

**Completion of Level 2
Milestone M2AT
19IN030401044,
Complete construction of
the gas and moisture
supply systems and
receive the custom-
designed tube furnace
from the vendor**

John D Stempien

August 2019

The INL is a U.S. Department of Energy National Laboratory
operated by Battelle Energy Alliance



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19IN030401044, Complete construction of the gas and
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August 2019

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Idaho Falls, Idaho 83415**

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**Prepared for the
U.S. Department of Energy
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14517**

August 29, 2019

CCN 245399

Mr. Timothy Beville, Acting Director
Office of Advanced Reactor Technologies
NE-52, Germantown Building
U.S. Department of Energy
19901 Germantown Road
Germantown, MD 20874

SUBJECT: Contract No. DE-AC07-05ID14517 – Completion of Level 2 Milestone – M2AT-19IN030401044,
“Complete construction of the gas and moisture supply systems and receive the custom-designed
tube furnace from the vendor”

Dear Mr. Beville:

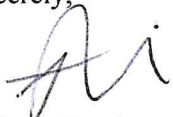
This letter and attached photos formally document completion of the Advanced Reactor Technologies Level 2 Milestone M2AT-19IN030401044, “Complete construction of the gas and moisture supply systems and receive the custom-designed tube furnace from the vendor,” due September 12, 2019.

The Advanced Gas Reactor (AGR) program has designed and is now constructing the Air/Moisture Ingress Experiment (AMIX) facility to test irradiated tristructural isotropic (TRISO) fuels under air or moisture-ingress accidents postulated for high-temperature gas-cooled reactors. AMIX will ultimately be installed in the Fuel Conditioning Facility at the Materials and Fuels Complex (MFC) at Idaho National Laboratory. AMIX consists of a gas supply (capable of supplying mixtures of air/helium and steam/helium), a tube furnace capable of accepting samples up to 6 cm in diameter and heating them to 1650°C, gamma detectors for measuring the release of condensable, gamma-emitting fission products, and cold traps with gamma detectors for measuring the release of fission gases. Data obtained from AMIX experiments will be used to qualify this new generation of TRISO fuels with the U.S. Nuclear Regulatory Commission, and inform models and simulations of TRISO fuel accident performance and source term.

The AMIX furnace and its associated power supplies and controls were received, and the gas and moisture supply systems were constructed. The attached photos provide objective evidence of completion of this milestone.

If you have any questions, please contact me at (208) 526-1216.

Sincerely,



Gerhard Strydom
Co-National Technical Director
Advanced Reactor Technologies

JLV

Attached: Photos INL/MIS-19-55575

Timothy Beville
August 29, 2019
CCN 245399
Page 2

cc:

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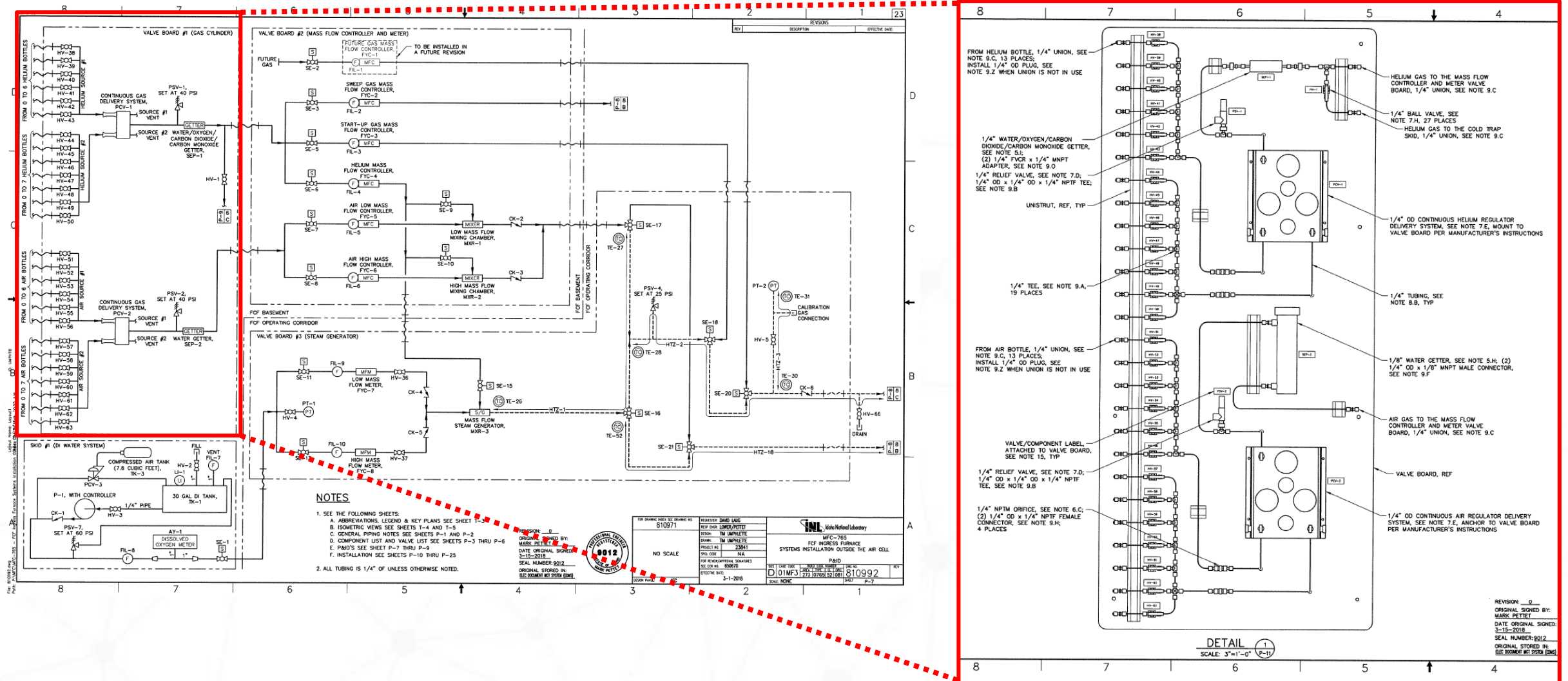
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Photographic evidence of assembled gas and moisture supply systems and tube furnace from the vendor for milestone M2AT 19IN030401044, INL/MIS-19-55575.

Gas Supply Valve Board (Board #1)

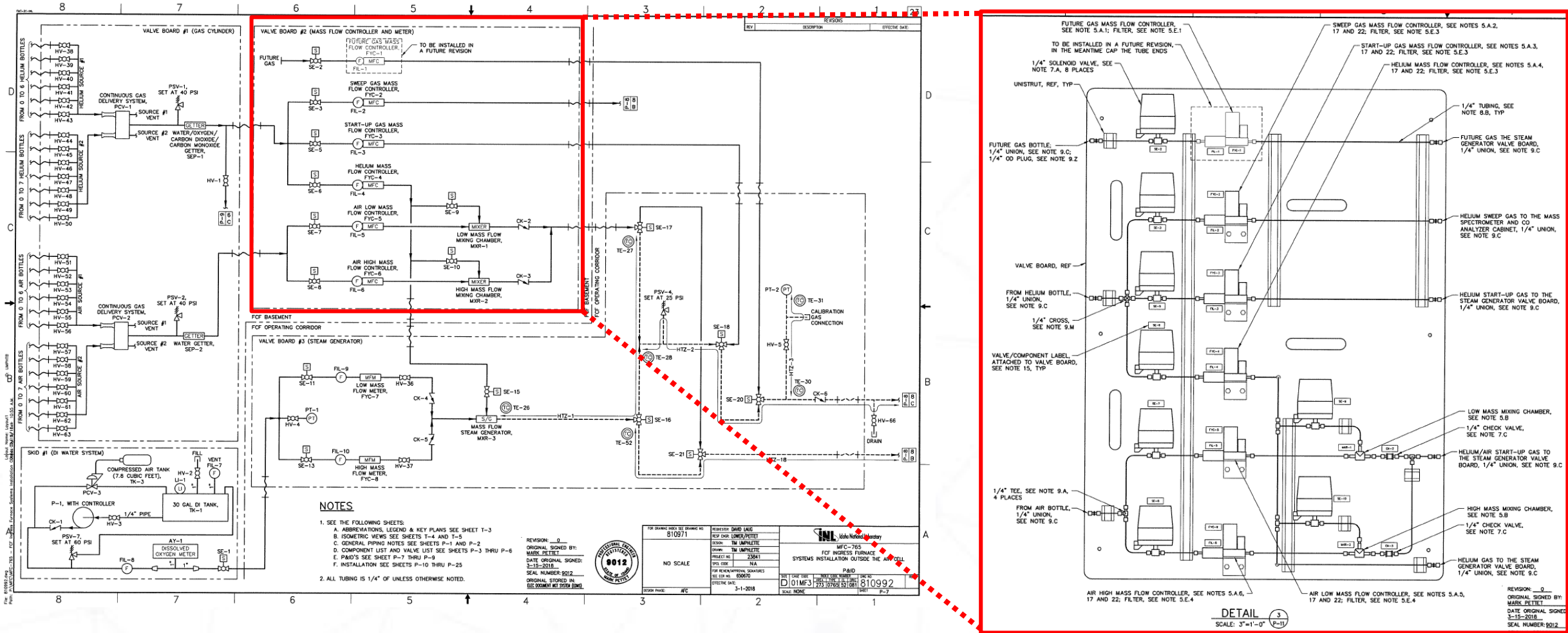


Gas Supply Valve Board #1, Side A

- Gas distribution
- Auto source switching based on pressure
- Air source drier
- Helium source drier and oxygen getter



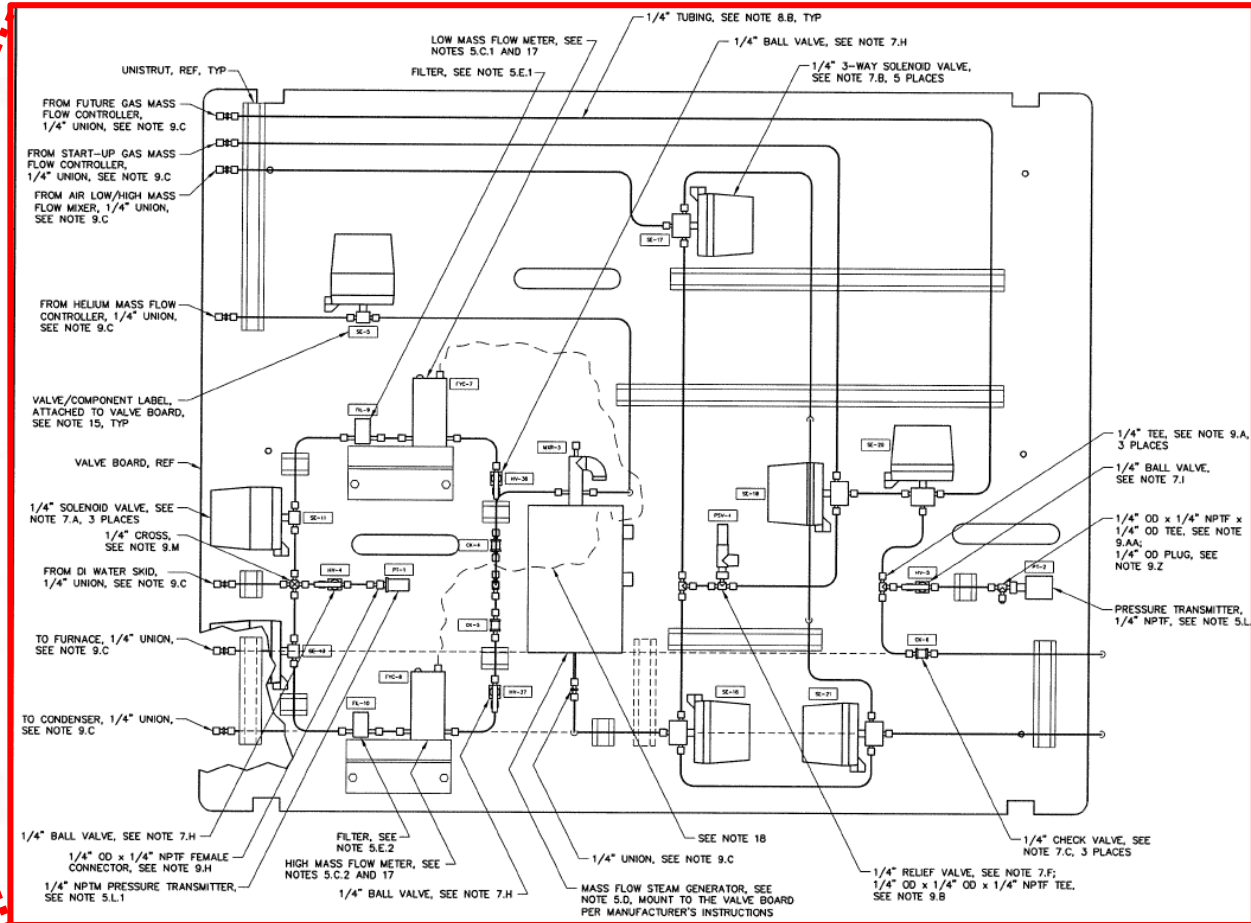
Gas Supply Valve Board and Flow Controllers (Board #1, Side B)



Gas Supply Valve Board #1, Side B

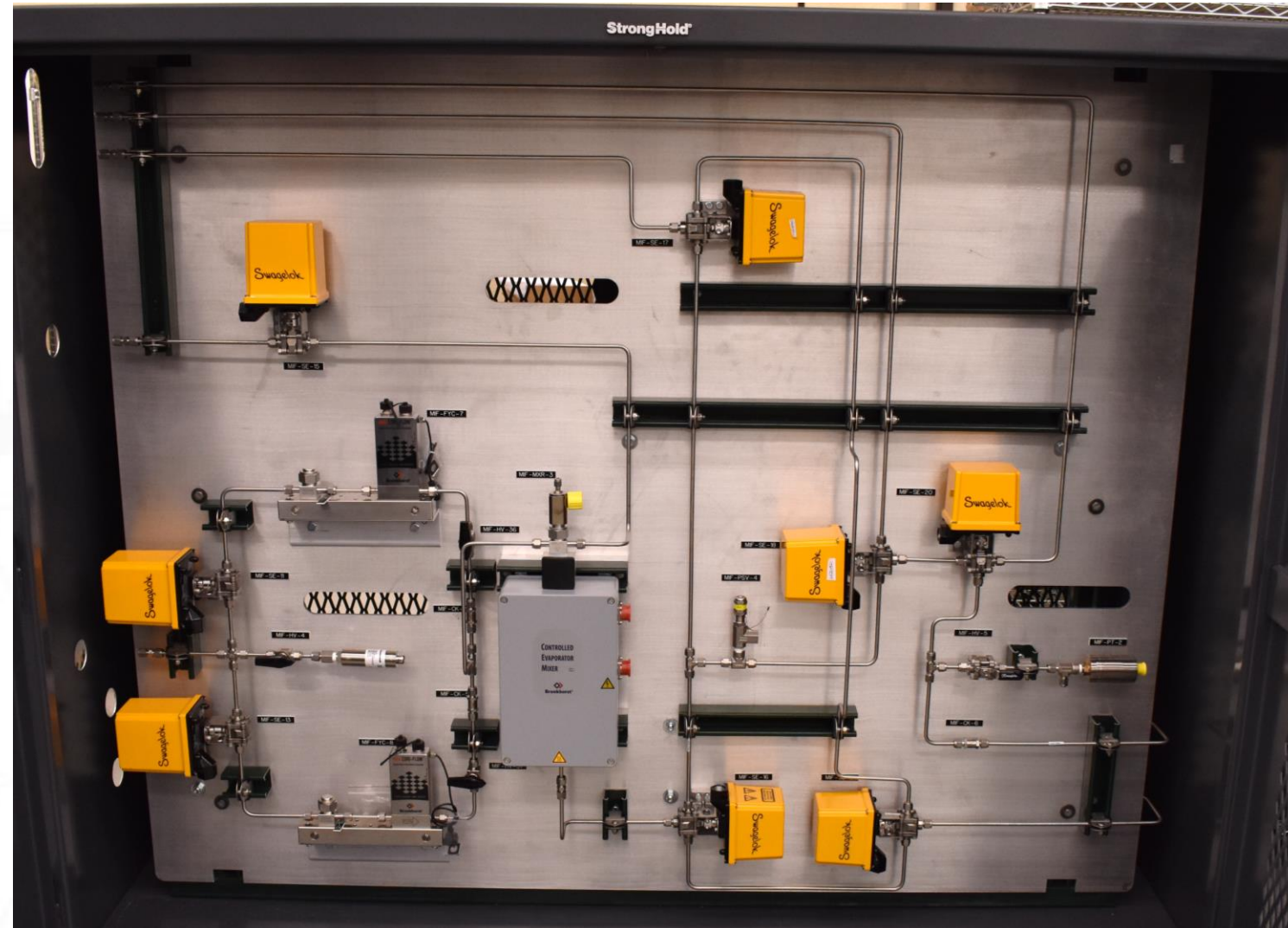
- Mass flow controllers
- Motor-operated valves
- Helium/air mixing chambers





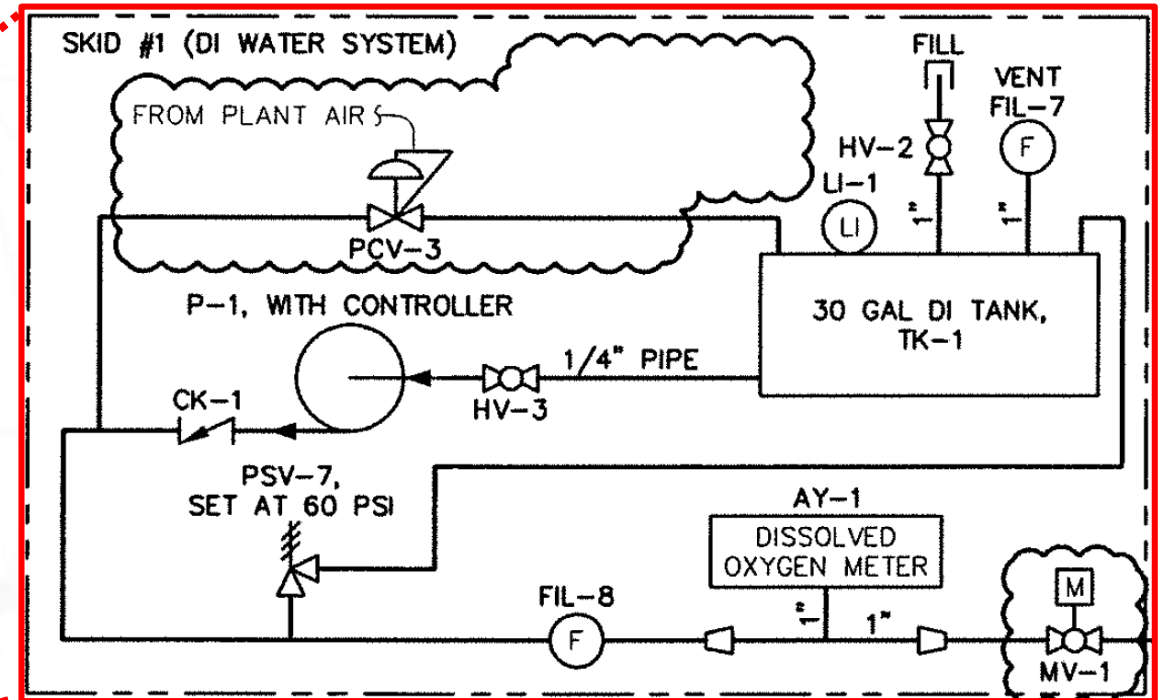
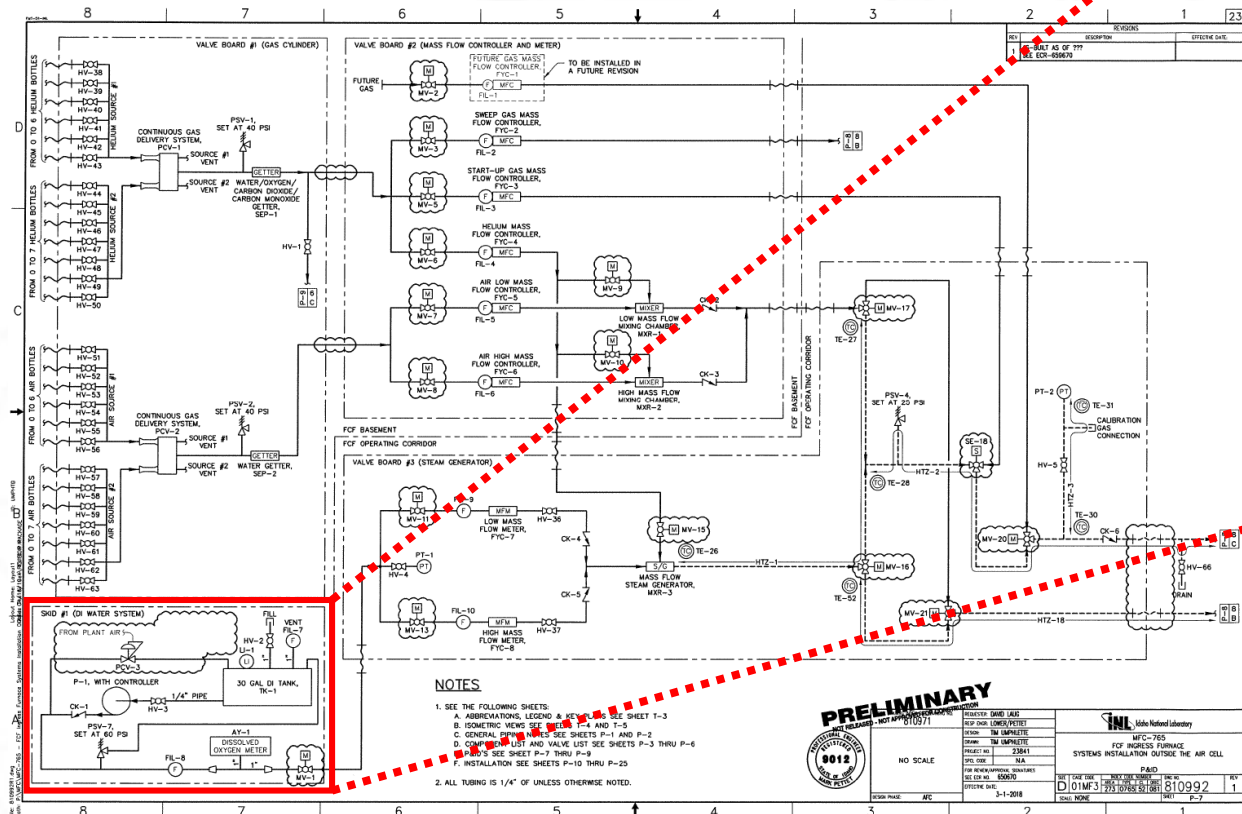
Steam generator and Steam/Helium Mixing (Board #2)

- Water flow meters
- Steam generator
- Motor-operated valves
- Helium/steam mixing
- Process pressure measurements

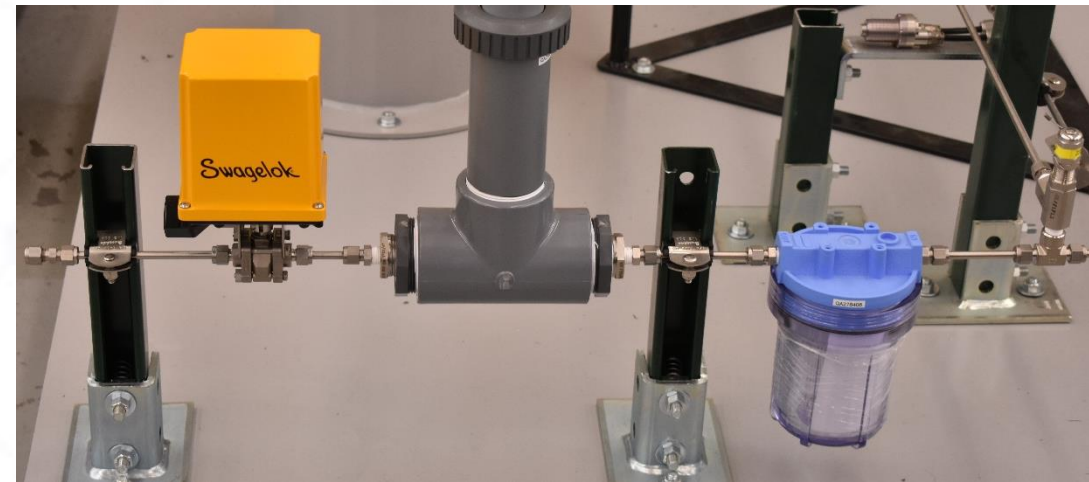
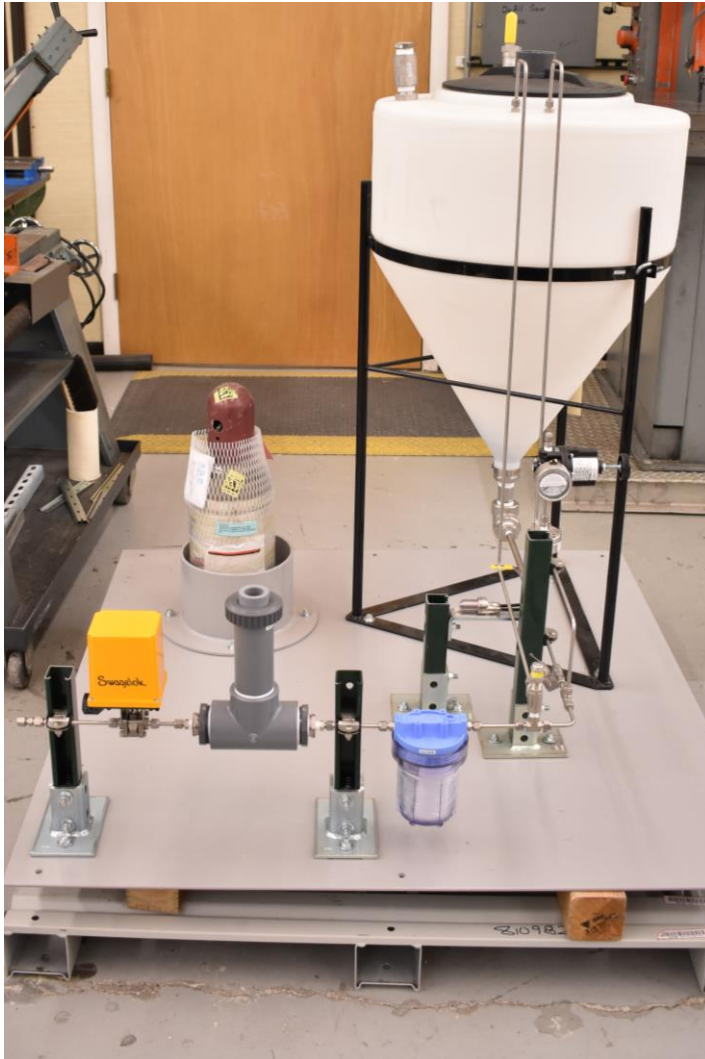


Water Supply and Water Collection (Skid #1)

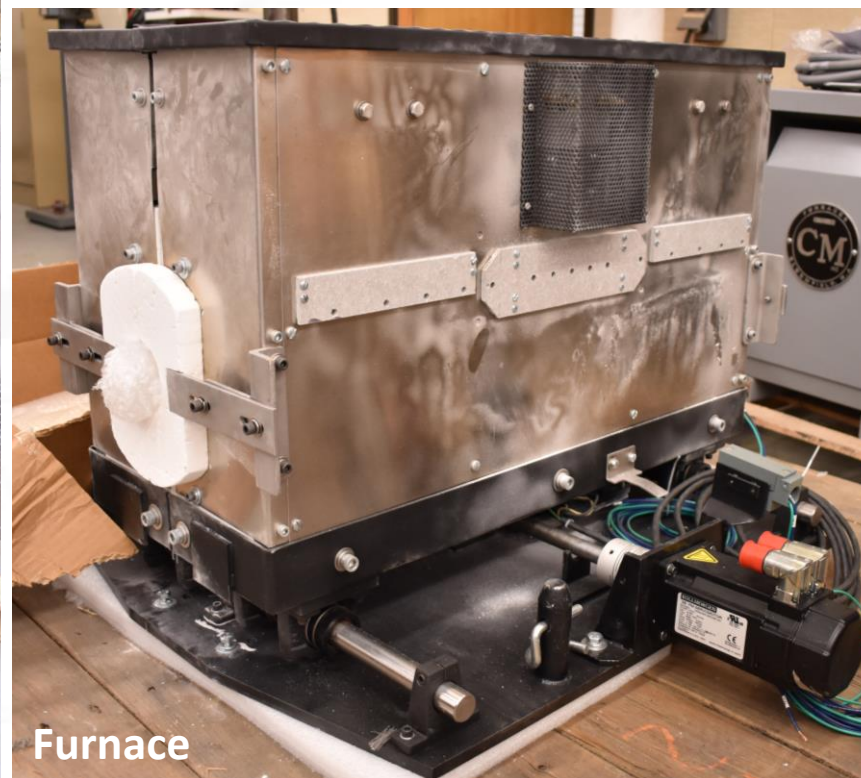
- 30-gallon tank
- Pump
- Dissolved oxygen sensor
- Supplies Valve Board #3



Skid #1 Water Supply



AMIX Furnace Delivered to INL



Furnace



Furnace Transformer

AMIX Furnace Delivered to INL

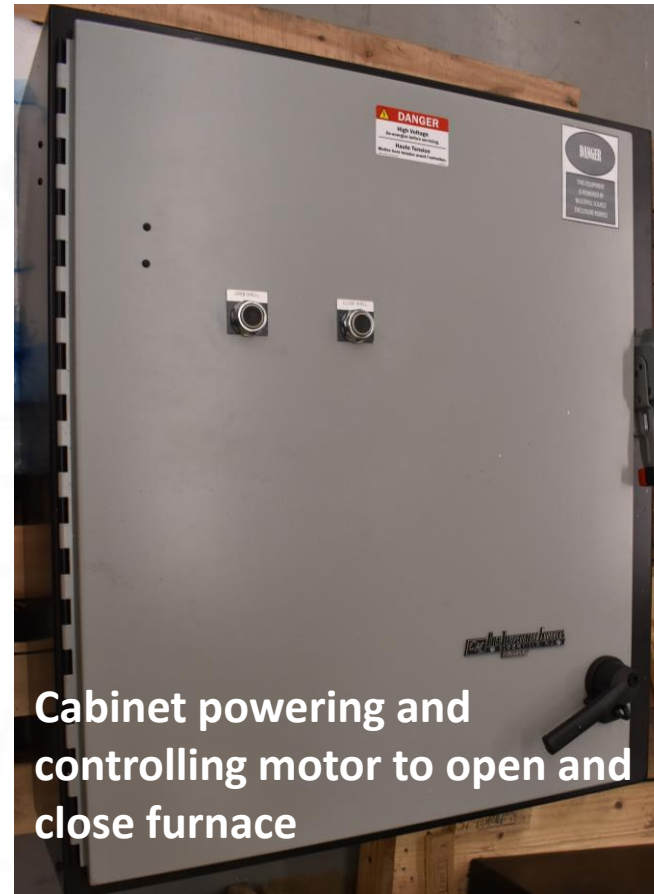


Furnace power
supply and control
cabinet

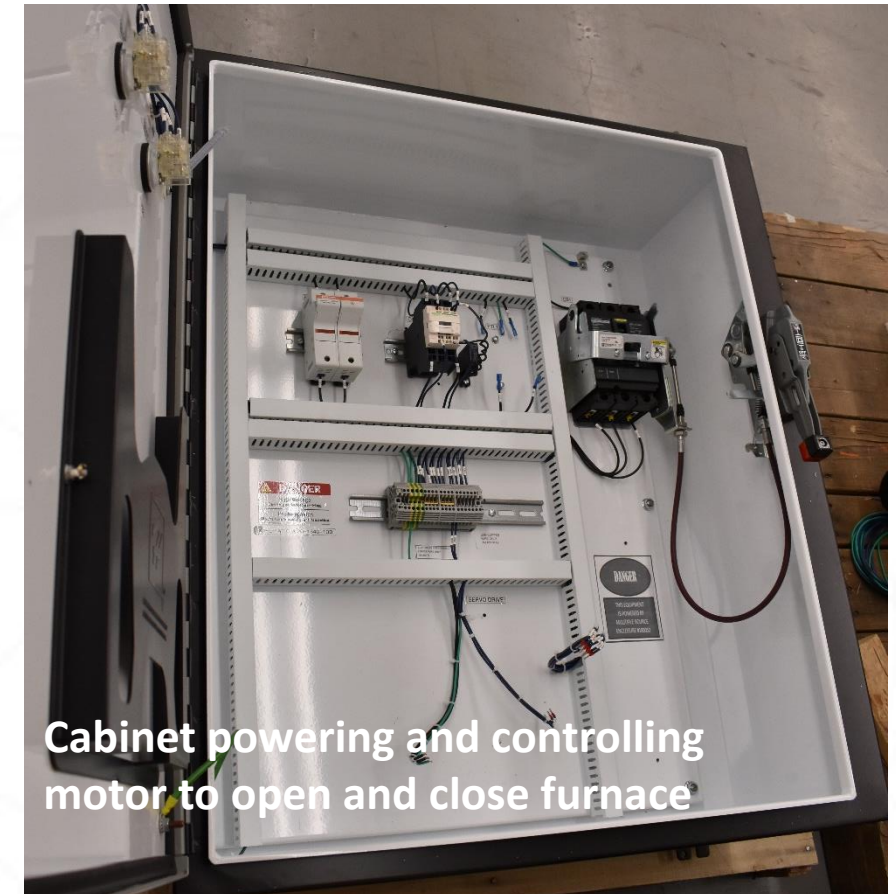


Furnace power
supply and control
cabinet

AMIX Furnace Delivered to INL



Cabinet powering and controlling motor to open and close furnace



Cabinet powering and controlling motor to open and close furnace