

Hg Delivery System Vacuum Discussion

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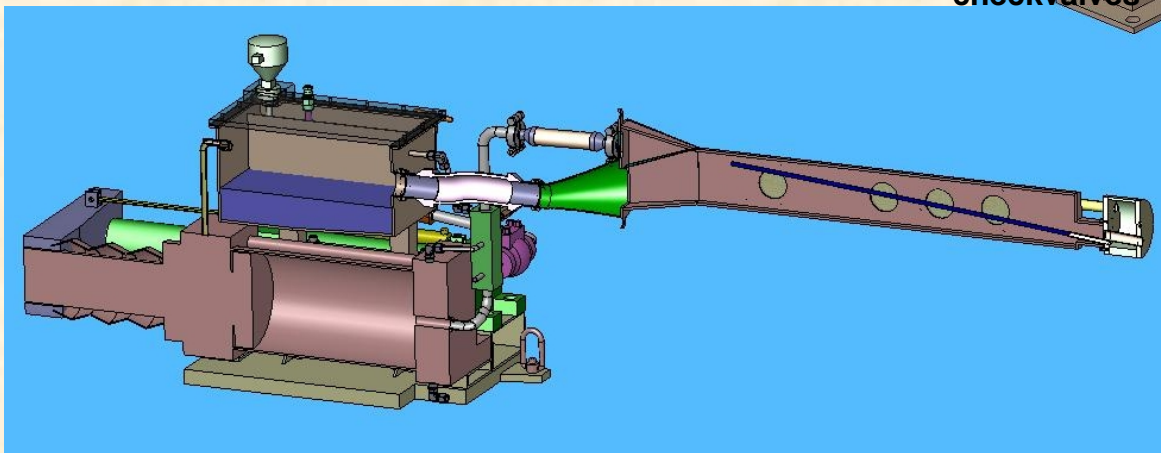
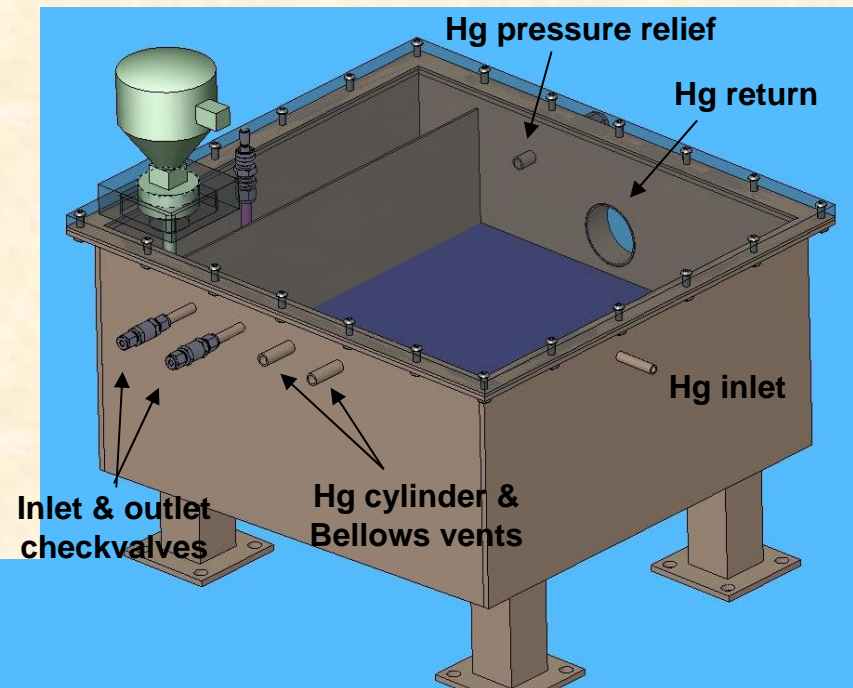
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- **During Hg delivery system design review, consideration given to running delivery system under vacuum conditions**
 - Improve jet profile by eliminating trapped air in plenum and/or Hg supply tubing
 - Performance of stream may improve in vacuum
 - Confirmation of primary beam window integrity
- **Vacuum condition has implications related to both design and operations**

Design Issues & Considerations

- Entire primary containment will be under vacuum
 - Hg supply & return lines
 - Sump tank & all connecting ports
 - Hg cylinder & bellows



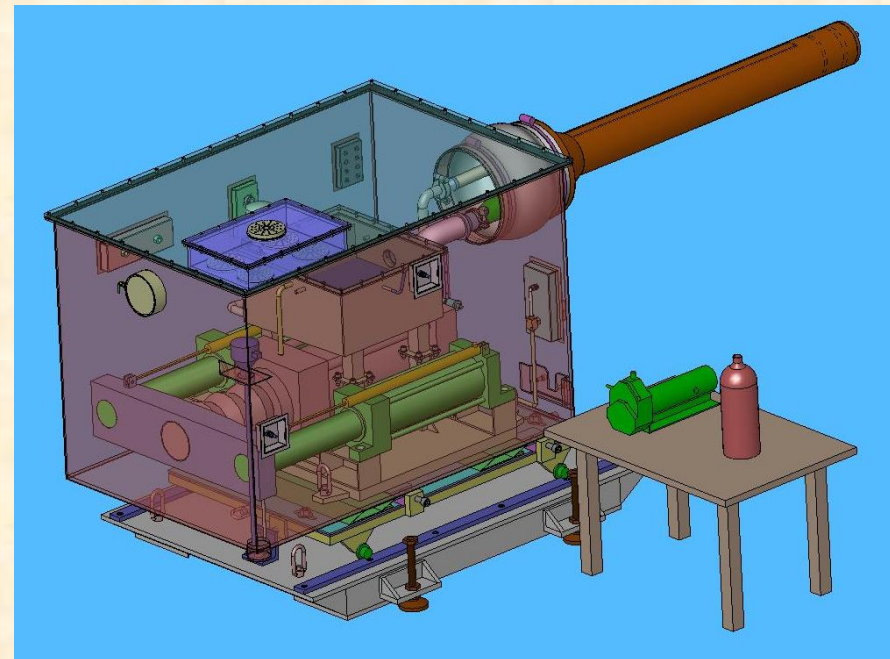
Possible Design Issues



- **Sump tank not designed for vacuum**
 - Need to return to circular configuration
 - Cover plate may have to be SS rather than lexan
- **Optical viewport disks' ability to withstand vacuum condition not known**
- **Vacuum pump inside secondary requires remote pump control, radiation-tolerant remotely-controlled isolation valve, and radiation-tolerant vacuum gage**
 - Filter saturation must be considered
- **Vacuum pump outside secondary may allow manual operations, but vapors become an issue**
- **Hg cylinder bellows probably not capable of withstanding vacuum, but will discuss with syringe vendor**
 - Could vent to passive filter rather than sump tank

Operational Issues & Considerations

- **Draining & filling**
 - Sump outlet checkvalve allows air displaced during Hg fill to vent to filters
 - Sump inlet checkvalve allows air to enter tank while Hg is drained
 - **Current design will not allow vacuum operations**
 - **Might eliminate inlet valve & attach hose to Hg inlet port during draining**



Summary



- **Configuring delivery system for vacuum operations possible**
 - Requires modifications to sump tank
 - Porting may need changes
- **Adding vacuum pump/valving inside secondary creates complications**
 - Consider using vacuum system outside secondary but within a separate containment
- **Testing at ORNL essential to determine filter effectiveness**