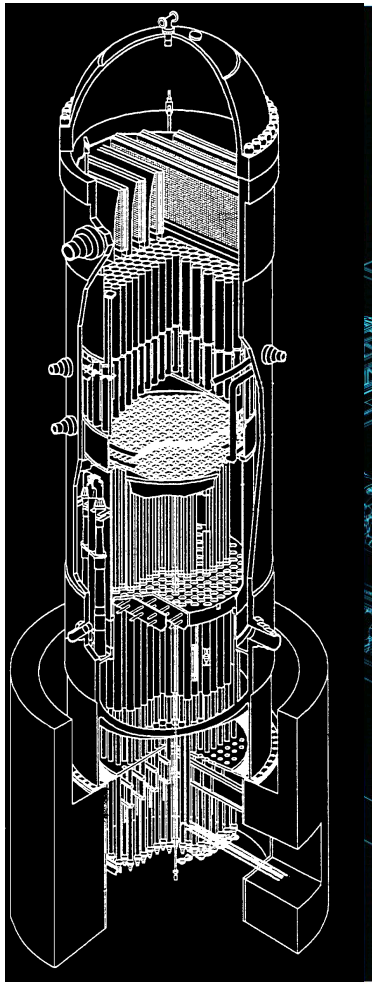
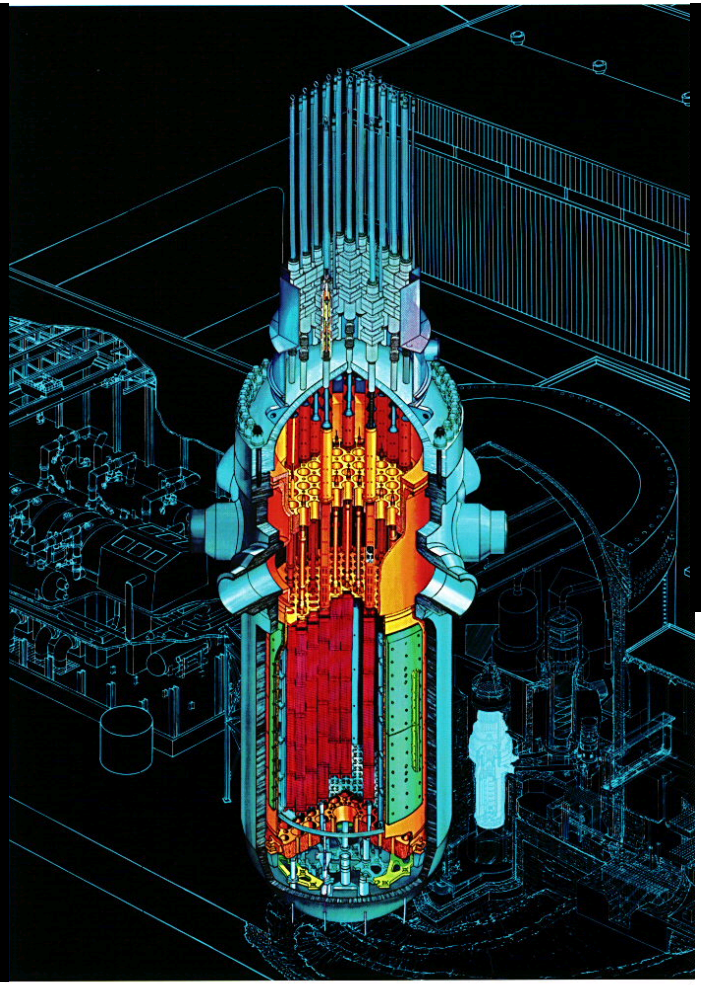
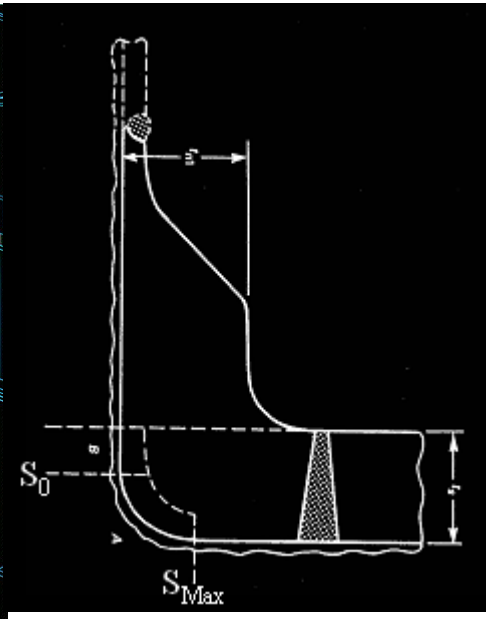
PDI - Reactor Pressure Vessel Project







PDI/NRC Meeting

Feb. 4-5, 2004

Mike Gothard

RPV Qualification Status

Schedule for 2004

January PWR/AUTO Phased Array BWR/Man	February PWR AUTO Phased Array	March	April PWR/AUTO
May PWR/AUTO BWR/MAN/INR	June PWR/AUTO	July PWR/AUTO	August
September	October	November	December

Other Stuff We Need To Think About

What is the status of RPV qualification

Nozzle Qualification Summary – Dec. 31, 2003						
Scan surface	**Scan Direction**	**Applicable Code, Rule, or PDI Requirement**				
Man – O.D.– 7.64"		**Supplement 4**	**Supplement 5**	**CC N-552**	**Supplement 6**	**Supplement 7**
Clad to BM Interface And Inner 15%	Radial	Vendors/Gen.	N/A	N/A	N/A	N/A
	Circumferential	Vendors	N/A	Vendors	N/A	N/A
Outer 85%	Radial	N/A	N/A	N/A	Vend/Gen SSA	N/A
	Circumferential	N/A	N/A	N/A	Vendors/Gen.	N/A
Inside Corner Region	Circumferential	N/A	N/A	Vendors	N/A	N/A
Auto I.D. – 11"		**Supplement 4**	**Supplement 5**	**CC N-552**	**Supplement 6**	**Supplement 7**
Clad to BM Interface And Inner 15%	Radial	Vendors	N/A	N/A	N/A	Vendors
	Circumferential	Vendors	N/A	N/A	N/A	N/A
Outer 85%	Radial	N/A	N/A	N/A	Vendors SSA	Vendors
	Circumferential	N/A	N/A	N/A	Vendors	N/A
Inside Corner Region	Circumferential	N/A	Vendors	N/A	N/A	N/A

Note, one vendor qualified for manual from OD on 11" t samples for detection and sizing with S

Development and Code work 2003/4

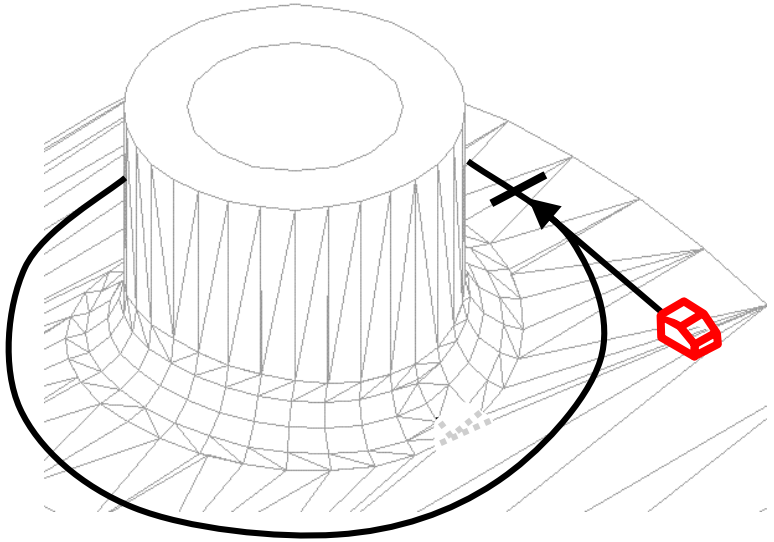
Development and Code work 2003/4

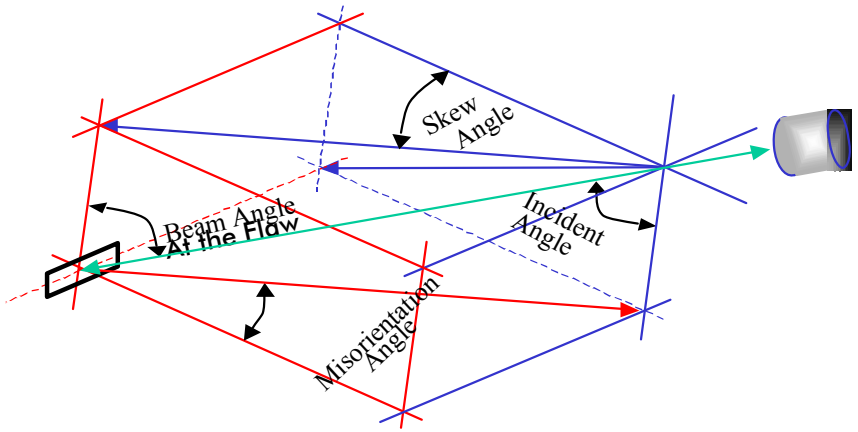
- **PDI Development**
  - Revision to Supplement 11
    - Incorporate RFR, Rev. 2
  - Revision to Appendix I
    - Remove off-axis flaw requirement
      - *Code includes Supplement 4 Single Side Access*
      - *Rule does not*
      - *Procedures qualified for SSA readily detect off-axis flaws*
      - *Requirements are redundant*
      - *SSA is more stringent than off-axis*
      - *Off-axis should be eliminated*
    - Appendix VIII optional

Development and Code work 2003/4

PDI Development

- Revision to Supplement 5
  - Incorporate CC N-552
  - App. To OD exams

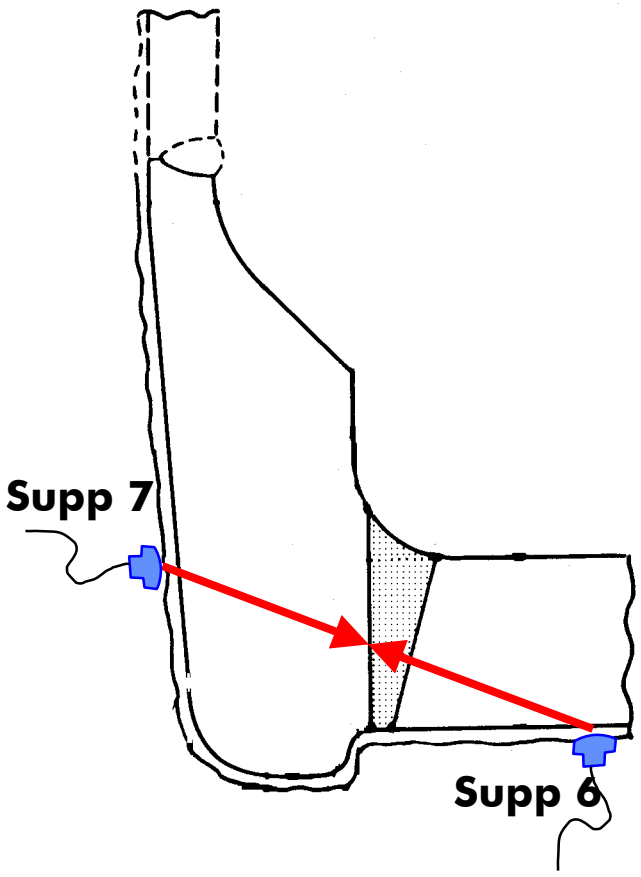




Development and Code work 2003/4

PDI Development

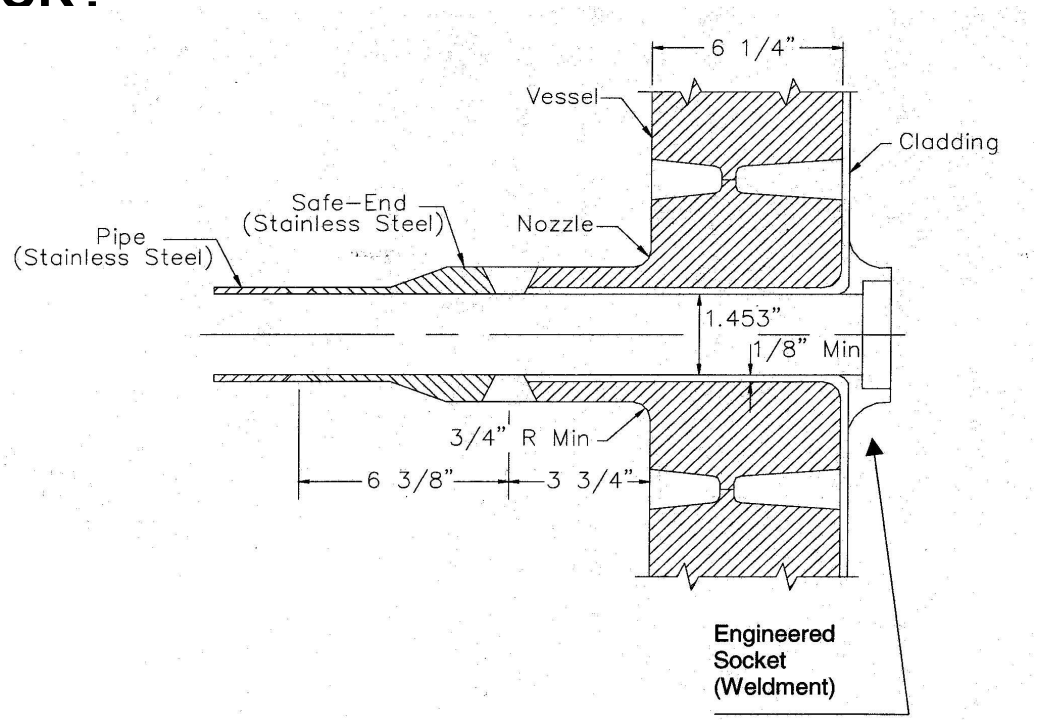
- Revision to Supplement 7
  - Procedure Qual. Only
  - App. To ID exams from Bore



Development and Code work 2003/4

PDI Development

- Inquiry on BWR Nozzle Design?
  - Does it have an ICR?
  - If so where?



Development and Code work 2003/4

- …conflicts exist between the modifications in §50.55a(b)(2)(xv), and the provisions in Appendix VIII and its Supplements and Article I–3000 in the 2002 and 2003 Addenda of Section XI of the ASME BPV Code. Therefore, Appendix VIII and its supplements can not be implemented in accordance with §50.55a(b)(2)(xv) when using the 2002 and 2003 Addenda.
  - No known conflict with Appendix VIII and its Supplements
  - Article I-3000
    - Single side access Supplement 4
    - Circumferential Supplement 6 exams of nozzle-to-vessel welds

Development and Code work 2003/4

A02

ARTICLE I-3000
EXAMINATION COVERAGE

I-3100 EXAMINATION

Components identified in I-2110(a), I-2220, and I-2300 shall be examined as follows.

I-3200 PIPING

(a) The required piping examination volume shall be examined in two axial directions. When examination in the circumferential direction is required, the circumferential examination shall be performed in two directions.

(b) When examination of ferritic welds from both sides is not possible, procedures and personnel qualified for single-side examination in accordance with Appendix VIII, Supplement 3 shall be used to examine the required volume. When examination of austenitic welds from both sides is not possible, procedures and personnel qualified for single-side examination in accordance with Appendix VIII, Supplement 2, with all flaws on the opposite side of the weld, shall be used to examine the required volume.

I-3300 REACTOR PRESSURE VESSEL SHELL WELDS

(a) The clad-to-base-metal interface and the adjacent volume to a depth of at least 15% of the vessel thickness, *T*, shall be examined from four directions, using procedures and personnel qualified in accordance with Appendix VIII, Supplements 4 and 6. The vessel thickness, *T*, shall be measured from the clad-to-base-metal interface. The examination shall include scans parallel and perpendicular to the weld.

(b) If access is not available, the required examination volume shall be scanned to the extent and in the directions allowed by the physical restrictions. The limitations shall be documented in the record of examination. Examination coverage of the inner 15% *T* is acceptable provided

(1) the required volume is examined in one direction parallel and one direction perpendicular to the weld;

(2) the procedure and personnel are qualified for single-side access in accordance with the requirements of Appendix VIII, Supplement 4, 2.3, and Appendix VIII, Supplement 6, 2.3; and

(3) the initial examination shall be performed using a procedure qualified to detect flaws with a tilt angle of 45 deg relative to the weld centerline. Subsequent examinations may be performed using procedures qualified for a tilt angle of at least 10 deg.

(c) The remaining 85% of the vessel thickness shall be examined in four directions using procedures and personnel qualified in accordance with Appendix VIII, Supplement 6. The examination shall include scans parallel and perpendicular to the weld.

(d) As an alternative to (c), the outer 85% of the vessel thickness may be examined in one direction parallel and one direction perpendicular to the weld, using procedures and personnel qualified for single-side access in accordance with the requirements of Appendix VIII, Supplement 6, 2.3.

I-3400 REACTOR PRESSURE VESSEL NOZZLE-TO-SHELL WELDS

I-3410 EXAMINATIONS CONDUCTED FROM THE INSIDE

(a) The clad-to-base-metal interface and the adjacent examination volume to a depth of at least 15% *T* (measured from the clad-to-base-metal interface) shall be examined from four orthogonal directions, using procedures and personnel qualified in accordance with Appendix VIII, Supplements 4 and 6.

(b) When the examination volume defined in (a) cannot be effectively examined in all four directions, the examination shall be augmented by examination from the nozzle bore, using procedures and personnel qualified in accordance with Appendix VIII, Supplement 7.

(c) The remaining 85% of the required examination volume shall be examined in at least one radial direction from

(1) the nozzle bore, using procedures and personnel qualified in accordance with Appendix VIII, Supplement 7, or

(2) the vessel shell, using procedures and personnel qualified for single-side examination in accordance with Appendix VIII, Supplement 6.

I-3420 EXAMINATIONS CONDUCTED FROM THE OUTSIDE

(a) The clad-to-base-metal interface and the adjacent examination volume to a depth of at least 15% *T* (measured from the clad-to-base-metal interface) shall be examined from one radial and two opposing circumferential directions using procedures and personnel qualified in accordance with Appendix VIII, Supplements 4 and 6, for examination performed in the radial direction, and Appendix VIII, Supplement 5, for examination performed in the circumferential directions.

(b) The remaining 85% of the required examination volume shall be examined in at least one radial direction using procedures and personnel qualified for a single-side examination in accordance with Appendix VIII, Supplement 6.

I-3500 BOLTS AND STUDS

Bolts and studs shall be examined using procedures and personnel qualified in accordance with Appendix VIII, Supplement 8. The volume specified in IWB-2500 or IWC-2500 shall be examined.