Bottom Mounted Instrument

Penetration Tube Condition Update

STP Participants

Tom Jordan	VP, Engineering & Tech Services
Mark McBurnett	Manager, Quality & Licensing
Steve Thomas	Manager, Plant Design
Rick Gangluff	Manager, Chemistry
Michael Lashley	Test Engineering Supervisor
Bill Humble	NSSS Supervisor
Ron Baker	Materials Specialist
Wayne Harrison	Licensing Engineer
Ulhas Patil	Design Engineer
Steve Hunt	Dominion Engineering
John Broussard	Dominion Engineering
Chong Chiu	Performance Improvement Intnl.

INTRODUCTORY REMARKS

Mark McBurnett

Manager, Quality & Licensing

Agenda

Introductory Remarks	Mark McBurnett
Progress Summary	Tom Jordan
NDE Activities	Michael Lashley
Cause Analysis and Status	Steve Thomas
Repair Plan	Steve Thomas
Corrosion Assessment	Rick Gangluff
Concluding Remarks	Mark McBurnett

Desired Meeting Outcomes

- NDE results and cause analysis are understood
- Future NDE and testing is understood
- Supporting analyses and schedule are understood
- Documents provided for submittal and inspection are understood
- Future NRC / STP meetings are identified
- NRC questions and needs are clearly understood

PROGRESS SUMMARY

Tom Jordan
Vice President,
Engineering & Technical Services

Summary

Found residue on two BMI penetrations on April 12

~150 mg of residue on Penetration #1

~ 3 mg of residue on Penetration #46


04/12/2003

Penetration #1

Penetration #46

Efforts to Date

- Completed inside vessel NDE
- Selected vendor; commenced design and preparations for half-nozzle repair
- Established cause investigation team using EPRI MRP FMEA technique
- Continuing with activities under the vessel

Overview of NDE Results

- UT and ECT revealed small axial cracks in #1 and #46, which confirmed leakage path
- No cracks found in other penetration tubes
- No surface breaking indication in any J-groove weld

Planned Activities

- Additional inspection
- Design and repair activities
- Sample removal and analysis
- NRC review
- Cause analysis

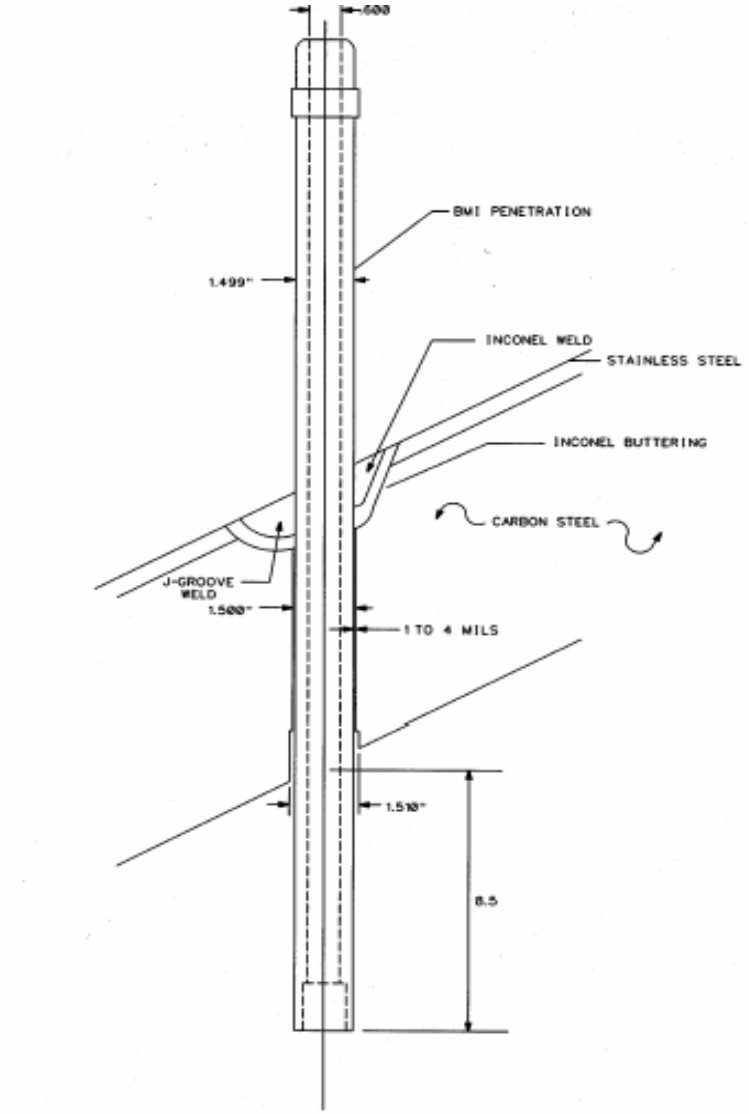
Key Points

- Careful, deliberate process
- NDE campaign successful
- Condition / repair scope known
- Repairs enable safe return to operation
- Close cooperation with industry and NRC on cause analysis

NDE ACTIVITIES

Michael Lashley
Test Engineering Supervisor

BMI Guide Tube Penetration

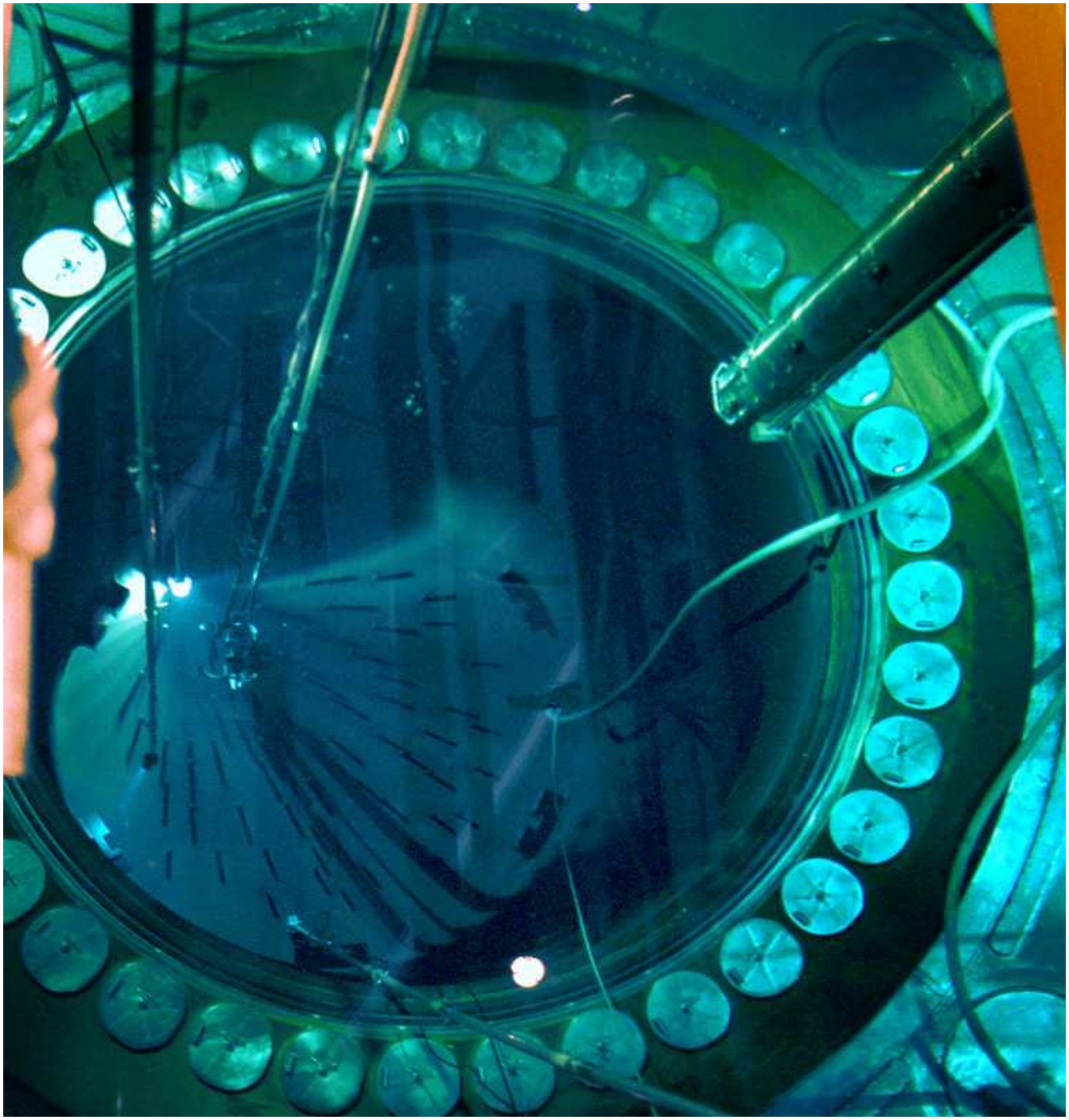


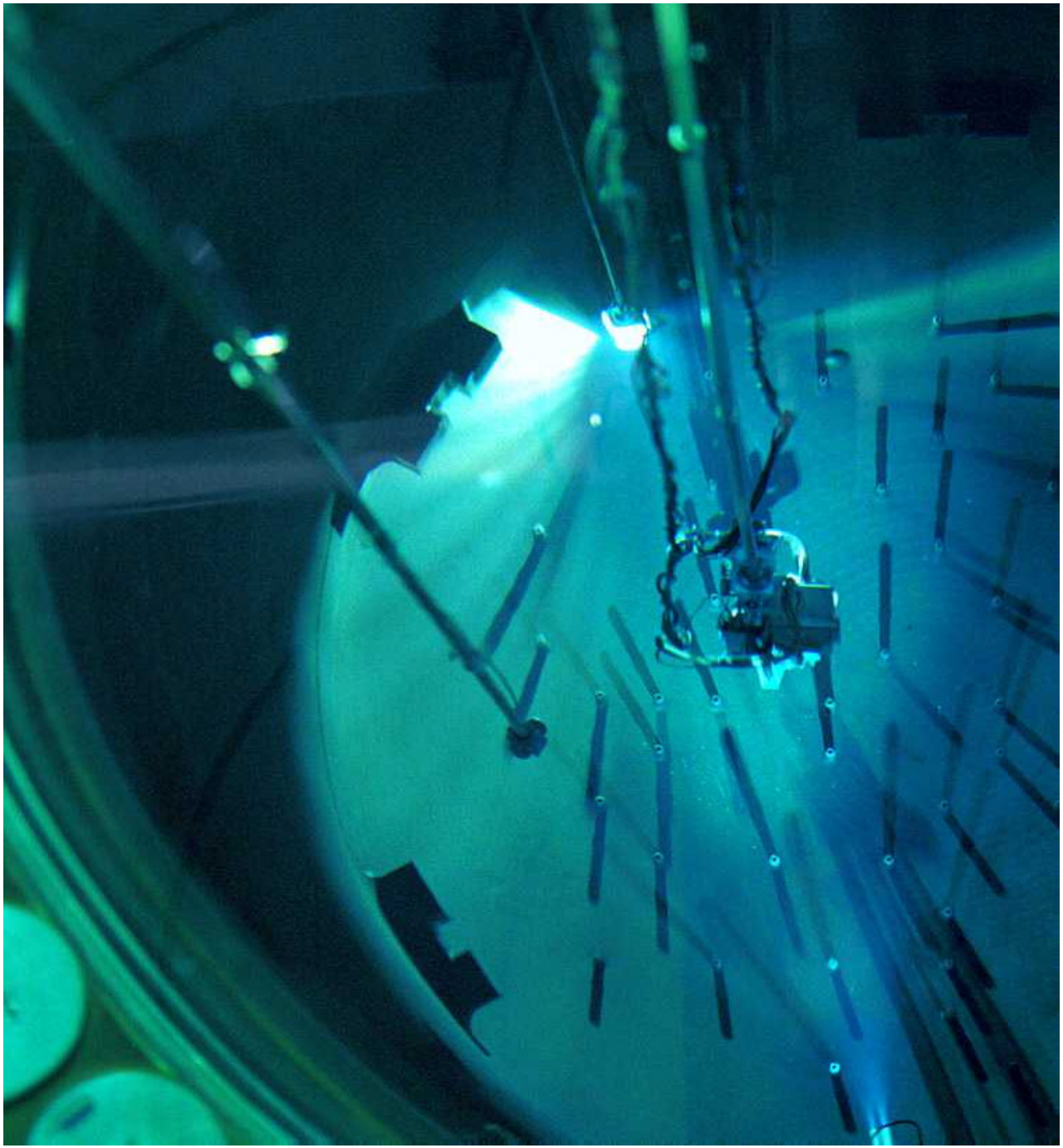
Base Inspections Scope

- Penetration 1 & 46
  - UT from penetration tube ID
  - Enhanced visual exam of J-groove weld surface
  - Volumetrically interrogate vessel base metal for wastage
- Remaining penetrations
  - UT from the penetration tube ID
  - Enhanced visual exam of J-groove weld surface

STP BMI Approach follows EPRI MRP CRDM Approach

- Define NDE objectives
  - Identify relevant flaw mechanisms
  - Define inspection locations and volumes
  - Define range of flaws to address
- Mockup design and procurement
- Demonstration protocol and schedule
  - Non-blind / blind
  - Detection / sizing / location
  - False calls





Confirmatory Inspection Scope

- Penetration 1 & 46
  - ET from penetration tube ID
  - ET of J-groove weld surface
- Remaining penetrations
  - ET from the penetration tube ID of two other penetrations (2 & 6)
  - ET of J-groove weld surface of six other penetrations (9, 12, 33, 34, 38 & 41)

Activities April 21 – May 26

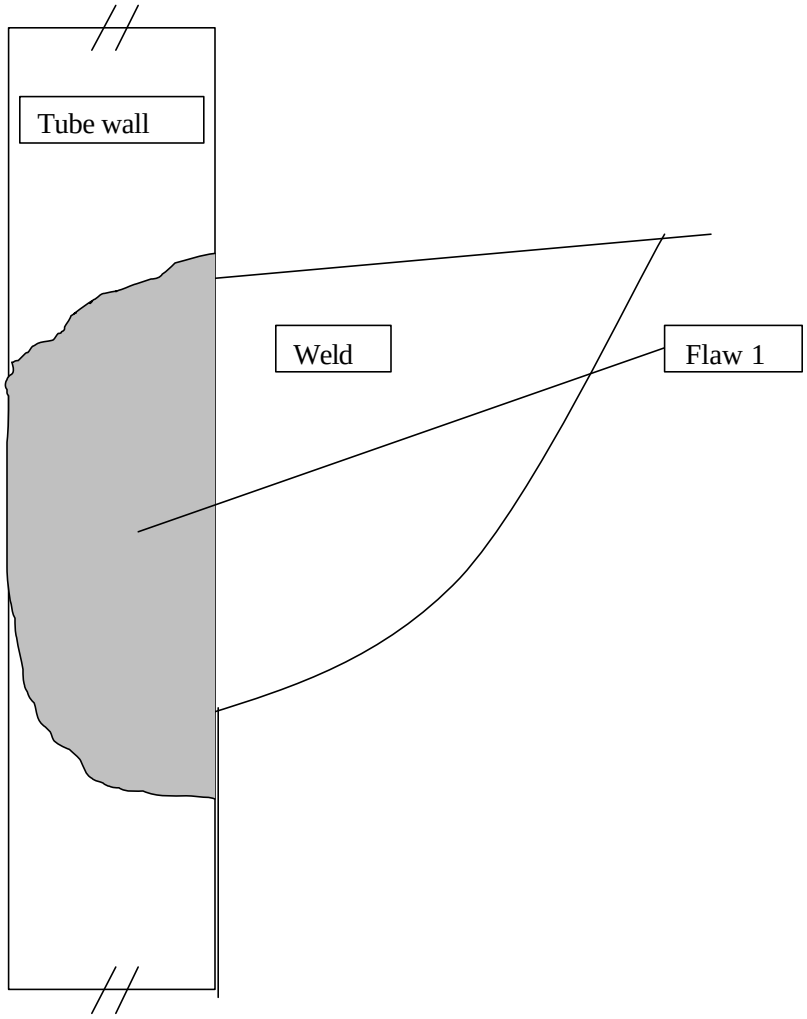
- Mockup fabrication (CIP samples & full scale mockup)
- NRC presentation
- Demonstration / vendor selection
- Demonstration / equipment checkout
- Base scope inspections
- Confirmatory Inspections

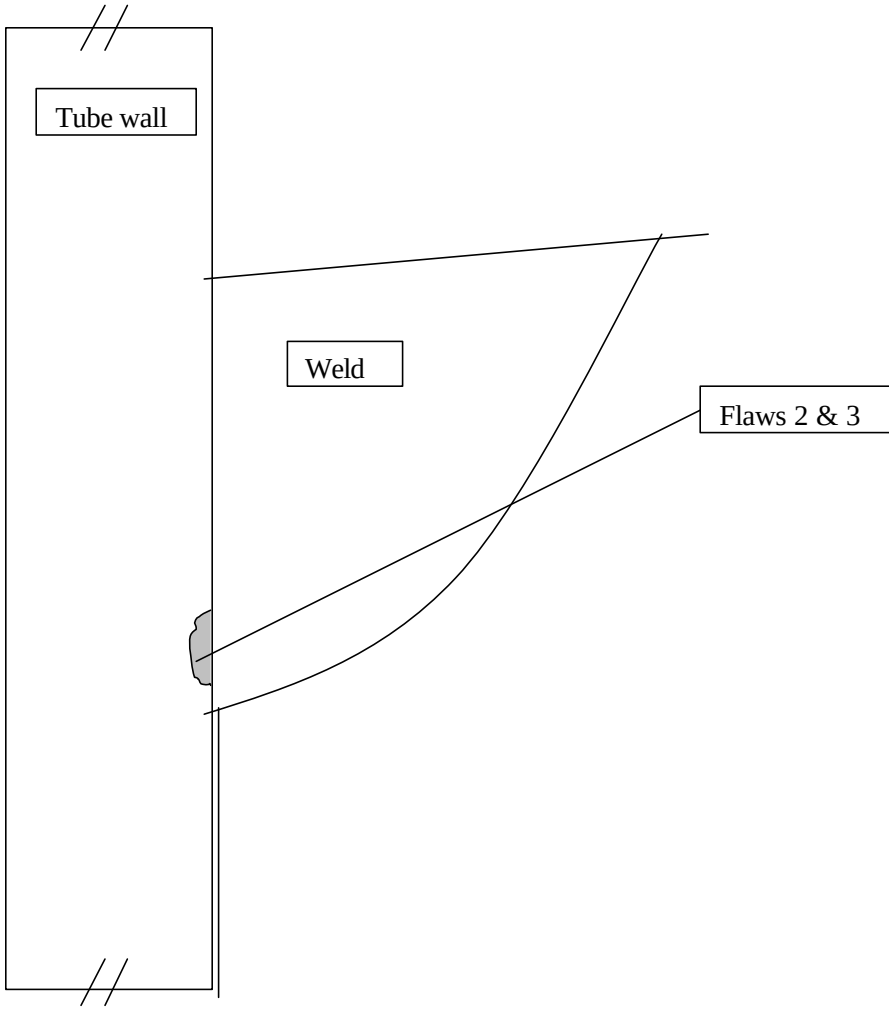
Demonstrations, base scope inspections, and confirmatory inspections were witnessed by NRC Inspection Team

Summary of Results

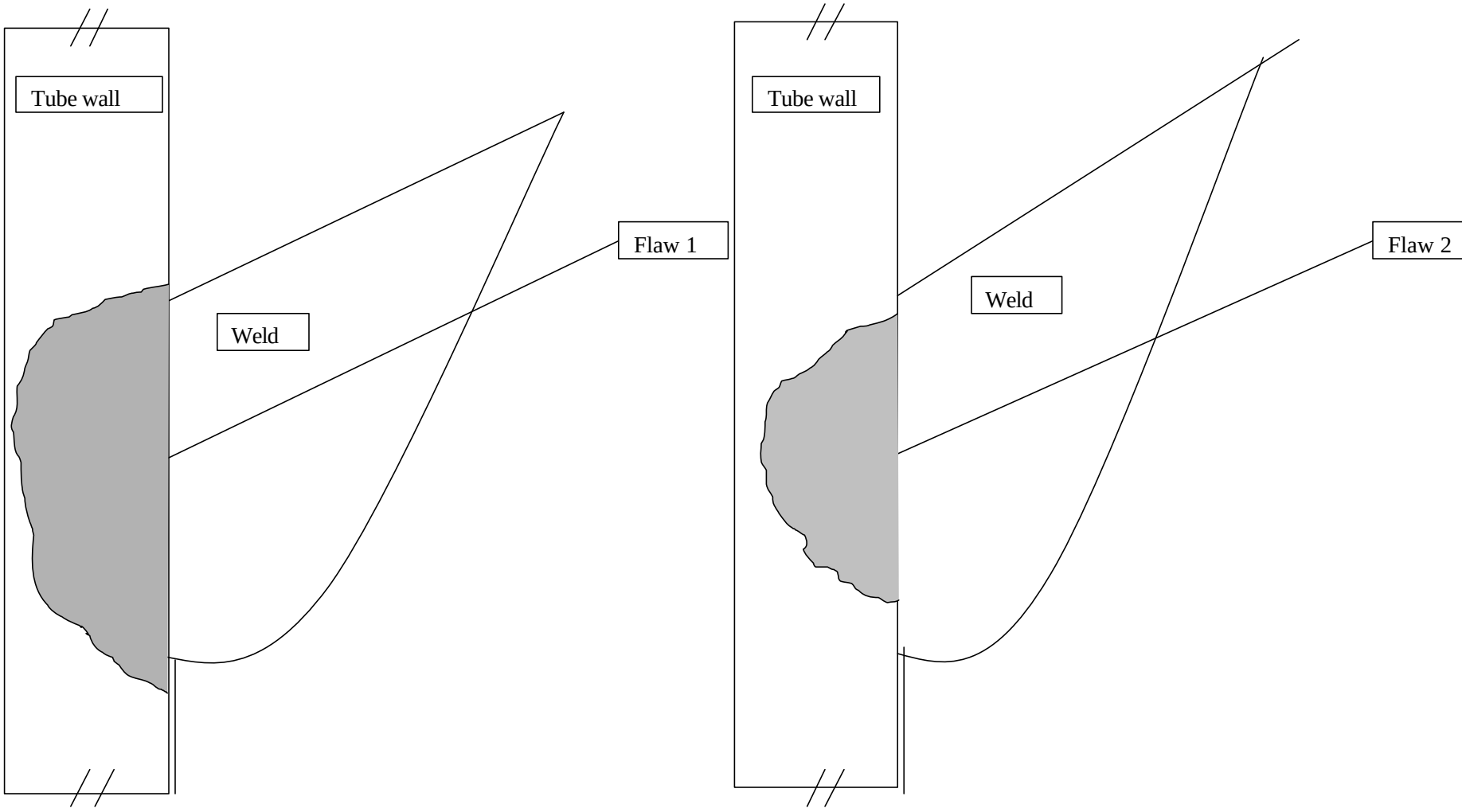
- Penetration #1
  - Three axial indications, one leak path
  - No crack-like indications on J-Groove weld
  - Visual grinding marks in side of tube
- Penetration #46
  - Two axial indications, one leak path
  - No crack-like indications on J-Groove weld

Penetration #1





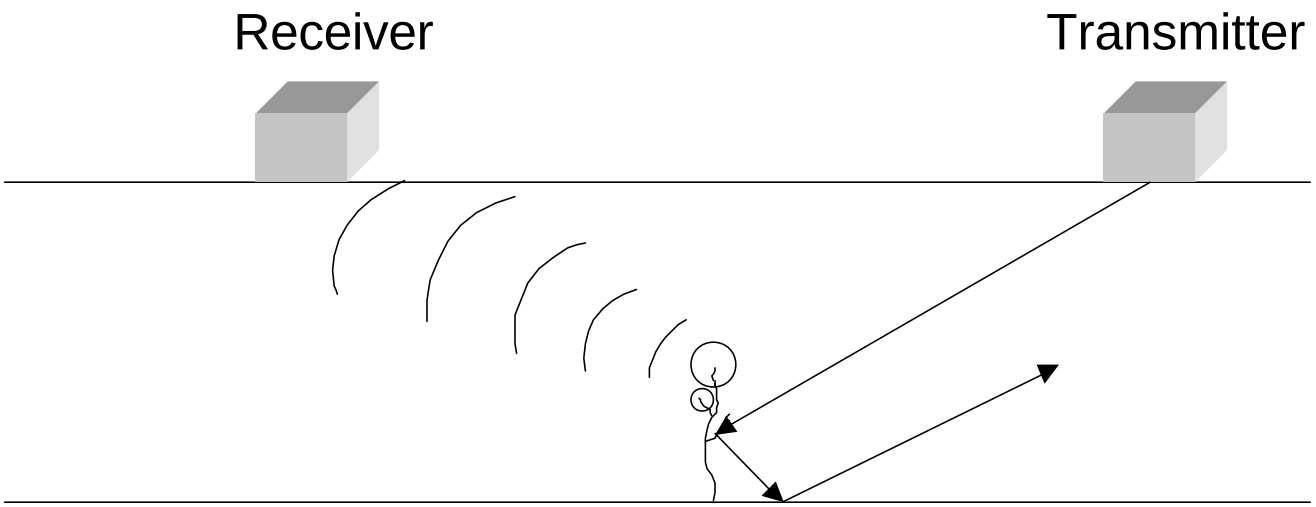
Penetration #46



UT Examination Probes

- Circumferential probe
- Axial probe
- 0-degree mapping

Time of Flight Diffracted (TOFD)



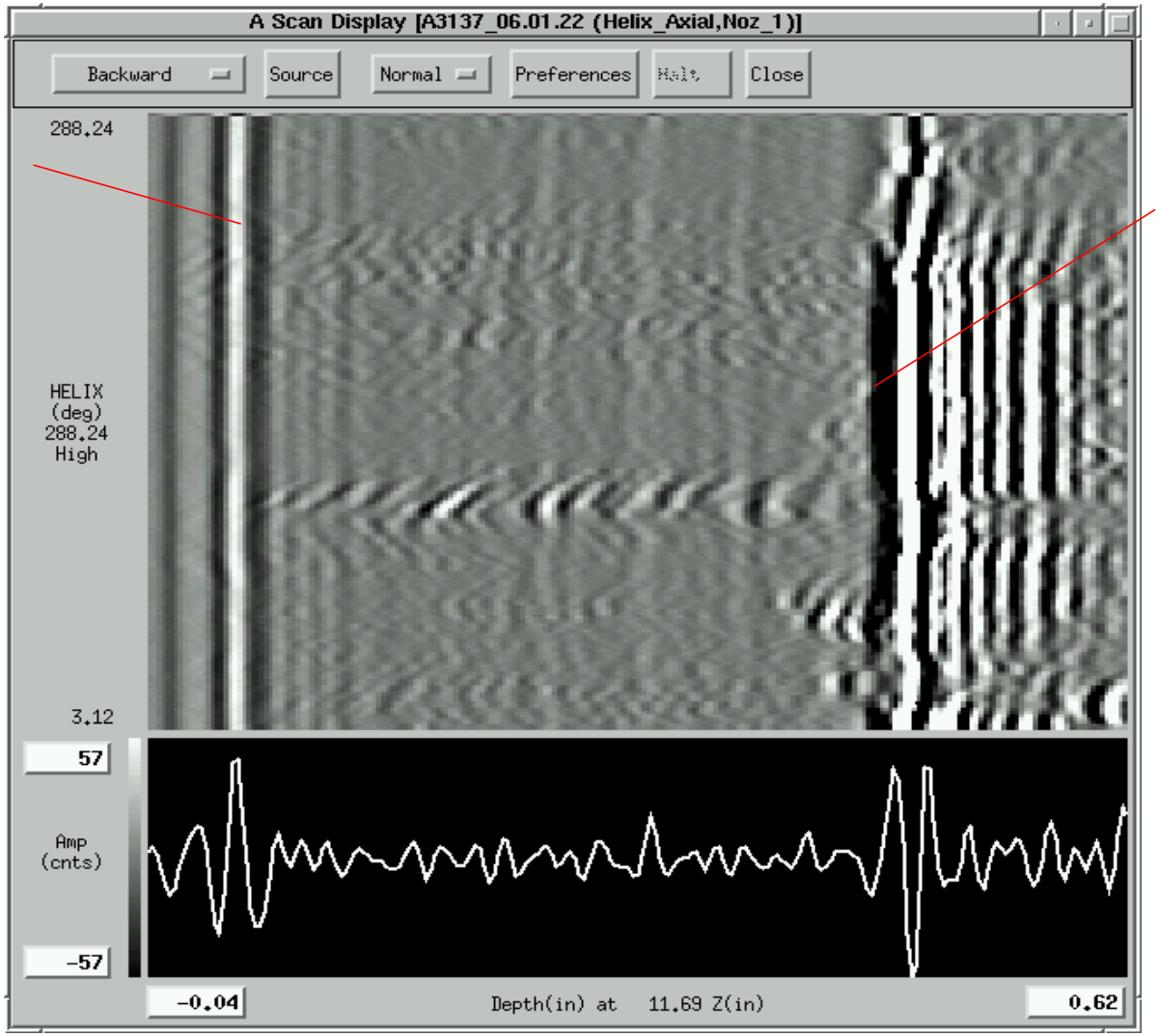
Low-amplitude, secondary wave generated by excitation of flaw

TOFD

Samp001.exe

Penetration #1 Axial Probe

Tube ID



Tube OD