

March 5, 2026

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T-REXC Project Engineer

# TREAT Reactor Experiment Cell (T-REXC)

## Test Bed for MARVEL

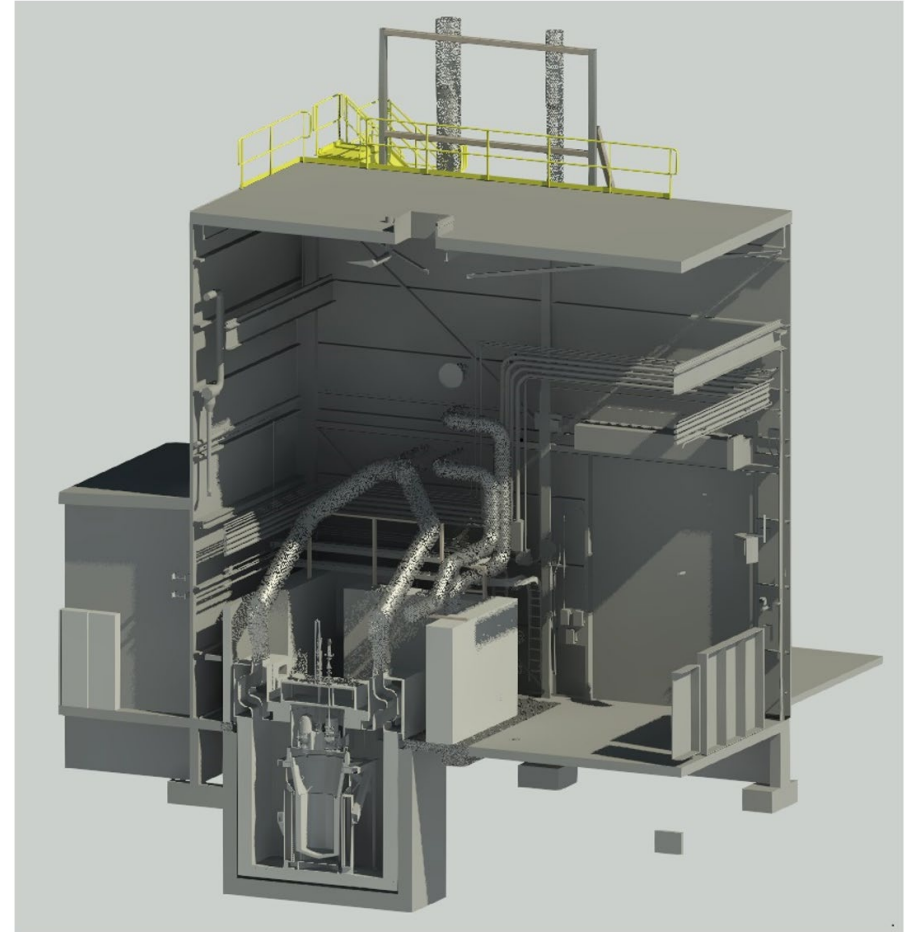
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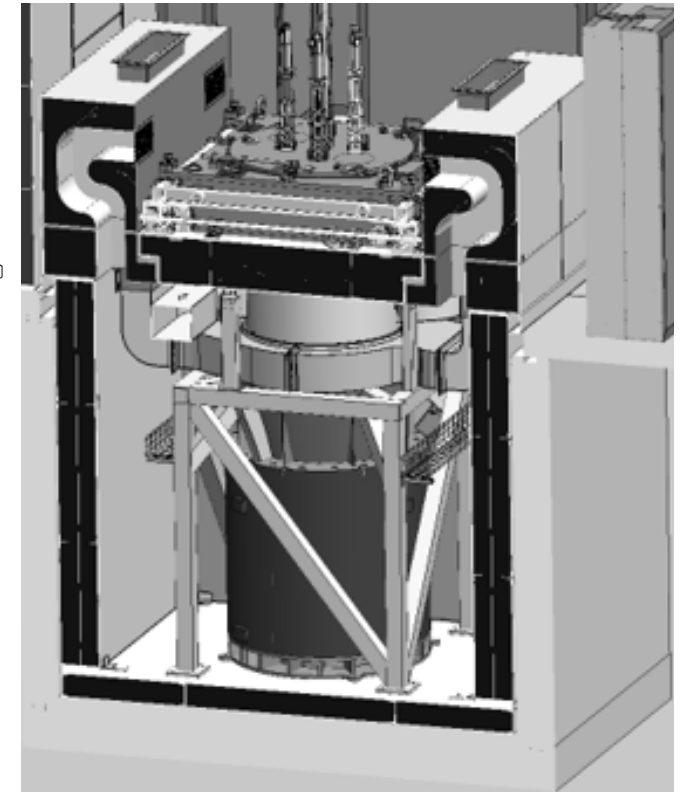
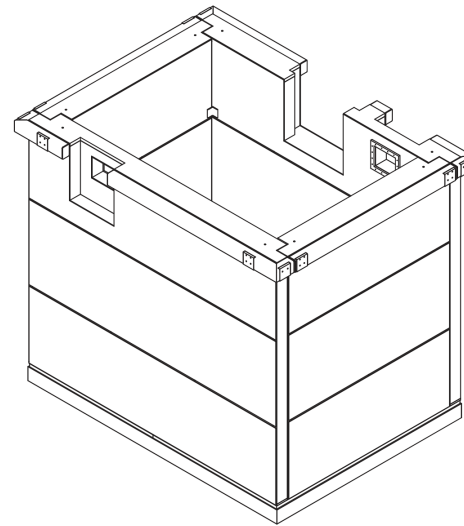
# T-REXC - Background and Overview

- The T-REXC test bed is INL-funded and is not part of the Microreactor Program.
- T-REXC establishes a versatile test bed for microreactors. The first reactor to utilize this test bed will be MARVEL.
- Critical components of T-REXC are as follows:
  - Shielded Pit
  - Utility Trenches
  - Ventilation Systems
  - Secondary Gamma Shield
  - Electrical Infrastructure
  - I&C capabilities
  - Radiation Monitoring
  - Fire Protection
  - Compressed Gas



# T-REXC - Shielded Pit

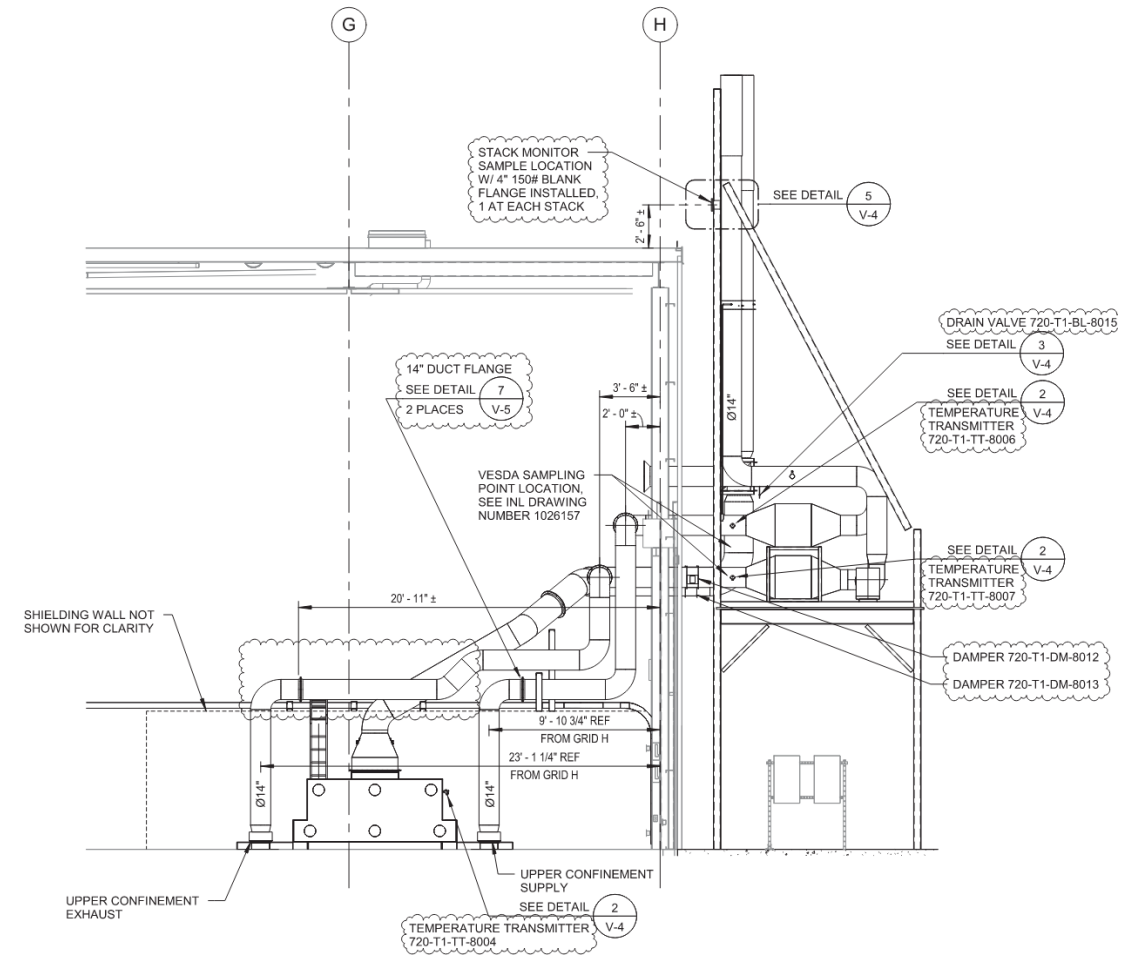
- The pit consists of the following:
  - Water extended polyester (WEP)-filled shielding surrounding the reactor
  - Base plate provides a level surface to mount the reactor to
  - Ventilation ducting sections
  - Utility penetrations
- Timeline:
  - Fabrication is included in the construction package that is currently out for bid
  - Required for MARVEL Full Power operation only





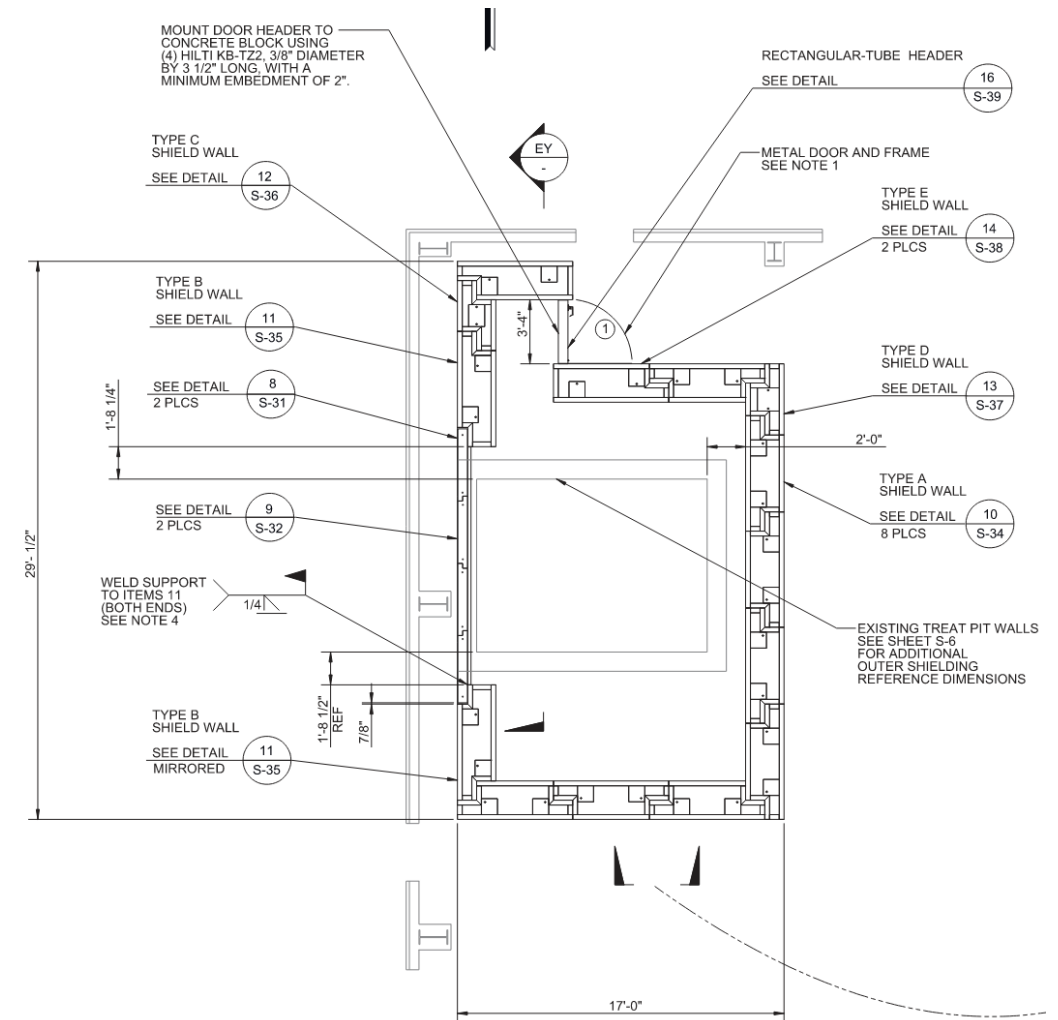
# T-REXC – Ventilation Systems

- The ventilation systems for T-REXC consist of two separate loops:
  - Main Ventilation System
    - Two 18” ducts with a single 20” stack
    - Safety-related
  - Upper Confinement Ventilation
    - Two 14” ducts with a single 20” stack
    - HEPA filtered intake and exhaust
    - Non-safety related
- Timeline:
  - Included in the construction package that is currently out for bid
  - Required for MARVEL Full Power operation only



# T-REXC – Secondary Gamma Shield Walls

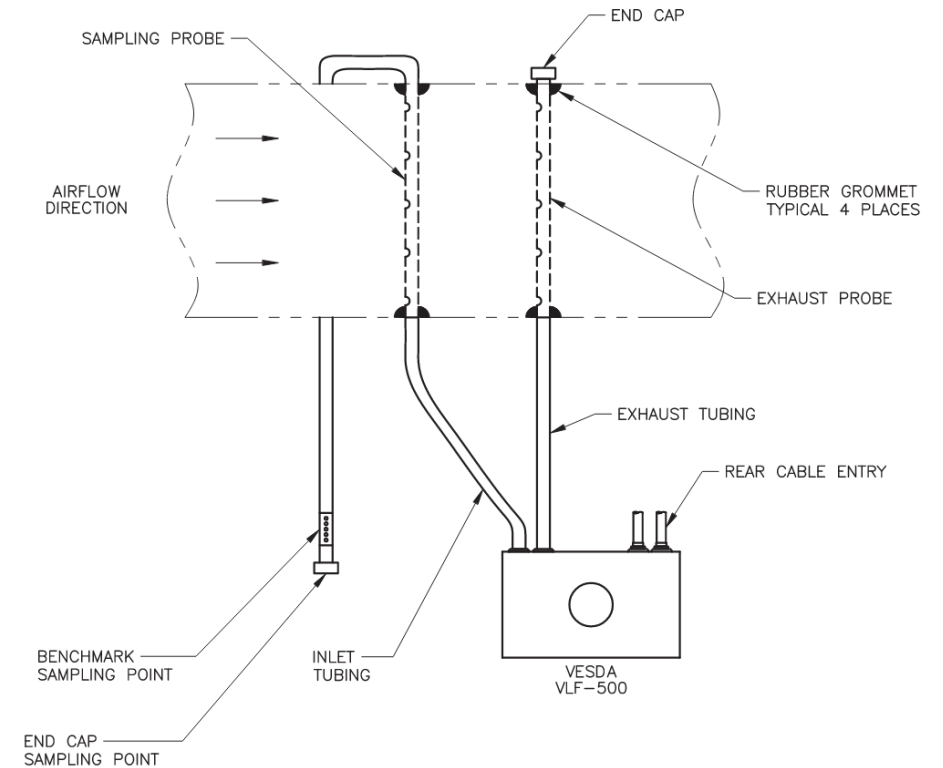
- Modular shield wall erected around the pit perimeter to reduce the downtime between reactor shutdown and personnel occupancy in the high bay
- Final configuration will be up to reactor demonstrator dose rates and equipment footprint requirements
- Partial to complete removal of the shield wall is being considered for MARVEL operation
- Timeline:
  - Fabrication is included in the construction package that is currently out for bid
  - Required for MARVEL Full Power operation only





# T-REXC – Monitoring Systems

- Additional monitoring systems are being installed inside of TREAT for higher fidelity monitoring in the area of the T-REXC test bed. These include:
  - Radiation Area Monitors (RAMs)
  - Flame Detectors
  - Very Early Smoke Detection Apparatus (VESDA) installed in the ventilation ducts
- Timeline:
  - Installation is included in the construction package that is currently out for bid
  - RAM installation was identified as a priority for MARVEL Dry Crit and will start this spring
  - Fire detection is required for MARVEL Full Power operation only



TYPICAL SAMPLING TUBE INSTALLATION

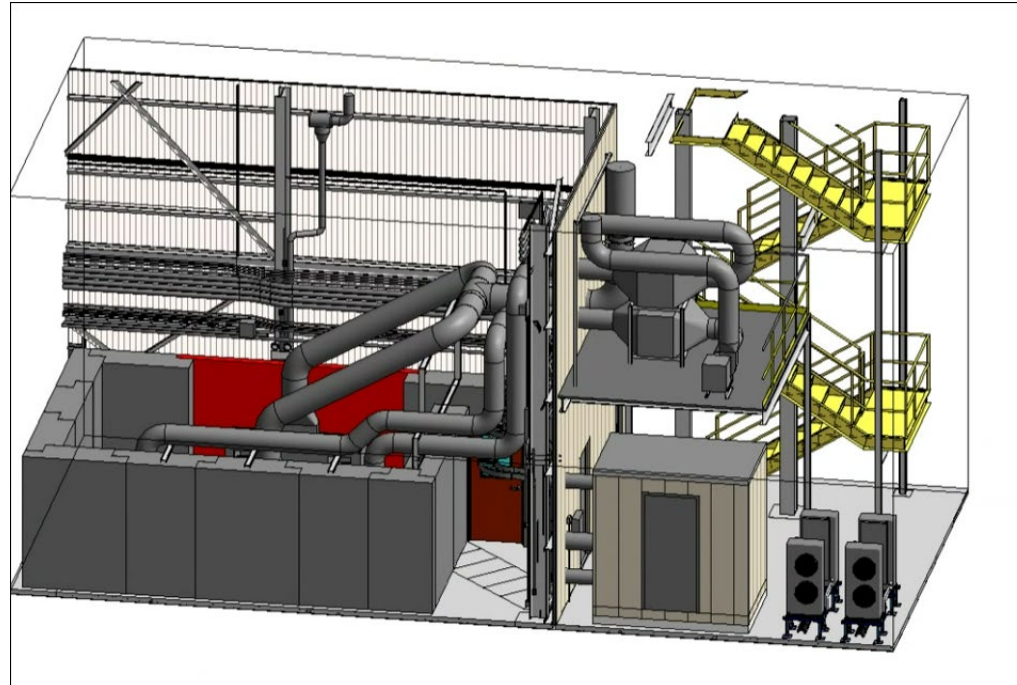
# T-REXC – Compressed Gas and Misc. Equipment

- A compressed gas bottle rack will be installed on the north, exterior of the TREAT building
  - Timeline:
    - Fabrication is included in the construction package that is currently out for bid.
    - Required for MARVEL Full Power operation only
- T-REXC owns and provides reactor demonstrators with the following equipment:
  - Beryllium oxide reflector components – April Delivery
  - 5 Curie AmBe source for startup – March Delivery



# Conclusion

- All T-REXC systems and components are on track to be completed in time to support both MARVEL Dry Crit and Full Power MARVEL operations
- The MARVEL and T-REXC project teams are in continuous collaboration to ensure compatibility between both designs as the MARVEL heat removal design matures





# Idaho National Laboratory

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