



ENERGY SCIENCE AND POWER SYSTEMS DIVISION EXPERIMENTAL SUPPORT

Test Site - High Energy Facility



- 6500 ft²
- Three high-energy conversion test cells
- National Instrument SCXI data acquisition and control
- 2500ft² assembly and fabrication area
- Prototype model shop
- Electronic controls and instrumentation assembly, calibration, and maintenance
- Energy conversion dynamometers
- High-temp. / low-press. steam generators
- Metal-fueled combustion spectrometry / diagnostics
- High power supplemental facility electrical service
- High pressure gas storage facility
- 500 gal. 180°F facility feed water system
- 2000 gpm @ 295 ft head cooling water system, 30000 gal. storage capacity
- 8 gpm @ 60 psig De-Ionized Water (>15 MΩ, organic free)



Rod Bundle Heat Transfer Facility (RBHT)



- 250 ft², 3 story
- Steam capability: exceeding 6000 lbm/hr
- Data Acquisition and Control: more than 500 channels; variable scan rate from 2 to 20 Hz during tests
- Dedicated Allegheny Power electrical service for heater rod power. Up to 750 KVA at 60 Vdc available
- 7x7 full-length simulated fuel assembly in prototypical power reactor core configuration
- 10kW per rod with skewed triangular power profile, simulating high burn-up axial power distribution
- Pressure: up to 60 psia for severe reflood conditions, significantly higher at less severe conditions
- Six (6) pairs of quartz windows for Laser Illuminated Digital Camera (LIDC) droplet size, distribution, and velocity measurements
- Thirteen (13) 3-pronged steam probes for sub-channel vapor and drop temperature measurement
- Sixteen (16) grid temperature T/C's
- Fifteen (15) fluid temperature T/C's attached to grids
- Twenty-three (23) fine-span (3"-H₂O) differential transducers for local void fraction measurement



Steam Plant – Test Facility



- 4650 ft²
- Three small scale thermal energy test cells
- Turbine / gearbox test cell
- National Instrument SCXI data acquisition and control
- 1065 ft² assembly and fabrication area
- Prototype model shop
- Electronic controls and instrumentation assembly, calibration, and maintenance
- Energy conversion dynamometer
- Superheated steam generator
- 2 high-power 1500 amp DC power supplies
- 300 gal. 180°F facility feed water system
- 600 gpm @ 205 ft head cooling water system, 5000 gal. storage capacity
- 8 gpm @ 60 psig De-Ionized Water (>15 MΩ, organic free)



Fueling Facility



- 1200 ft²
- Liquid metal handling facility
- Automated lithium alloy pouring system
- Remotely operated TIG welding station
- Ammunition and explosive storage and loading facility
- Water cooled MIG, TIG, and stick welding station



Additional Test Facility Features:

- 2000 psi high flow rate compressed air system
- Dynamic balancing facility
- 200,000 rpm bearing test rig
- 7000 rpm, 7.5 HP pump test rig
- 24" x 24" x 24" and 38" x 38" x 46" environmental chambers
- Computational facilities: ANSYS: structural, thermal, vibration; FLOW 3D: Computational Fluid Dynamics
- Roto-clone high capacity facility ventilation system
- Approved liquid and solid waste disposal services



**High-rate Energy Conversion
Power Plant Test Vehicle**



Turbine Testing



Combustor Testing