



# High Pressure Water Test Loop Facilities

Within CNL's Fluid Sealing Technology branch, there are a number of test loop facilities. Located at CNL's Chalk River Laboratories (CRL) the High Pressure Water Test Loop Facilities (HPWTLF) provide multiple means of simulating realistic reactor conditions for industrial equipment. The standard operating temperatures and pressures range from room temperature and atmospheric pressure up to 13.5 MPa and 330°C.

The HPWTLF has predominantly been used for the testing of nuclear-grade industrial components, such as seals, valves, burst discs, and corrosion studies of nuclear reactor pressure boundary materials. However, because they have never been exposed to radioactive particles they can be used for any type of industrial components.

The HPWTLF systems are designated as either a water supply loop, or a test stand. The water supply loop prepares the water for the test, through the use of in-line heaters, chemical ports, and multiple control systems. Multiple test stands are connected to each supply rig, and commonly contain the test specimen and associated instruments and control equipment. The currently connected test rigs include multiple rotating equipment characterization test stands, blast containment for use in corrosion and failure studies, as well as burst disk evaluation. Each loop has multiple test rigs valved in, allowing for a variety of tests to be conducted off of the same equipment. Some of the test rigs connected include blast containments for destructive testing, and rotating equipment for dynamic tests.

There are a number of facilities at CNL's CRL which complement the work performed at the High Pressure Water Test Loop Facilities such as the material surfaces, chemistry, and inspection branches. The facilities can run full scale testing of the corrosion mechanisms and stress-corrosion mechanisms of industrial components. By working with CNL's chemistry branches it is ensured that the system's water is at a known composition, while test facilities simulate the realistic conditions of operation. The inspection branches can provide a means of measuring any crack formation and growth throughout testing and the material surface branch is able to analyze the specimens after failure to determine the cause of failure.

CNL is looking to branch into different aspects of testing high quality industrial components. CNL offers potential partners the unique ability to develop a custom test apparatus or custom specimens and simply connect them to our facilities for testing.

## Types of tests include:

- Operation characteristics studies
- Lifetime studies
- Stress-corrosion cracking studies
- Failure analysis
- Fluid vibration studies
- Heat transfer studies

