
11. Rob Smith	Framatome-ANP	25. BOB WATTS	Matagorda County
12. Doug Killian	Framatome-ANP	26. Jerry Grooms	" " ED
13. Robert Cole	FRAMATOME-ANP	27. Mary B. Johnston	Public Safety
14. Harry Murren	STPNOC	28.	

Michael Doshley	STPNOC	Charles Walker	city
James Heil	STPNOC	Dianne Kline	Ra. Panel.
R. WAYNE FRIED	MCSO	Russell Lowell	STPNOC
HARRY SHANNON	Port of Bay City		
ANUP KHOSLA	STPNOC		
W. MCGEE	TRIBUNE		
R. SILVERTHORNE	STPNOC		
M. Baker	The Facts		

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ENCLOSURE 2

NRC PRESENTATION SLIDES

# U.S. NUCLEAR REGULATORY COMMISSION

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Special Inspection Team Exit Meeting

Bottom Mounted Instrumentation Leakage Issue

South Texas Project Unit 1

July 28, 2003

# Agenda

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P Purpose of Meeting and Introductory Remarks

P Introduction of NRC Personnel

P Introduction of STPNOC Personnel

P STPNOC Presentation

P NRC Exit Presentation

P Concluding Remarks

P Public Comment

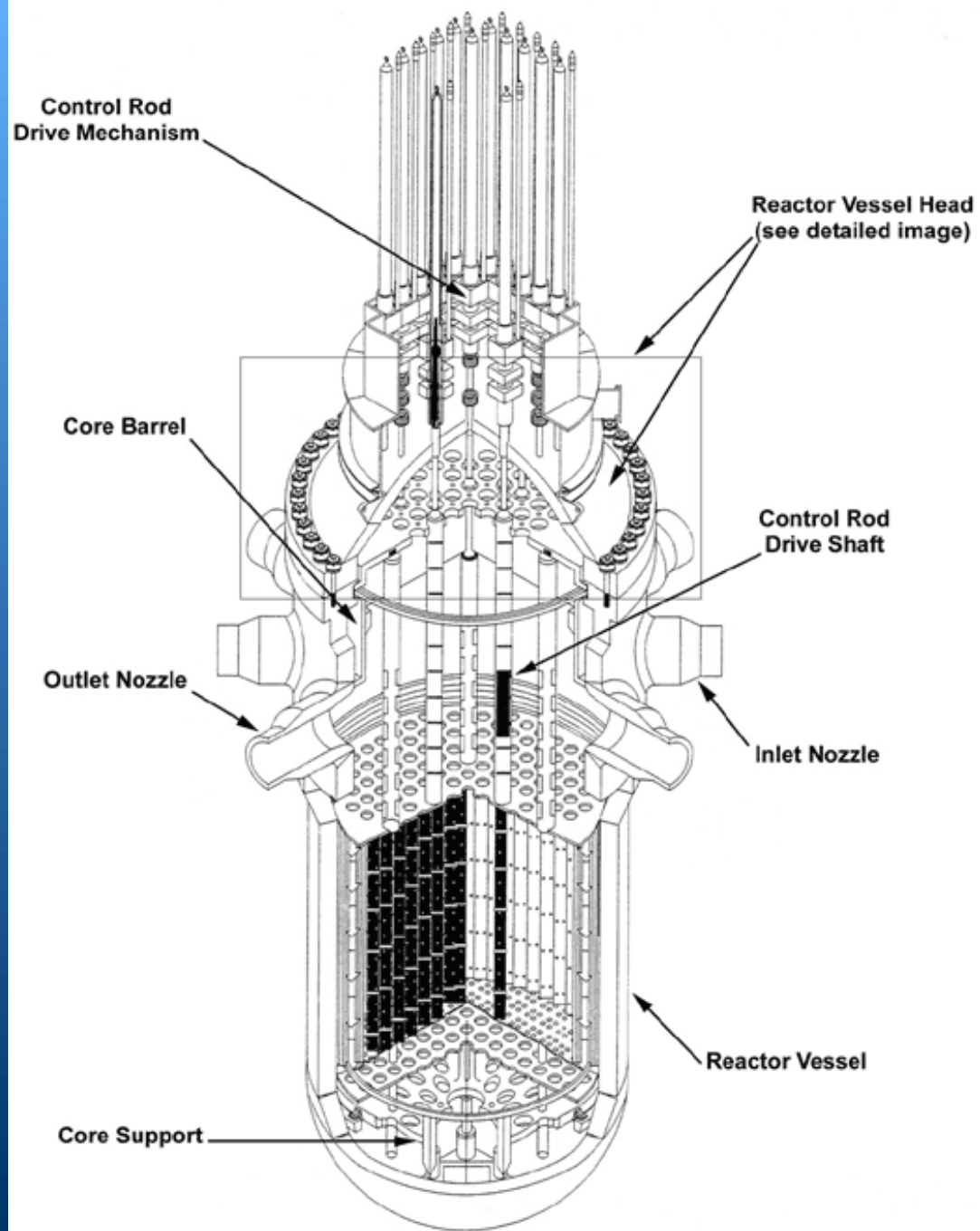
# NRC Special Inspection Team

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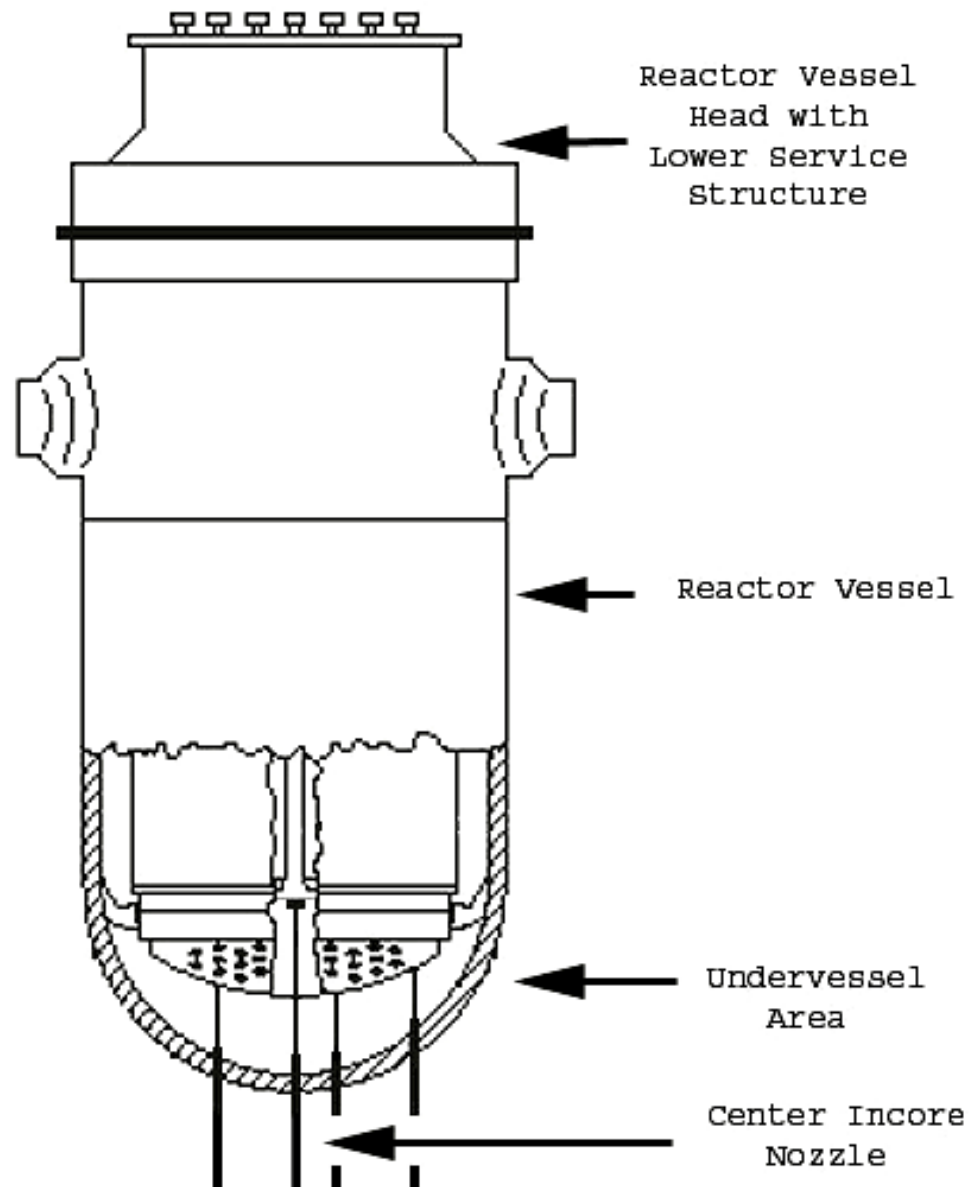
Chartered to Review STP Unit 1 BMI Leakage Issue

- P Russ Bywater, Senior Reactor Analyst, Region IV, Team Leader
- P Neil O'keefe, Senior Reactor Inspector, Region IV
- P Wayne Sifre, Reactor Inspector, Region IV
- P Matthew Mitchell, Senior Materials Engineer, NRR
- P Mike Runyan, Senior Reactor Analyst, Region IV
- P Dr. Steve Doctor, Pacific Northwest National Laboratory

# Typical Pressurized Water Reactor



## Typical Babcock and Wilcox Reactor Vessel



# Description of Issue and Chronology

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- P NRC Generic Letter 88-05
- P NRC Bulletin 2001-01
- P NRC Bulletin 2002-01
- P STP Identification of BMI Leakage

# Adequacy of Corrective Actions

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- P Examination Campaign
- P Development and Implementation of Repairs
- P Examination of Removed Samples
- P Evaluation of Potential Root Causes
- P Implementation of Continued Monitoring Program

# Safety Significance of Issue

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P Regulatory Requirements

P Assumptions Used in Analysis

P Preliminary Significance Determination

# Acceptability of STP-1 Operation

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P Examination Results

P BMI Nozzle Repair

P Continued Monitoring Program

# Concluding Remarks

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P STPNOC Response

P Public Comments

P NRC Concluding Comments

P For More Information:

[WWW.nrc.gov/reactors/operating/ops-experience/bottom-head-penetration-leakage.html](http://WWW.nrc.gov/reactors/operating/ops-experience/bottom-head-penetration-leakage.html)

ENCLOSURE 3

STP PRESENTATION SLIDES

# South Texas Project Unit 1



**Bottom Mounted Instrument Penetration  
Condition Resolution**

7/28/03

# STP Participants

Joe Sheppard

President & CEO

Tom Jordan

VP, Engineering & Tech  
Services

Gary Parkey

VP, Generation

Ed Halpin

Plant General Manager



7/28/03



# STP Used Worldwide Experts



# External Support

Framatome ANP

Westinghouse - PCI

Dominion Engineering

Performance Improvement International

Exponent Failure Analysis Associates

V. C. Summer Nuclear Power Plant

Comanche Peak Steam Electric Station

Arkansas Nuclear One Power Plant

Japanese loanee to Institute of Nuclear Power Operations (INPO)

Electric Power Research Institute (EPRI)

Electricite de France

Tractabel (Belgium)

Harfang Industries

Altran

# Full-Sized Mock-up at STP



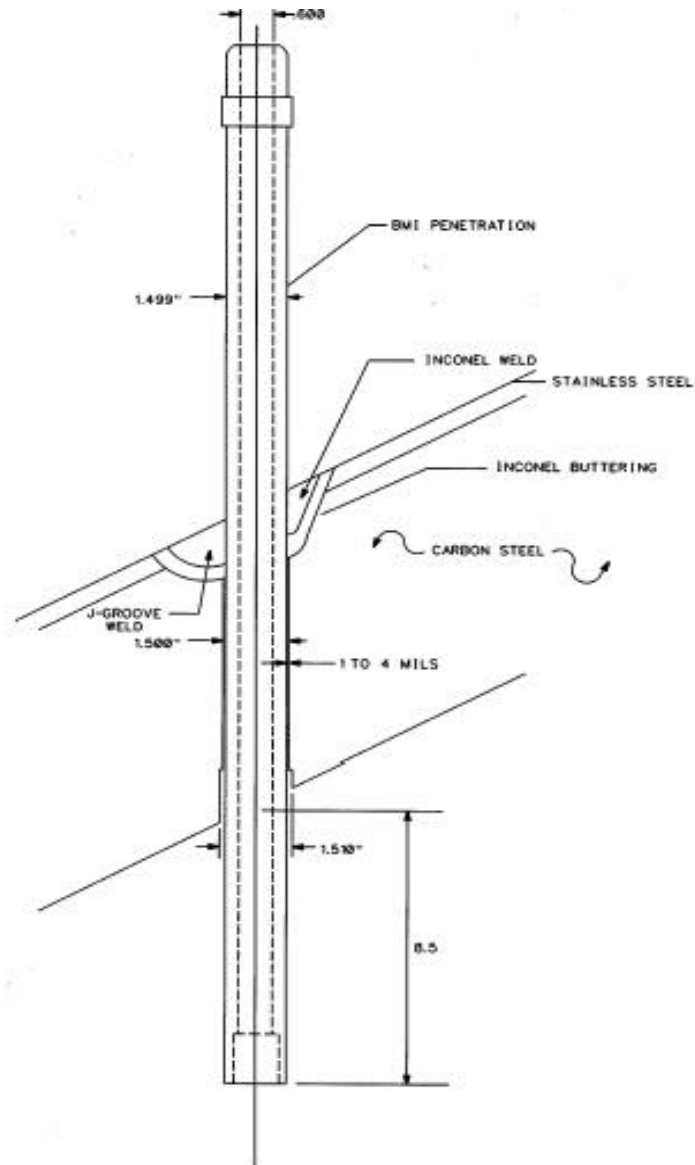
7/28/03



# **EXTENT of CONDITION, CAUSE, CORRECTIVE ACTION**

**Tom Jordan  
Vice President,  
Engineering & Technical Services**

# BMI Guide Tube Penetration



# Our Inspection Process Works

We inspect the exterior of our vessels every time we shutdown for a refueling outage. Previous inspections did not reveal indications of seepage.



# Evidence of Very Small Leakage Found in Routine Inspection



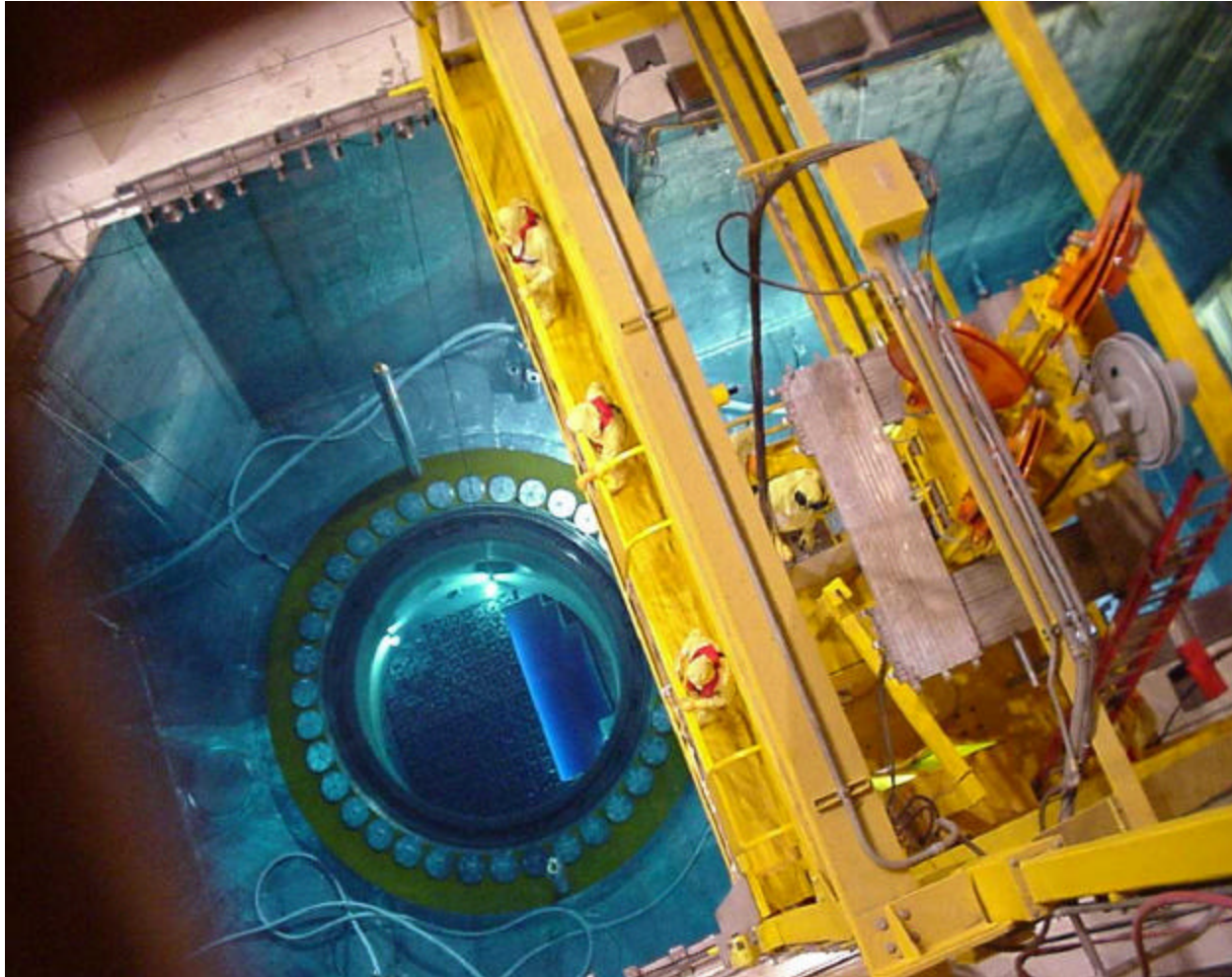
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# Actual Amount of Residue

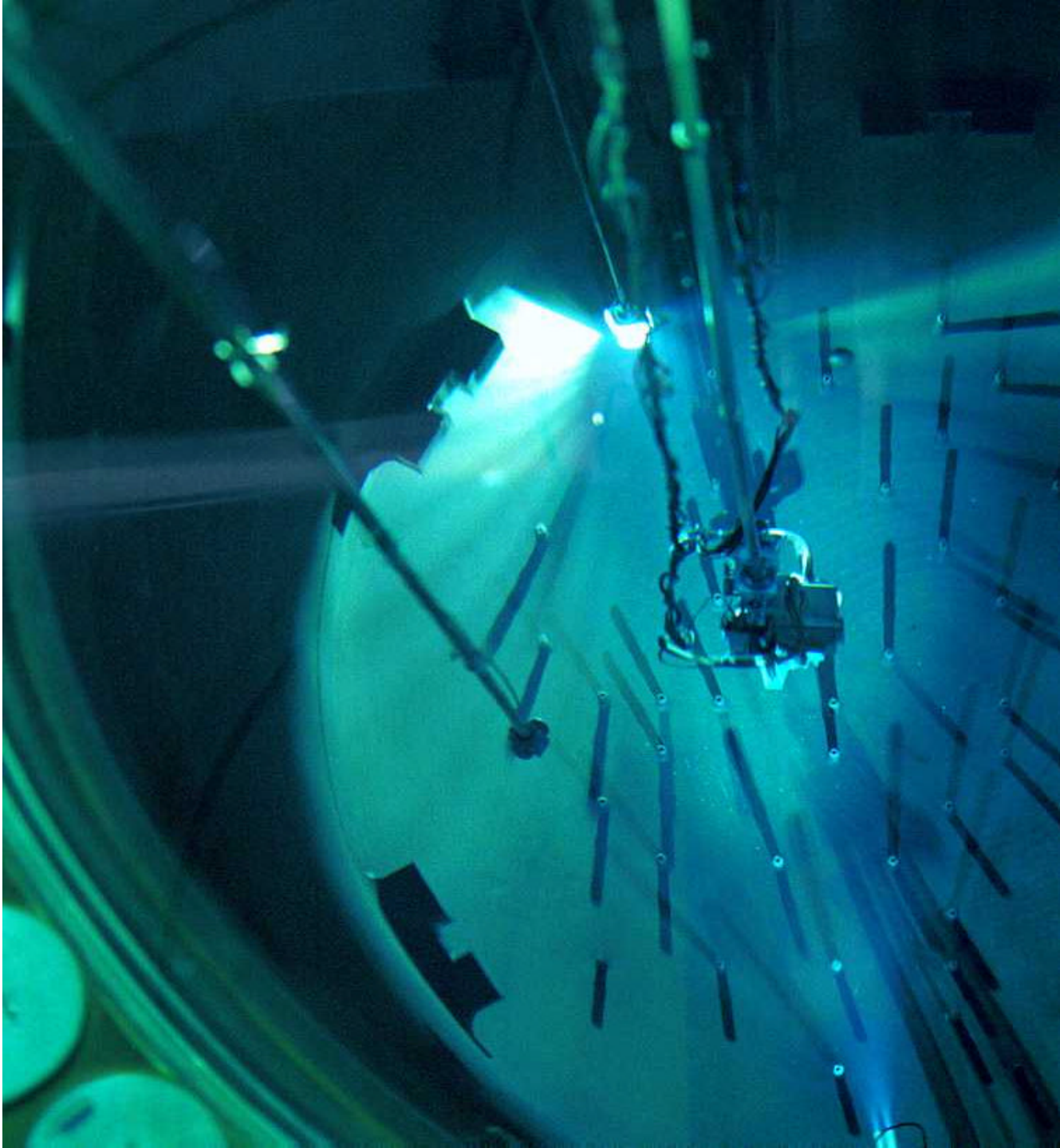


# Looking Down into Reactor Cavity

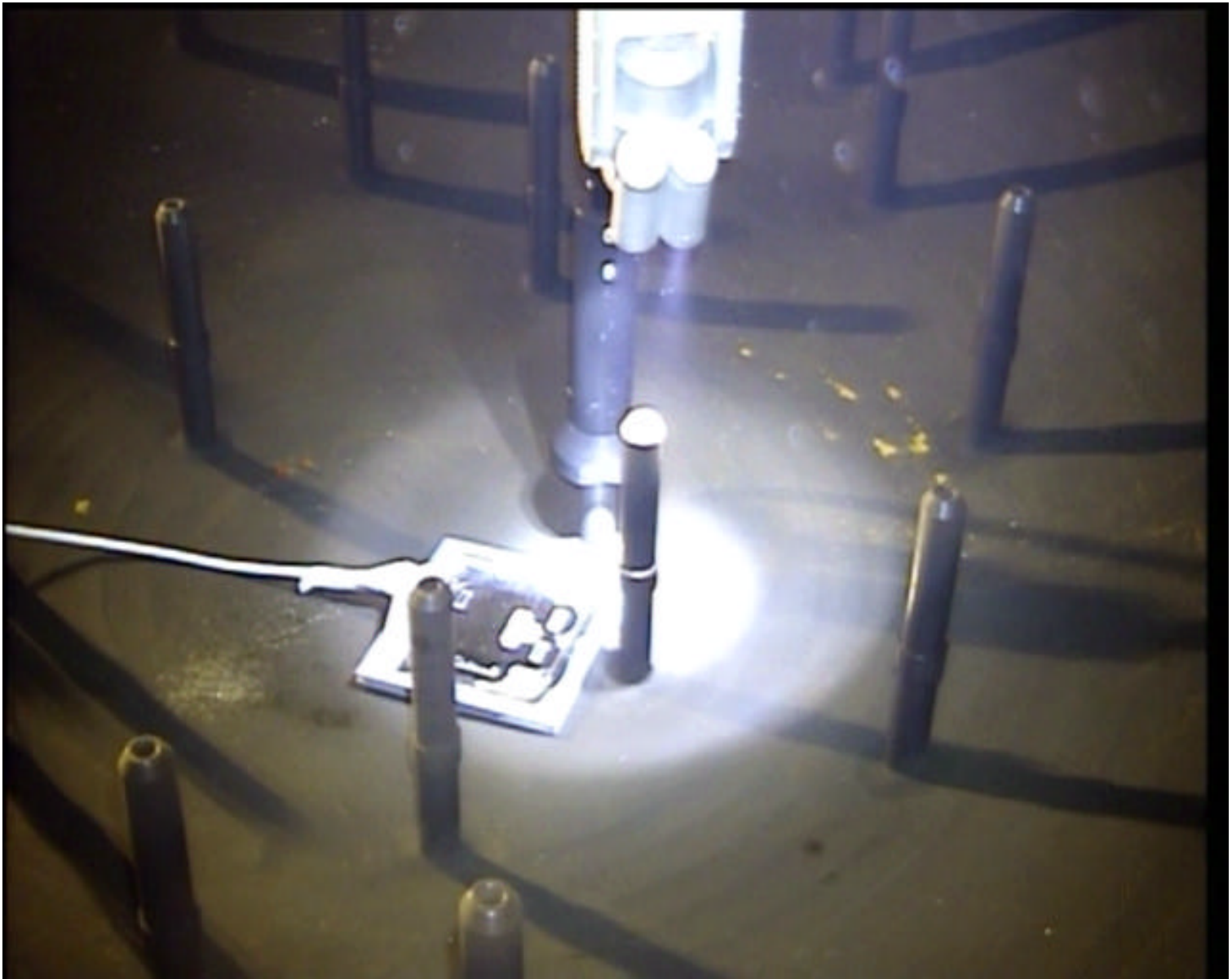


# Extensive NDE Using State-of-the-Art Techniques and the Most Experienced People in the World





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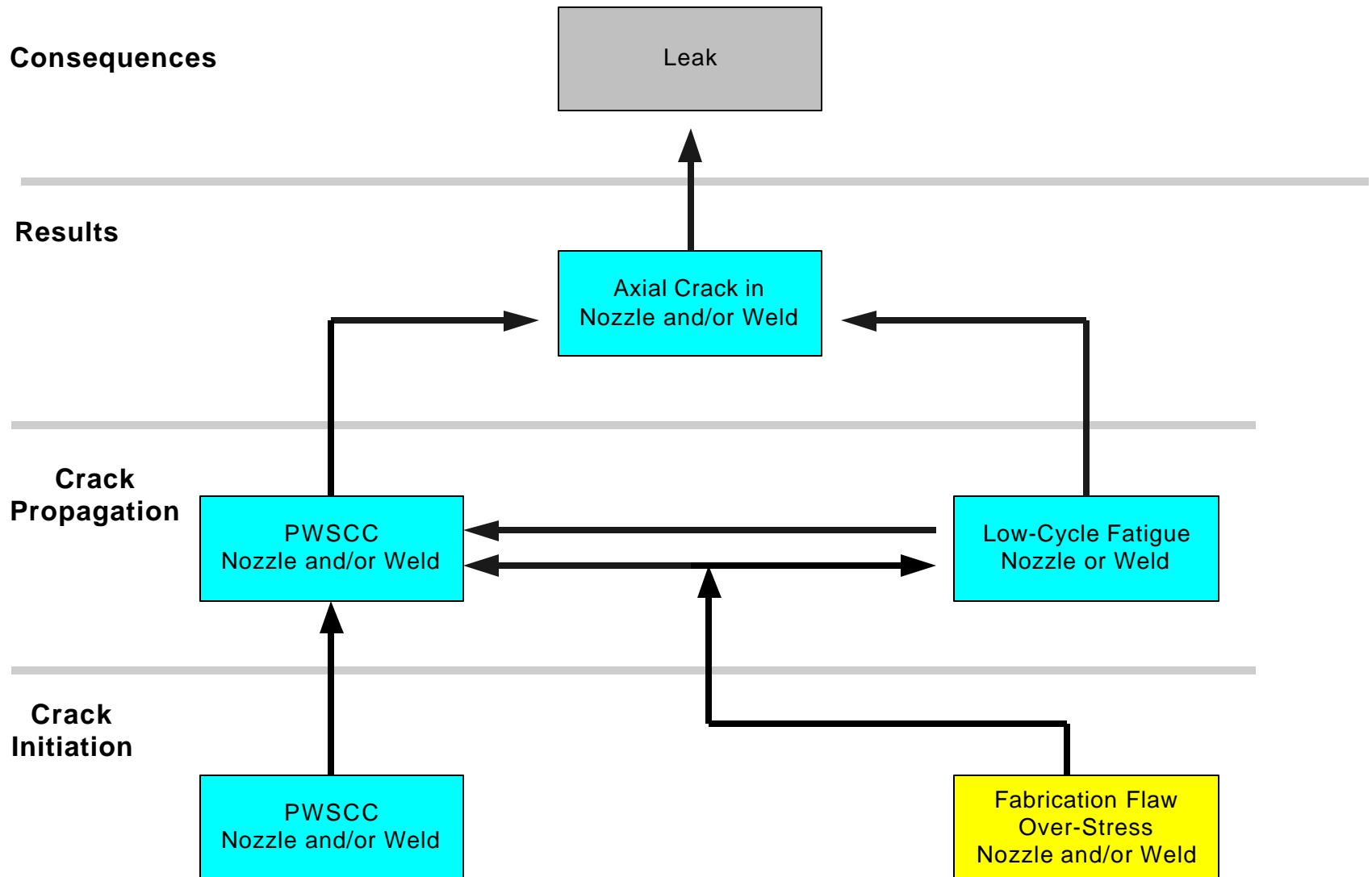
# Examination Scope

- Ultrasonic examination (UT) from penetration tube ID
- Enhanced visual exam of J-groove weld surface
- Volumetrically interrogate vessel base metal for wastage
- Eddy current examination (ET) from penetration tube ID
- ET of J-groove weld surface
- Profilometry [tube inside roundness / ovality]
- Borescope [tube inside visual] examinations
- Helium tests
- Metallurgical analyses of removed nozzle remnants
- Boat sample analyses

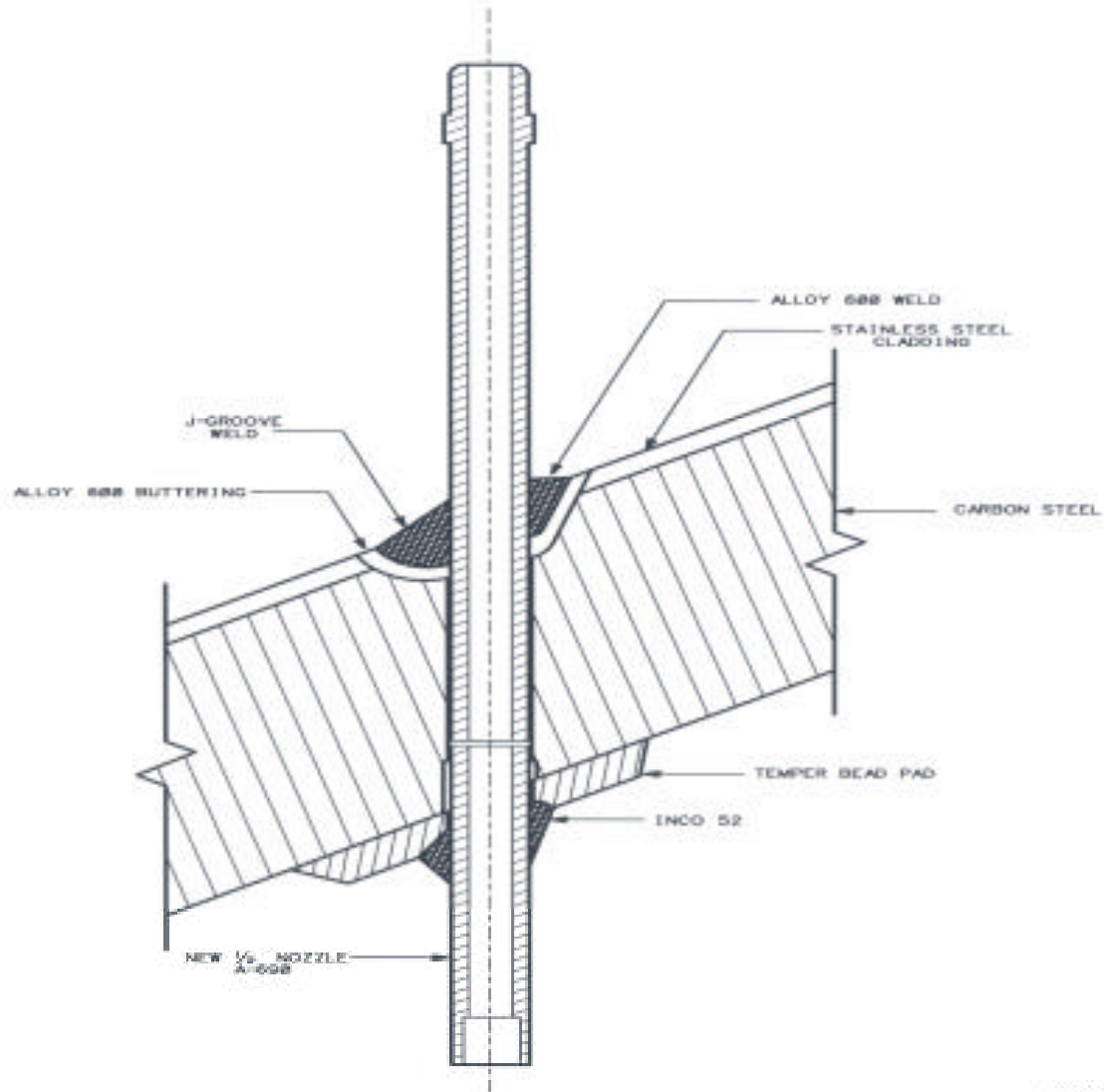
# Examination Results

- Penetration #1
  - Three axial indications, one leak path
- Penetration #46
  - Two axial indications, one leak path

# Investigation Results



# Permanent Half-Nozzle Repair



# Completed Repair



# Condition Limited to the Two Identified Nozzles

- Routine inspection identified very low leakage
- Extensive NDE confirmed condition limited to two penetrations
  - Axial cracks in tubes
  - No wastage
- Substantial safety margin existed
- Repairs are complete
- Monitoring / inspection plan developed

# **MONITORING / INSPECTION PLAN and RETURN to SERVICE**

**Ed Halpin  
Plant General Manager**

# **Monitoring / Inspection Plan Confirms Effective Corrective Action**

- Continue bare metal visual inspections under boric acid control program
- Perform UT and EVT of penetrations at next Unit 1 vessel inservice inspection
- Perform periodic UT of vessel base material around repaired penetrations
- Perform volumetric examination of Unit 2 penetrations at next refueling outage with core barrel removal
- Online monitoring plan developed

# Outage Philosophy

Three-phase outage approach for long-term focus on nuclear safety and reliability

- Phase One: Discovery
- Phase Two: Repair
- Phase Three: Return to Service

# Return to Service

- Plant readiness
  - Comprehensive communications plan
  - PORC reviewed selected activities
  - Just-in-time training for plant operators
  - Weekly plant walkdowns with key station management to assess readiness
  - Increase in staff and manning onshift
  - Specific readiness reviews including
    - Integrated schedule review
    - Refuel project readiness review
    - Secondary plant startup review

# Return to Service (cont'd)

