UT-BATTELLE

Hg System Assembly and Testing Status

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MERIT VRVS Meeting

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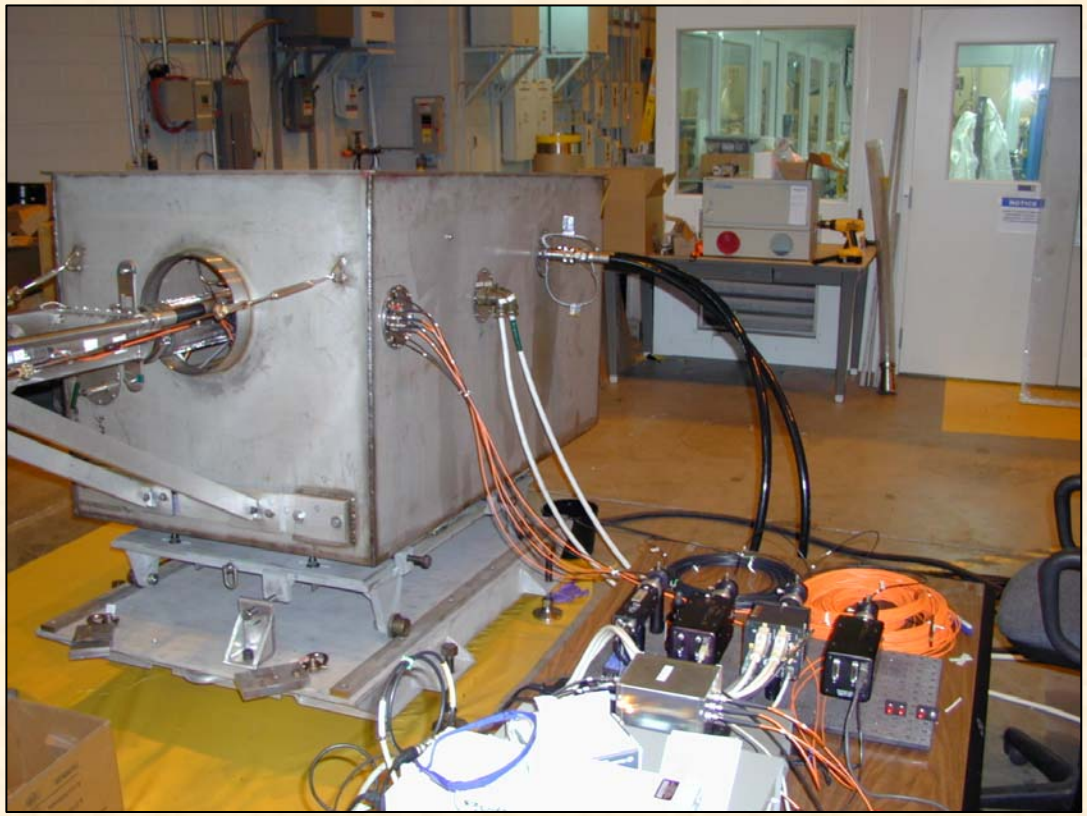
OAK RIDGE NATIONAL LABORATORY
U. S. DEPARTMENT OF ENERGY

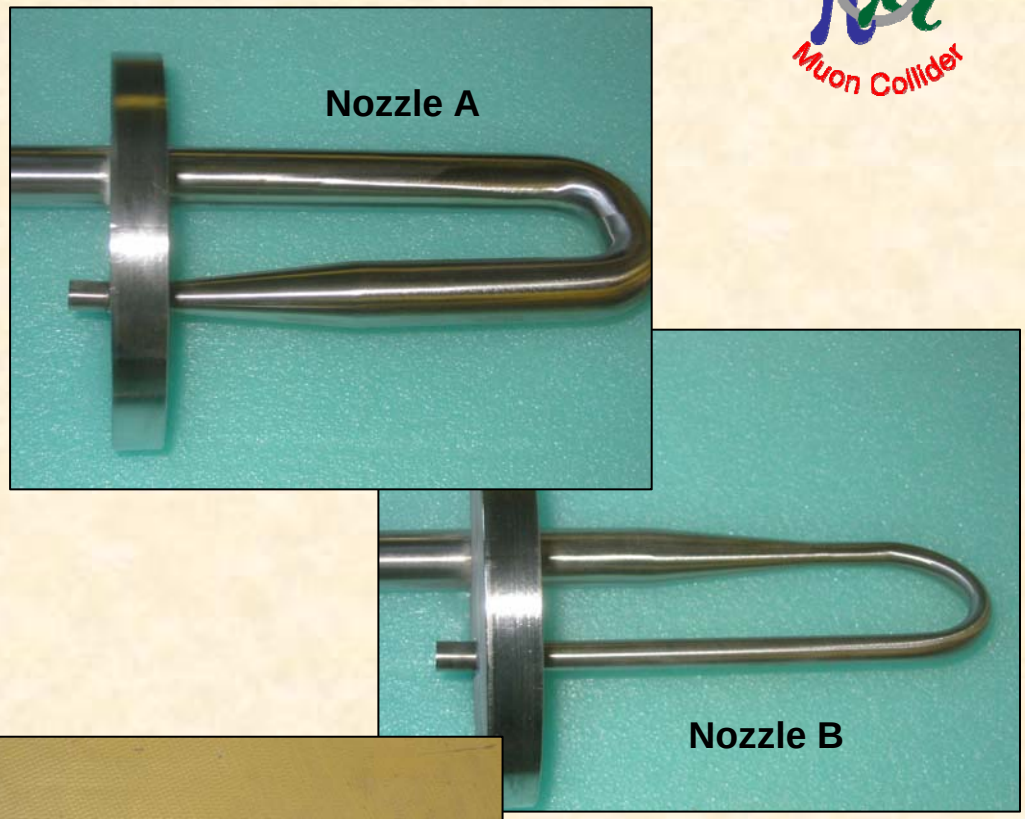
Primary Containment Completed

- **Issues with piping resolved, final fit-up completed**
- **Optical diagnostic system installed and operational**



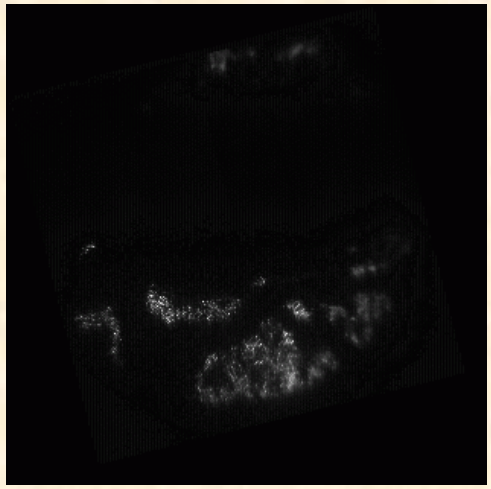
SS Water Test Nozzles

- **Nozzle A – diameter reduction after bend, 2.5° nozzle angle**
- **Nozzle B – reduction before bend, 2.5° nozzle angle**
- **Nozzle C – test nozzle with reduction after bend, straight nozzle tip**

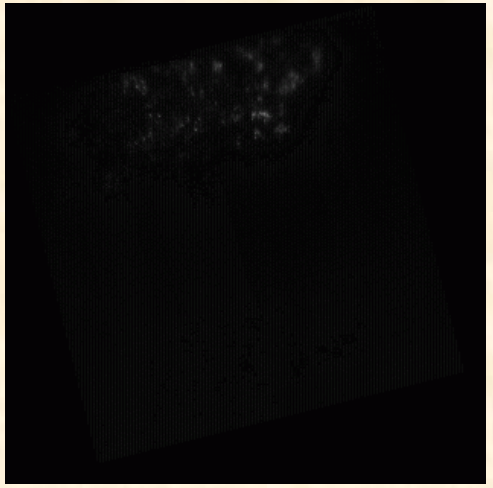


Results

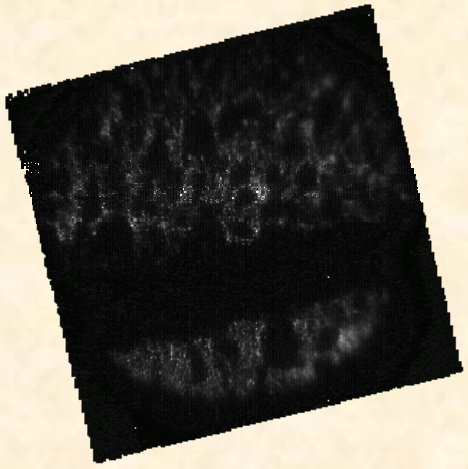
- **Nozzle B spray worse than Nozzle A**
  - **Neither jet was acceptable**
- **Definite increase in jet diameter at higher velocities**
- **Nozzle C gave best results**
- **Water droplets on windows was a problem**



Nozzle A, 20m/s



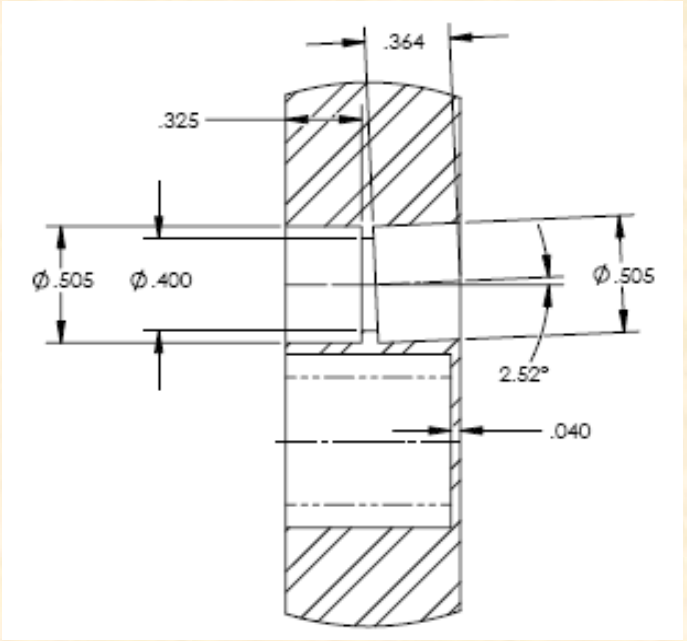
Nozzle B, 20m/s



Nozzle C, 20m/s

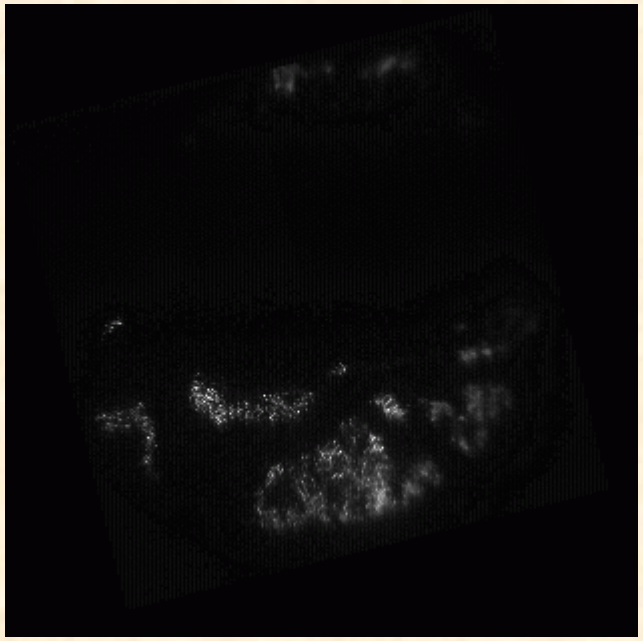
Nozzle Issues

- **Flow path is a three-piece weldment**
  - **Inlet tube**
  - **Nozzle flange**
  - **Short angled nozzle tip**
- **Smooth path requires constant ID**
- **Investigation revealed SS nozzles had step in flow path (flange thru hole smaller than tube IDs)**

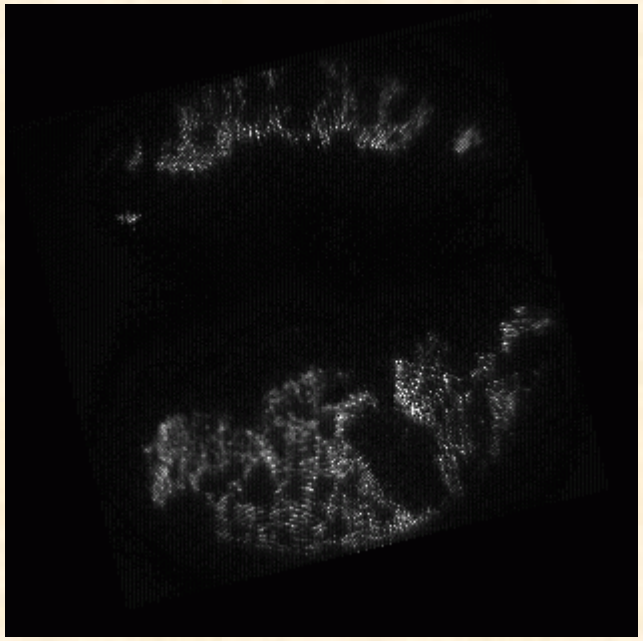


Modified Nozzle A Tested

- **Nozzle A was manually modified using drill bits to provide nearly constant ID from flange to tip**
- **Tests showed definite improvement**



Nozzle A As Received, 20m/s



Nozzle A After Mods, 20m/s

Proposed Path Forward

- **Proceed with fabrication of Ti nozzle A as designed**
- **Ensure constant ID of flow path prior to weldment**
- **Perform final reaming of nozzle tip**
- **Leave extra nozzle tip length for pressure testing**

Readiness Review Conducted

- **Internal ORNL review held to determine if necessary steps are in place for mercury operations**
- **No issues noted as long as safety equipment is in place and operating procedures are followed**
- **Have ordered replacement pond liner since original sent to MIT**
- **Awaiting Hg filter housings**

Current Status / Next Steps

- **Complete secondary containment**
  - **Check for pressure leaks**
  - **Install Hg vapor filters**
- **Remove nozzle, clean inside of viewports, reinstall nozzle**
- **Drain water and replace with Hg**
  - **Perform Hg tests with nozzle A**
- **Await Ti nozzle A or proceed to MIT?**
  - **Equipment crating is being fabricated**