

**NCSX PROJECT  
MEETING**

**NOV 27, 2002**

**Vacuum Vessel Design**

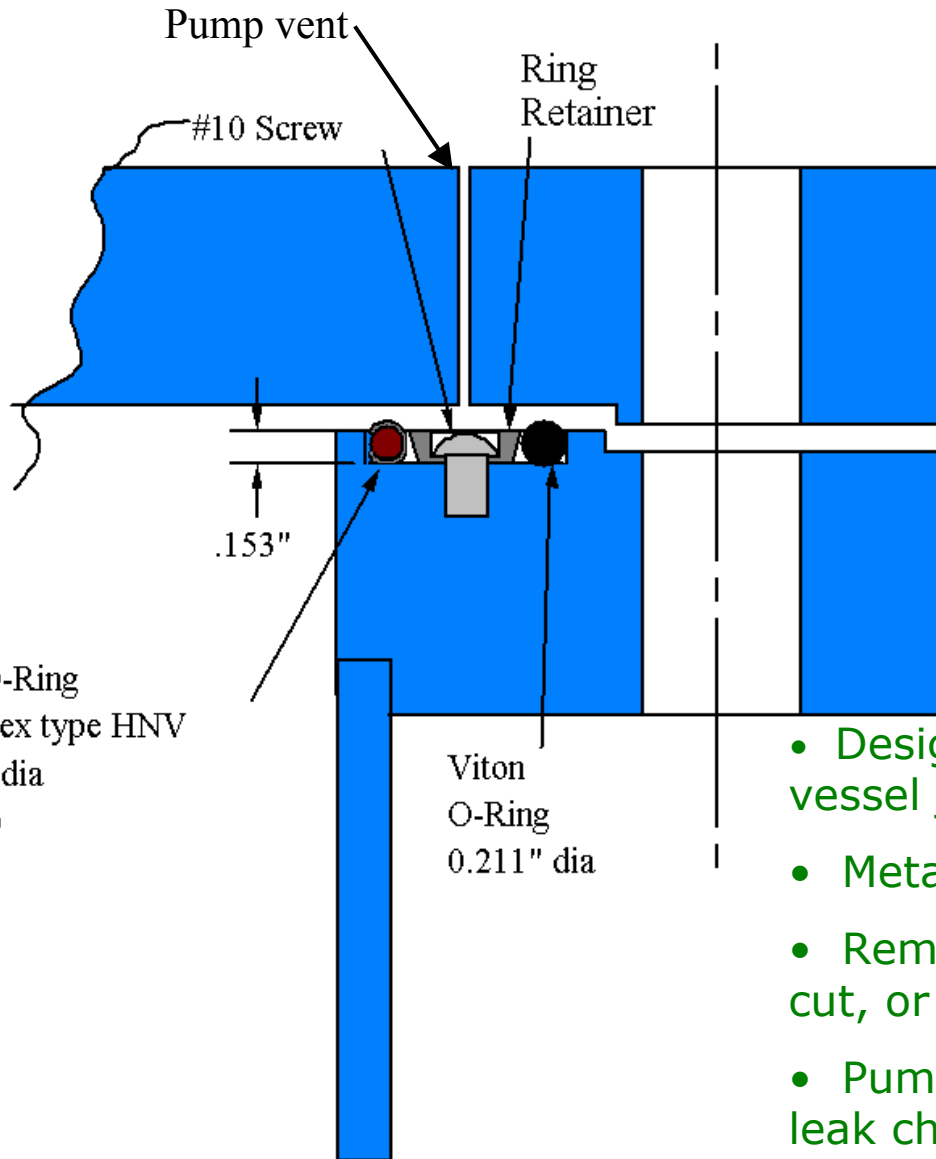
**Paul Goranson/Mike  
Cole/Brad Nelson**

# AGENDA

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- Metal Seal Design
- Proto Type Drawings
- VV Joint Design
- Summary

# METAL SEAL DESIGN



- Design can be adapted for use with vessel joint and non circular ports.
- Metal seal interchanges with o-ring.
- Removable retainer is milled, water jet cut, or laser cut from flat stock.
- Pumping vent between seals permits leak checking and differential pumping.

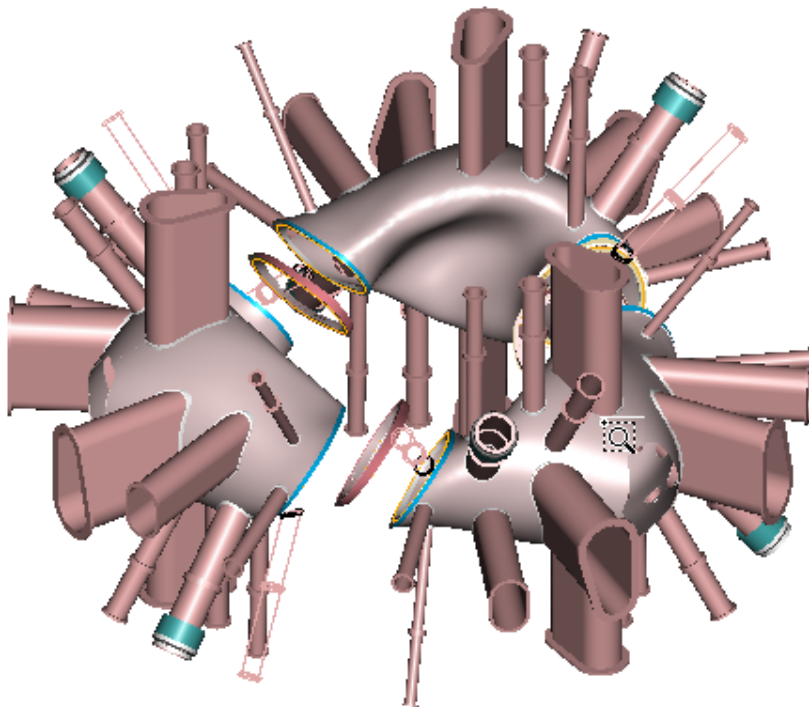




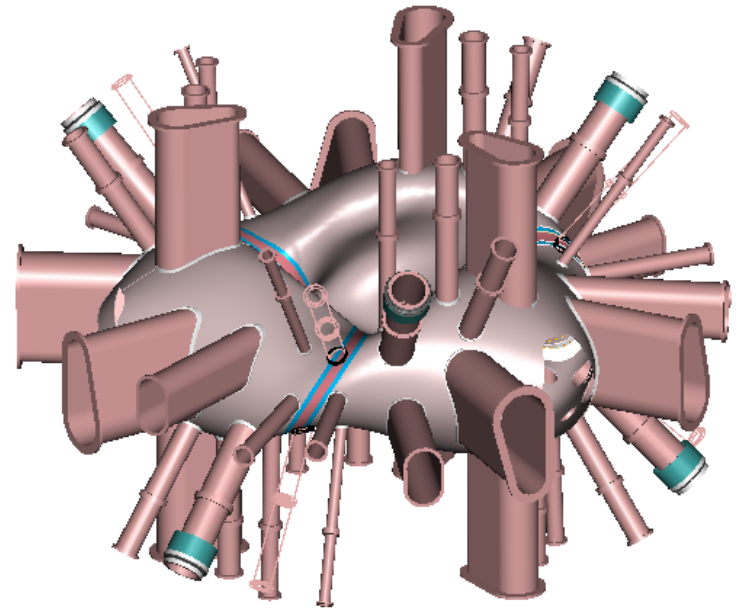


# VV JOINT DESIGN

## Slanted VV assembly joint



VV segments retracted



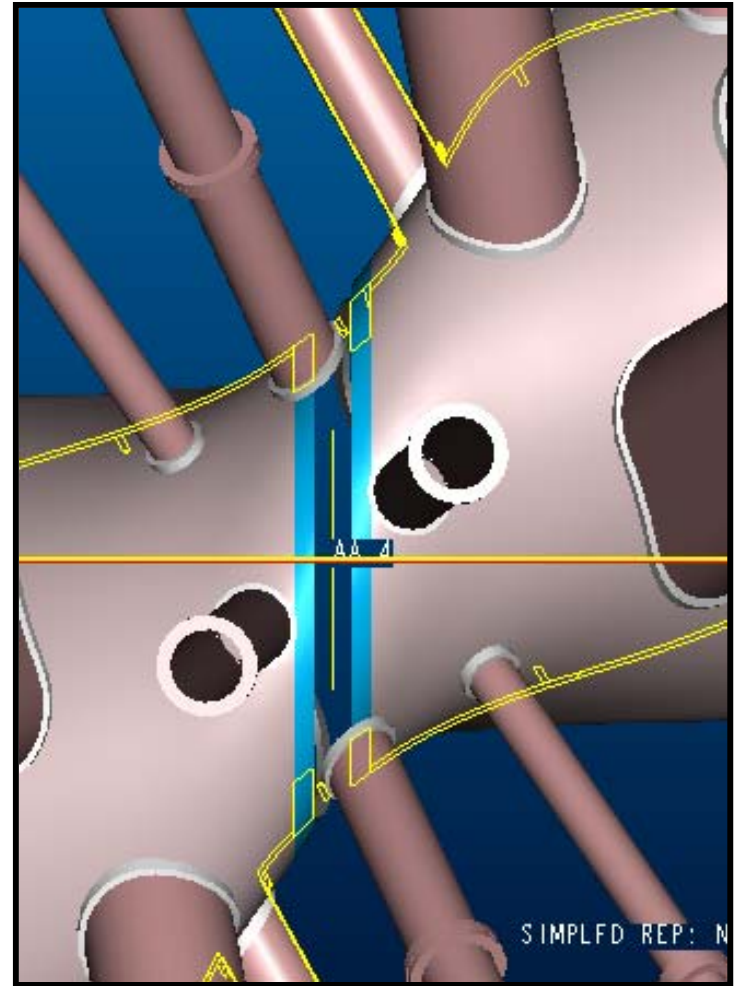
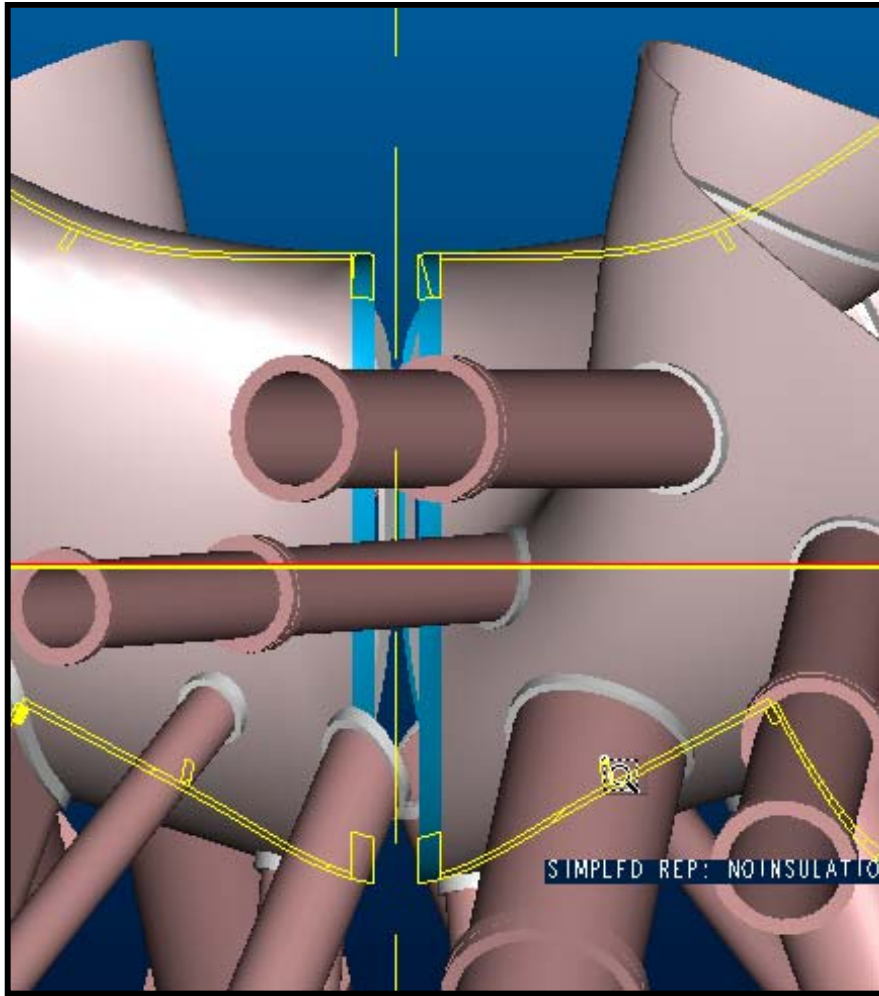
VV segments assembled

### Bottom line:

- Seems to work, bolts an issue
- Lose two ports per segment

# VV JOINT DESIGN

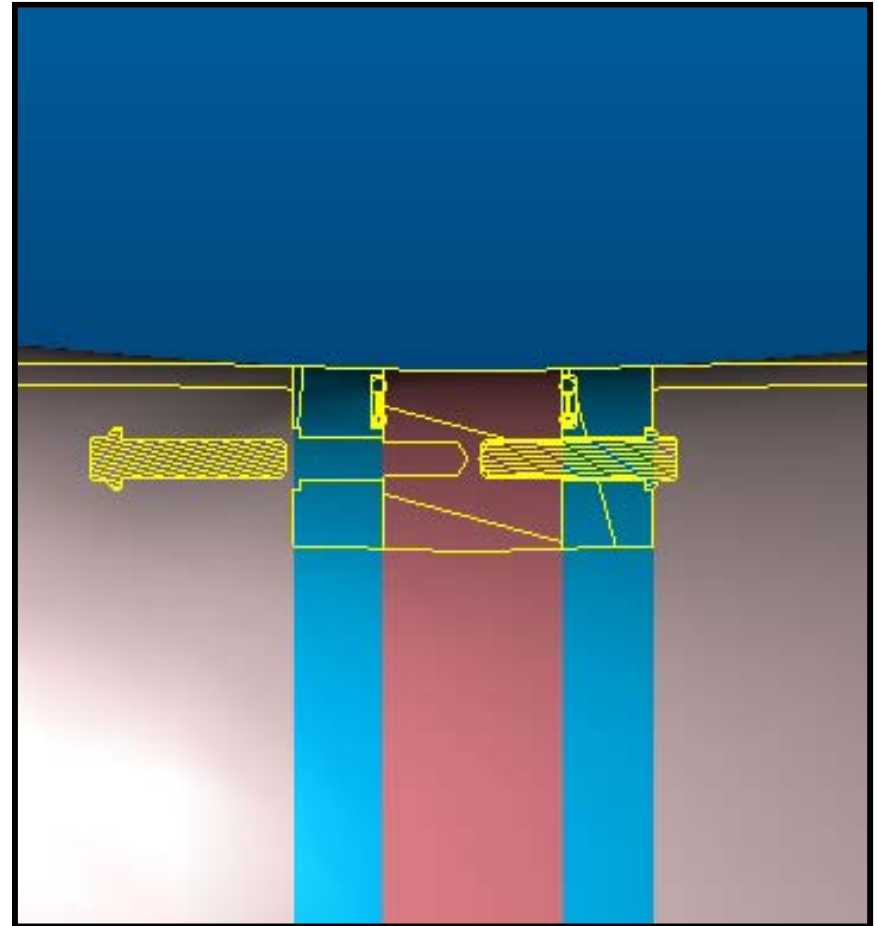
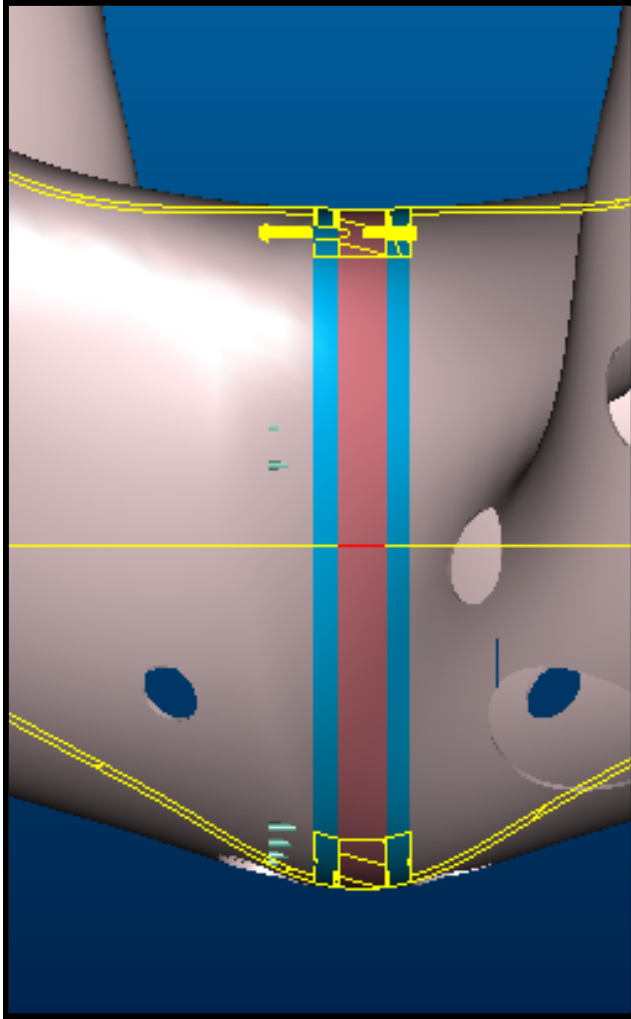
"0" and "90" deg





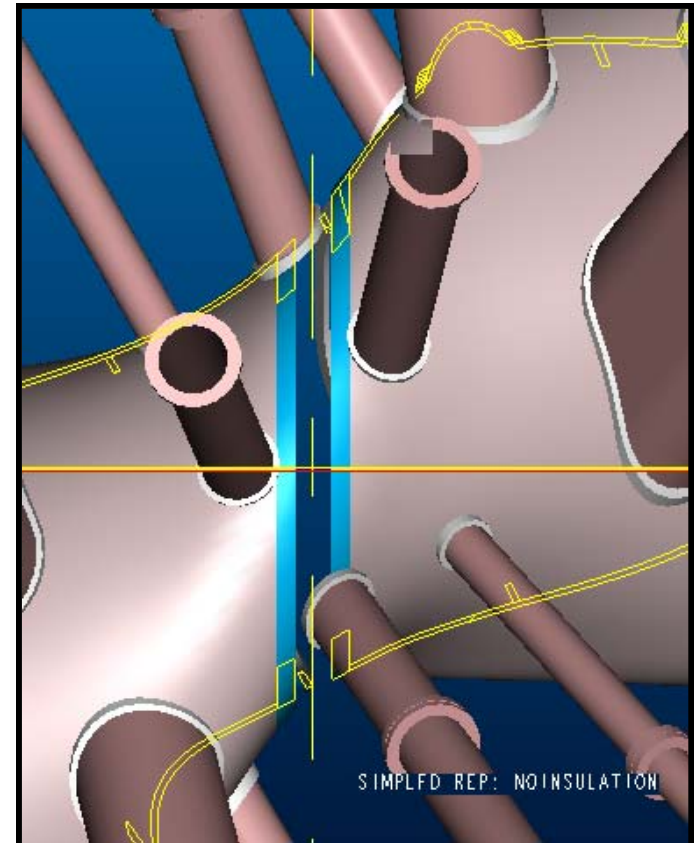
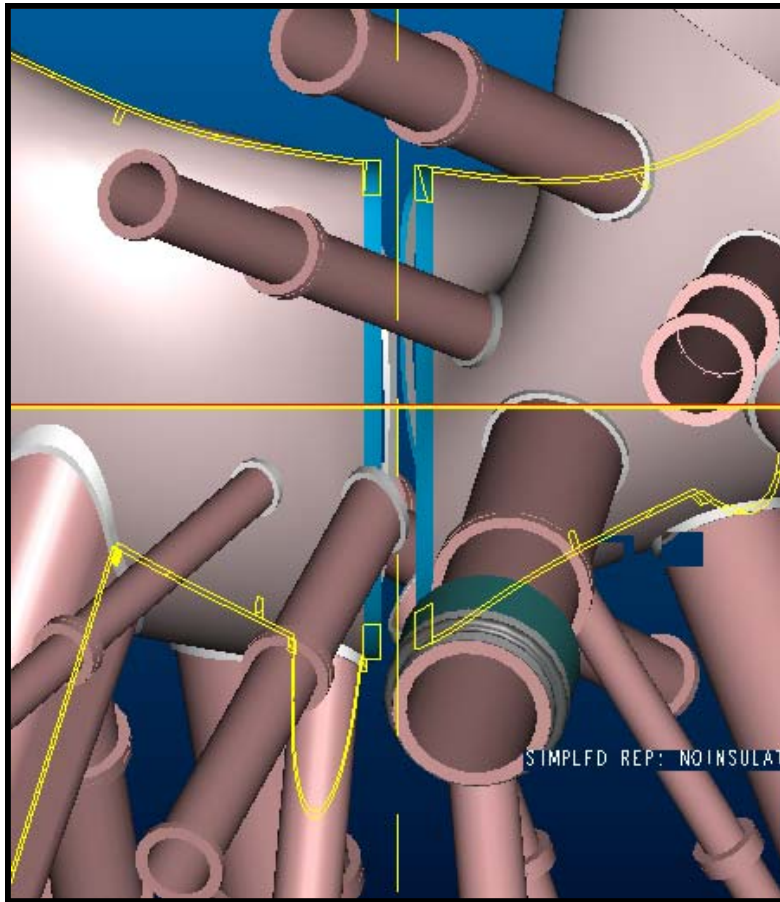
# VV JOINT DESIGN

"0" deg showing bolts and seals



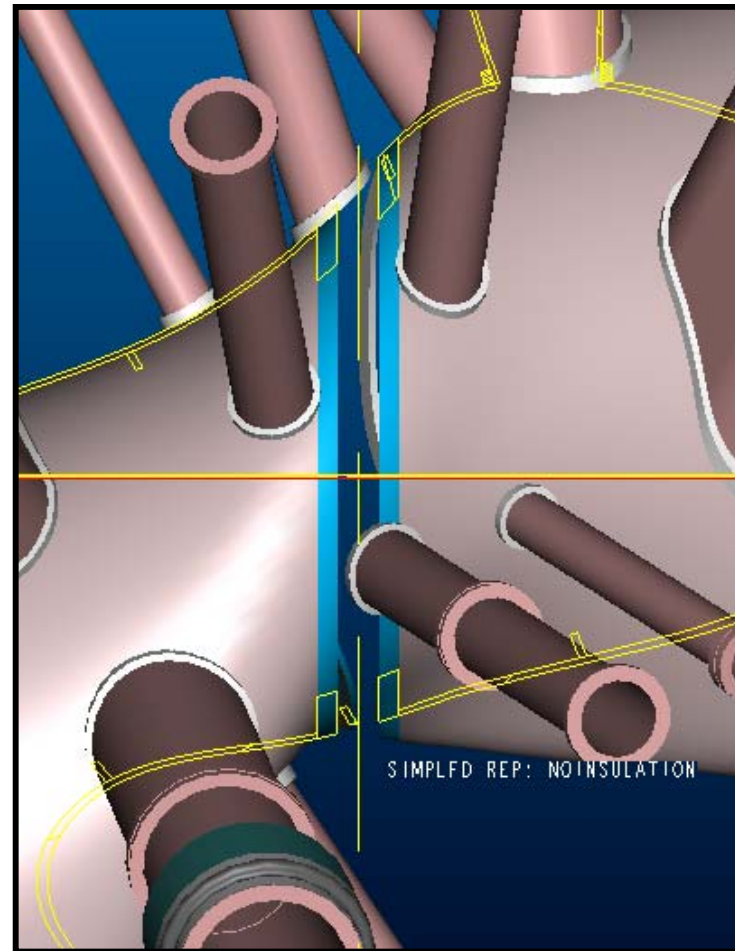
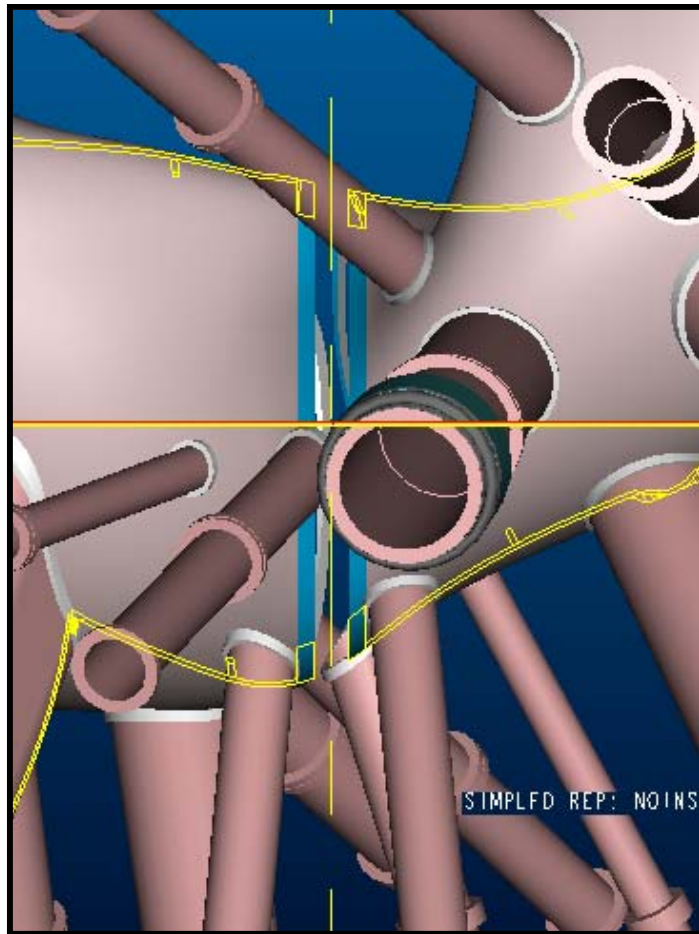
# VV JOINT DESIGN

"15" and "105" deg



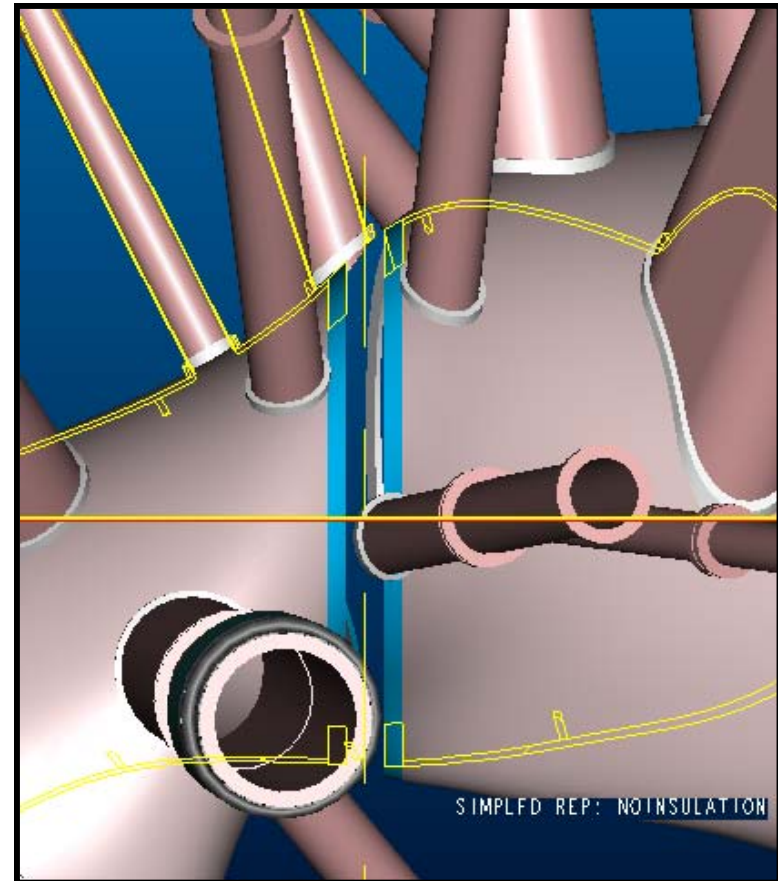
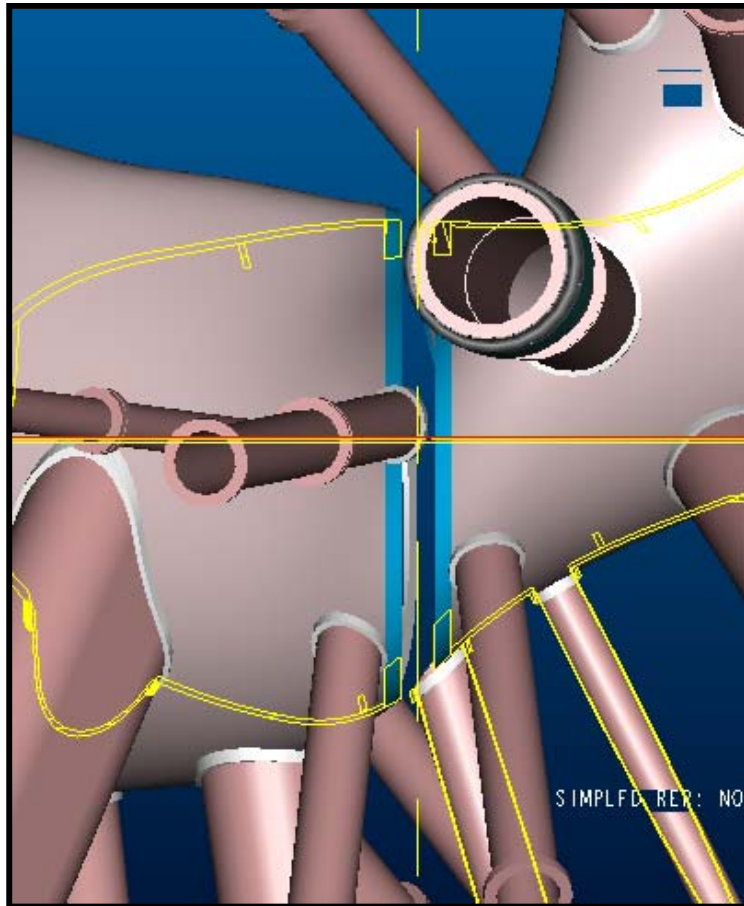
# VV JOINT DESIGN

"30" and "120" deg



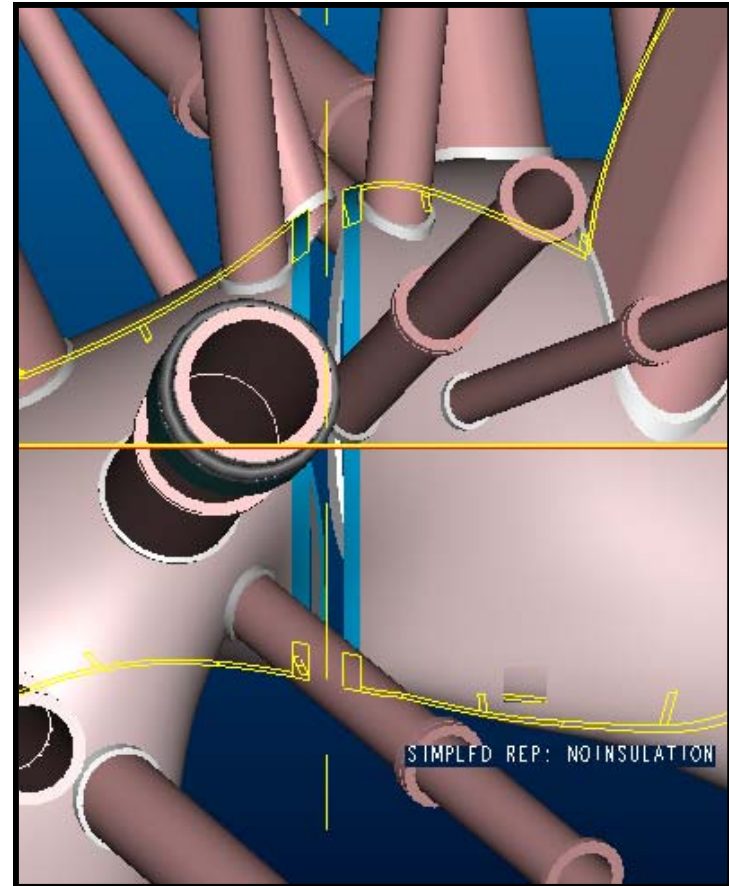
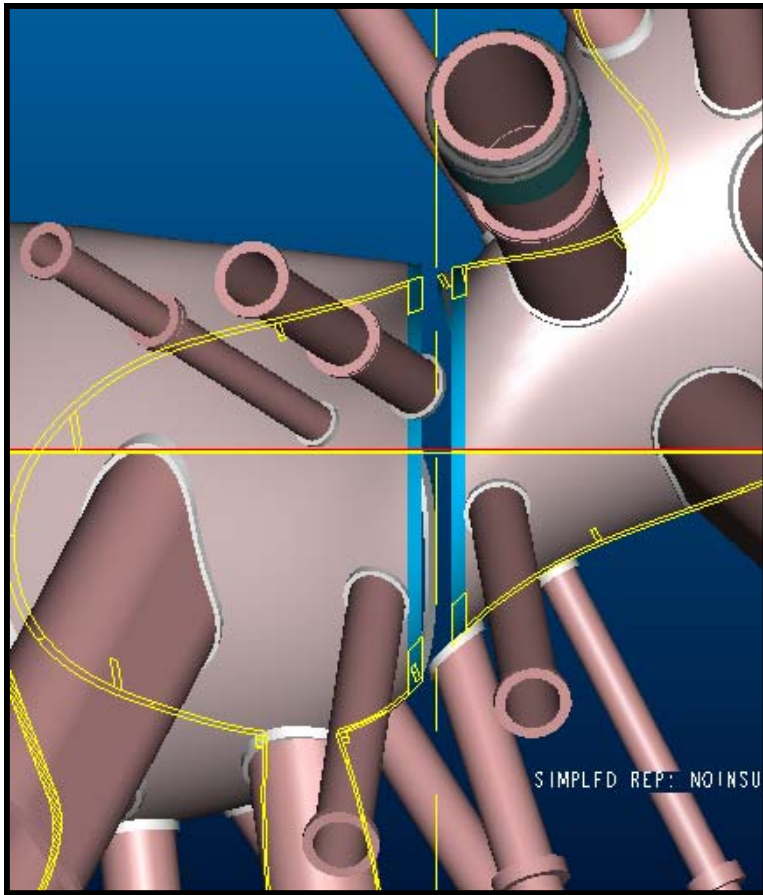
# VV JOINT DESIGN

"45" and "135" deg



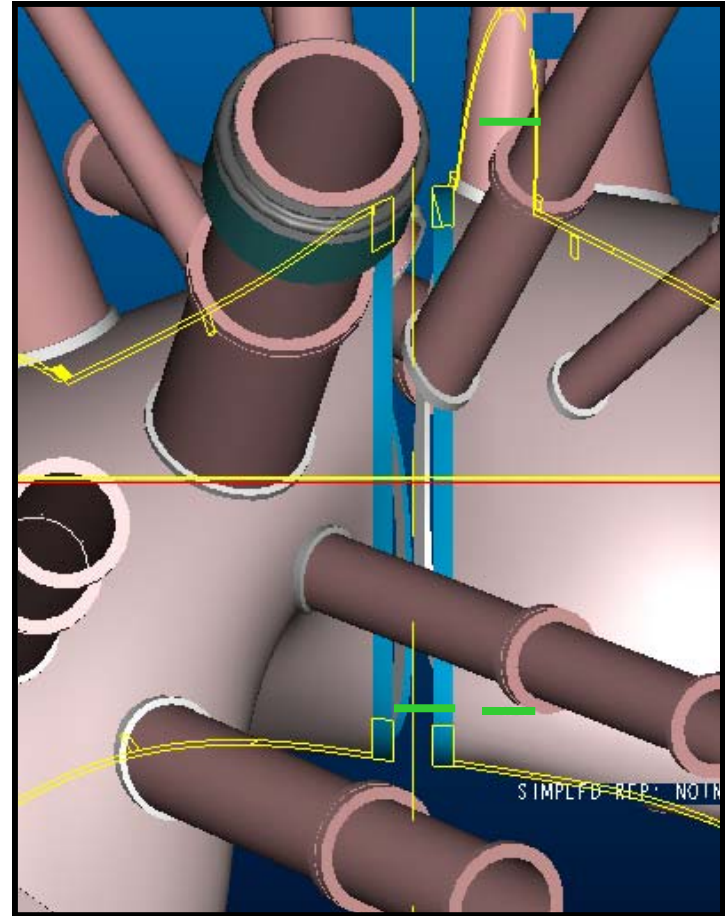
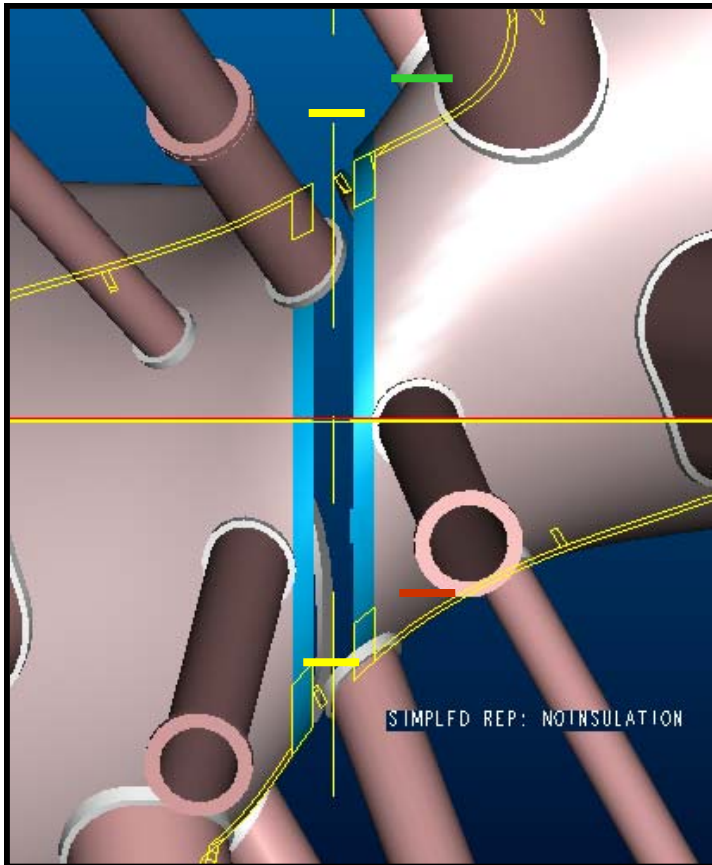
# VV JOINT DESIGN

"60" and "150" deg



# VV JOINT DESIGN

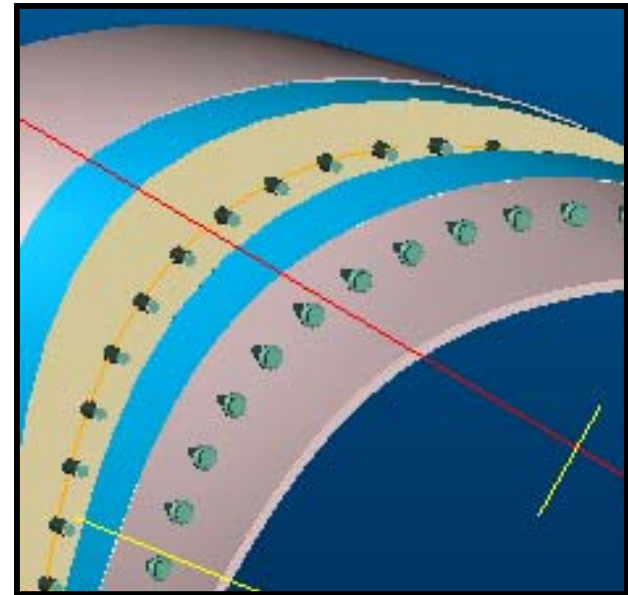
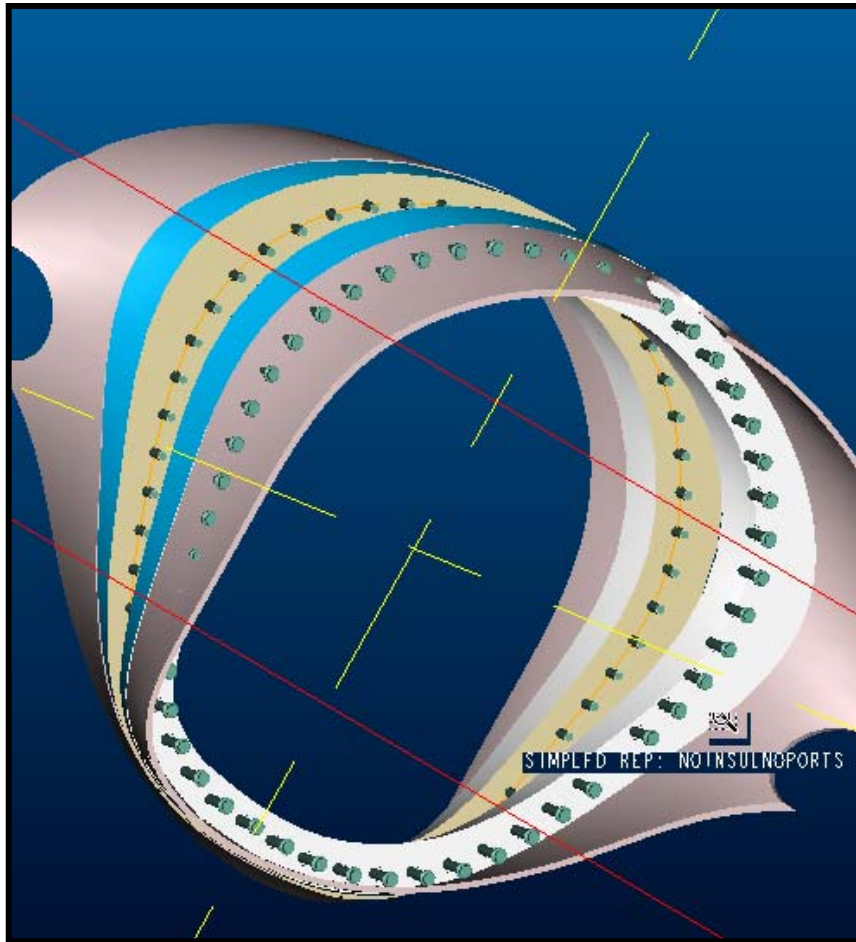
"75" and "165" deg



# VV JOINT DESIGN

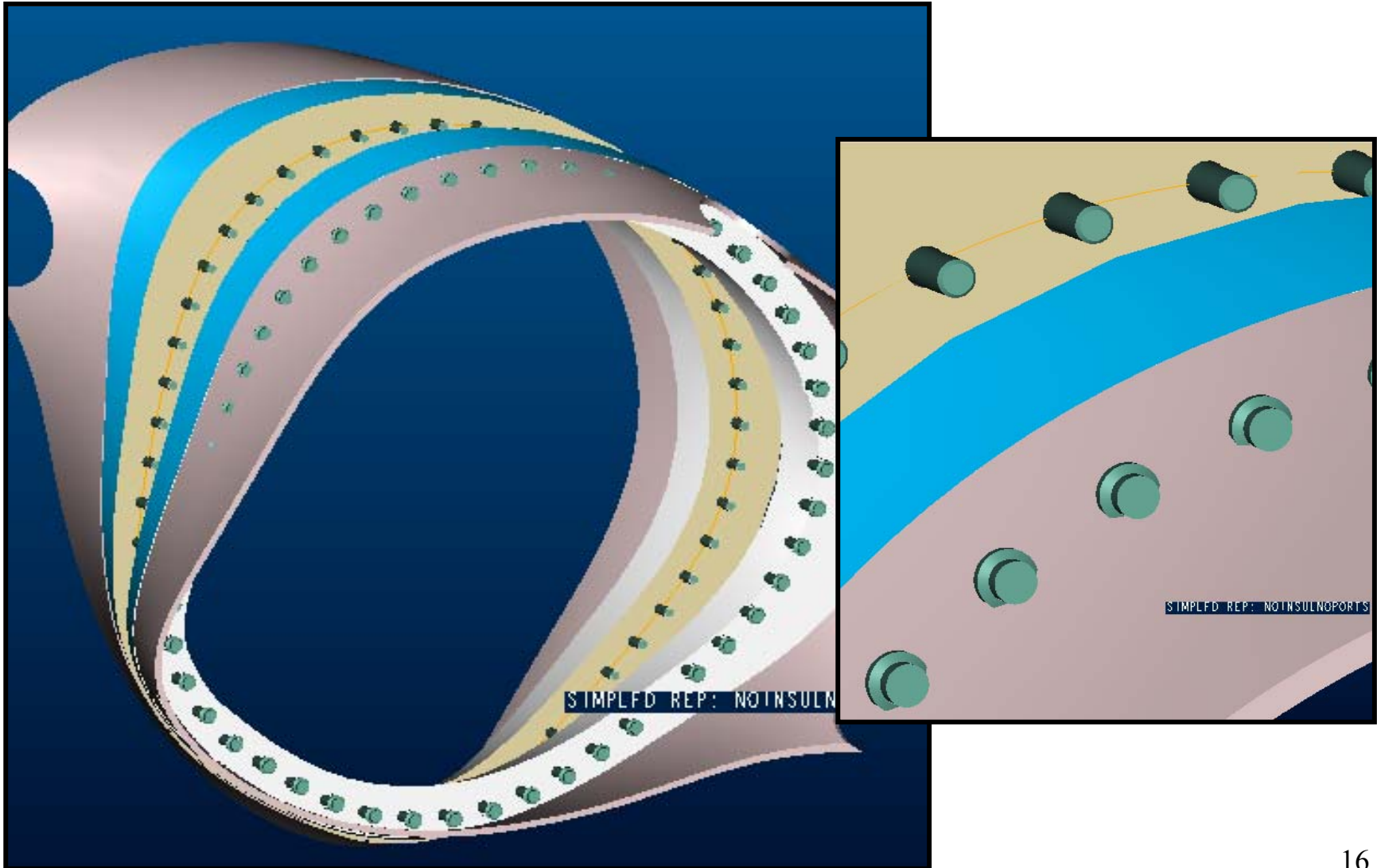
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bolts backed out 2.625 inches



# VV JOINT DESIGN

bolts backed out 1.5 inches

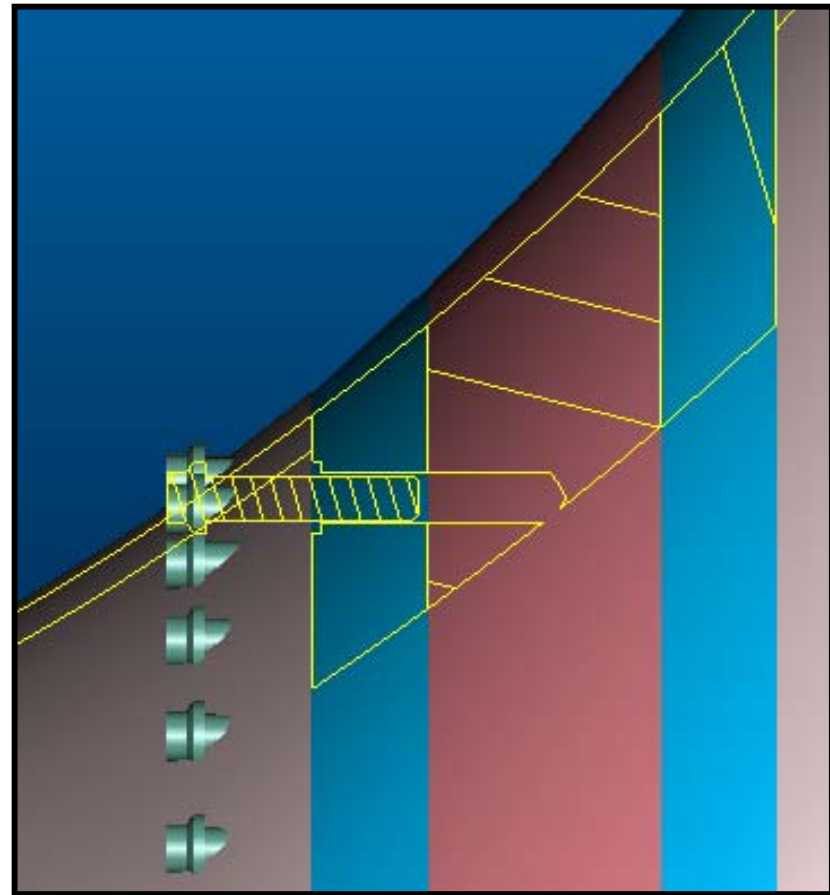
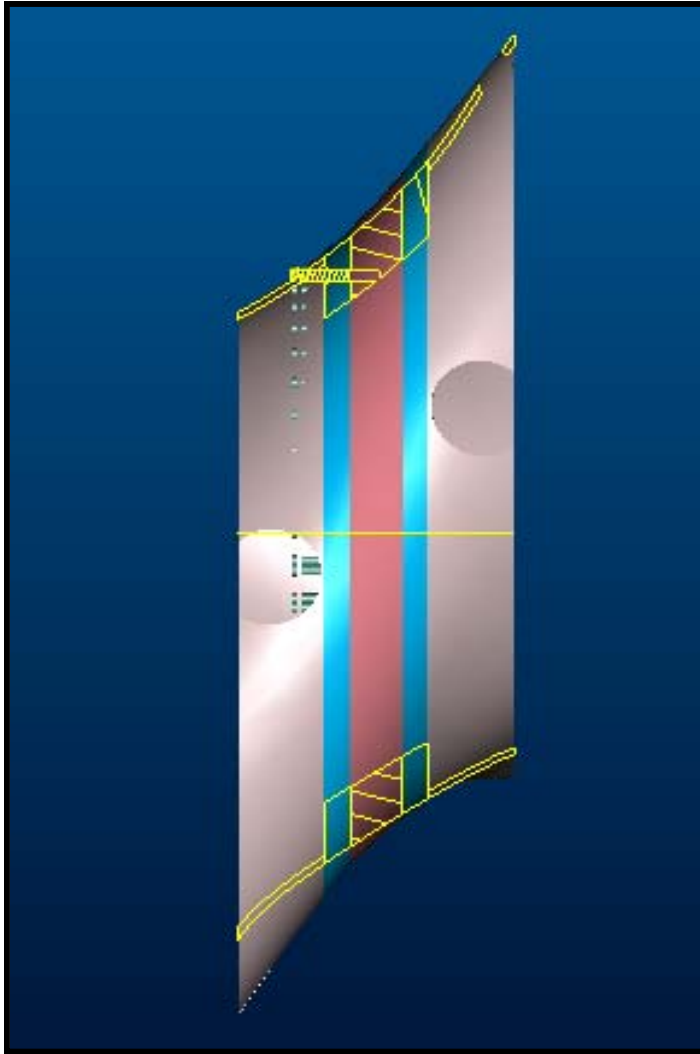




# VV JOINT DESIGN

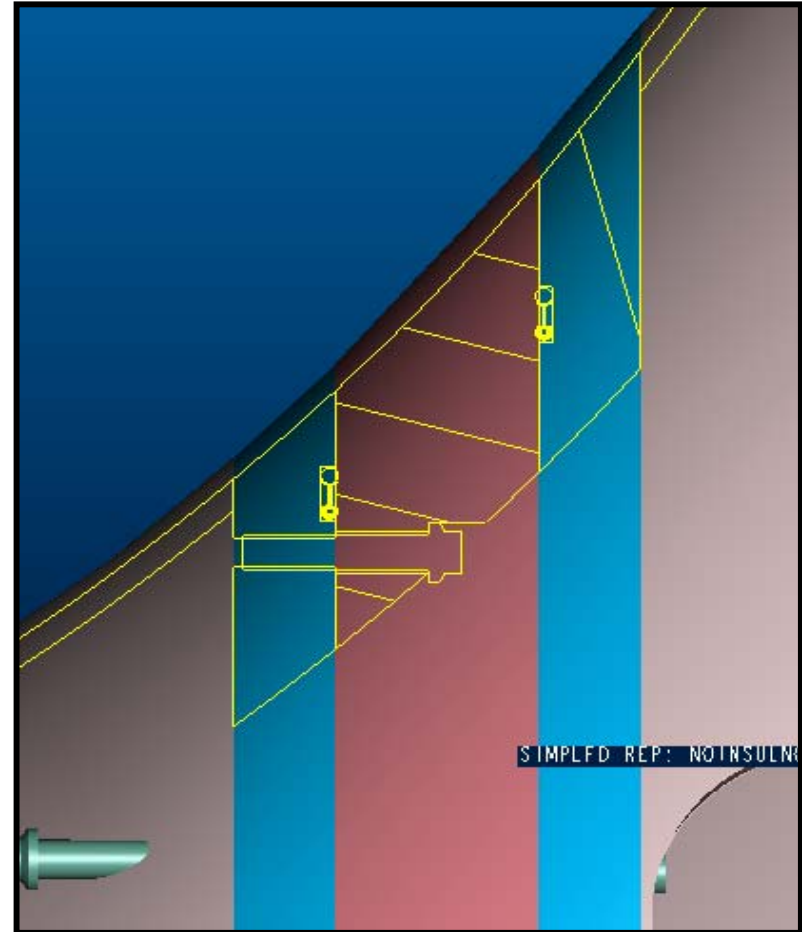
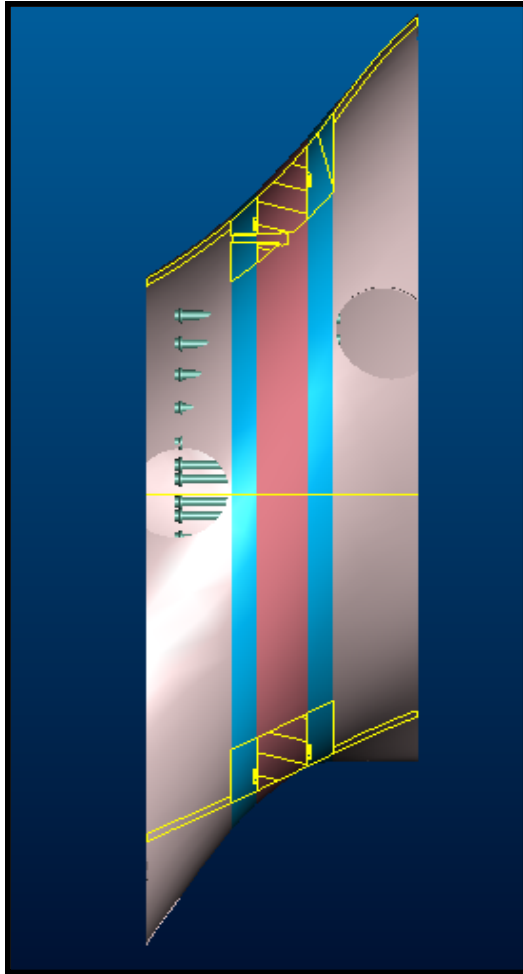
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bolts backed out 1.5 inches shows problem of interference with VV shell



# VV JOINT DESIGN

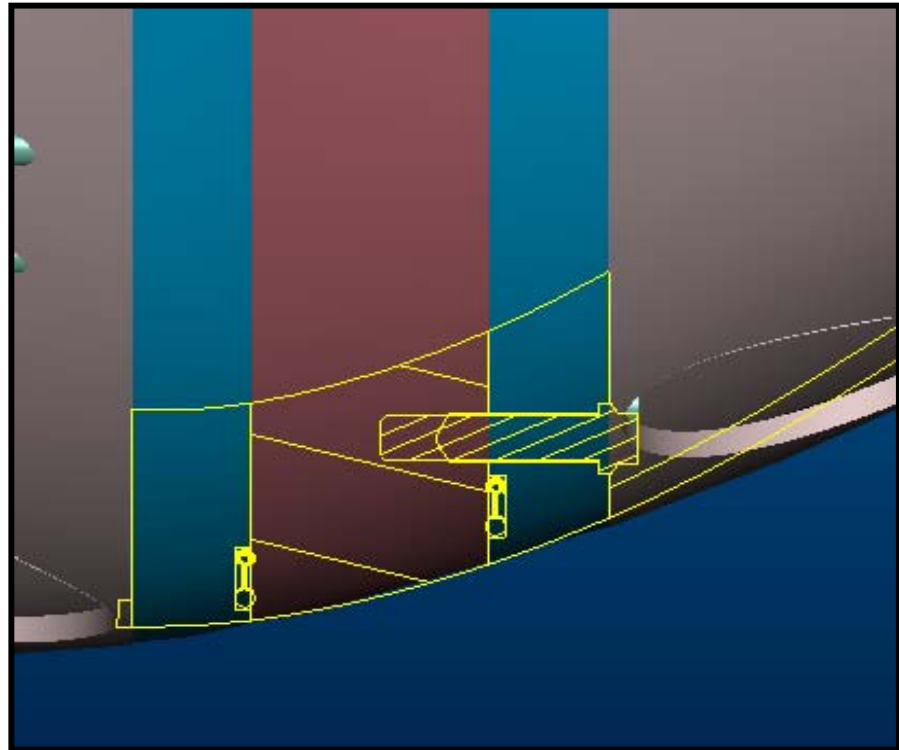
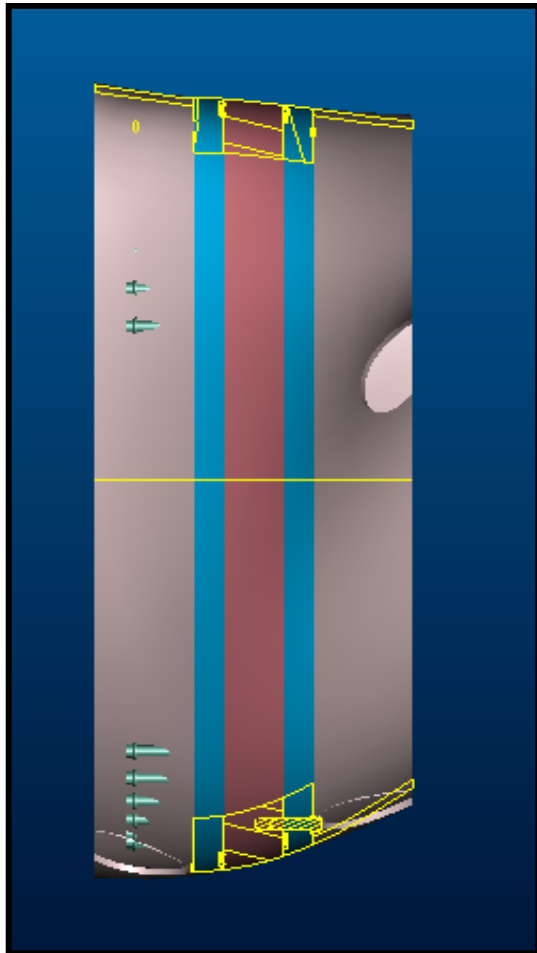
section at "105 deg", some bolts put in from shim side, others backed out 3 inches



# VV JOINT DESIGN

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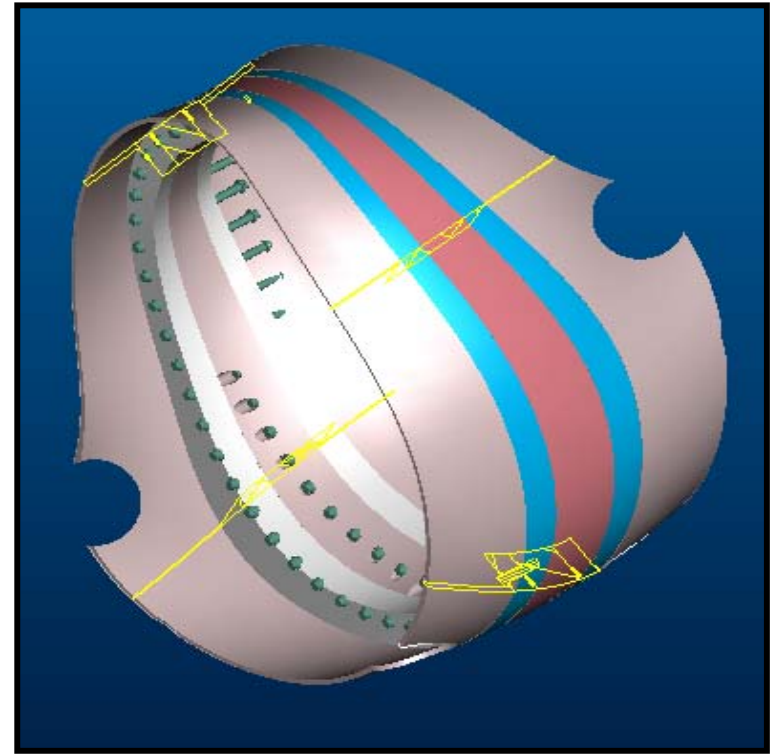
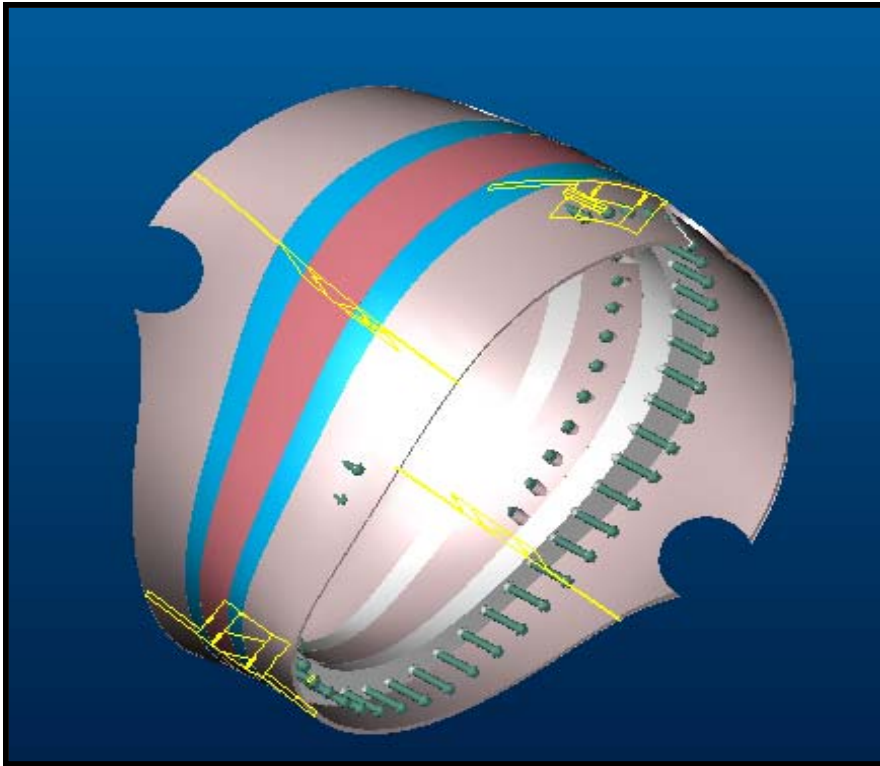
joint at 15 degrees, showing bolts inserted from flange side.



# VV JOINT DESIGN

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top and bottom view, sections at "15" and "105" deg



# SUMMARY

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- Configuration for providing metal seals or o-ring seals has been defined. Seal can be used in spacer and other flange connections.
- Minor cleanup of vacuum vessel prototype drawings is underway. Posting drawings should be complete today.
- Designing a spacer with a 30 deg offset from vertical has been reviewed. This design looks possible but still has the concern of sliding past seals during installation. Welding vv joints at assembly could be a second option.