The BWX Technologies, Inc. (BWXT) Fatigue and Fracture Laboratory (F&FL) routinely performs a wide variety of mechanical test methods on metallic samples. The F&FL is staffed with experienced engineers and technicians and is directly supported by a dedicated hot machine shop to ensure accurate and reproducible test results. Standard or non-standard specimens are designed by engineers, machined, and then tested in the F&FL.

**Experience**

The F&FL has handled more than 40 Reactor Vessel Surveillance Program (RVSP) capsules. RVSP capsules are usually irradiated in reactors for various periods of time and then withdrawn from the reactors for testing. The F&FL has also been instrumental in several projects where highly irradiated components such as vessel internals were removed from a reactor for mechanical testing.

**Equipment**

Equipment in the F&FL includes two 220 kN servohydraulic test machines and a 240 ft-lb Charpy impact tester. These machines are surrounded by 2 to 4 inches of lead to provide shielding for operators. Charpy impact, tension and compact tension fracture toughness tests are regularly performed in this laboratory in accordance with the appropriate ASTM standards. Remote handling tools and automatic specimen loading devices are available for transferring and loading of specimens. The F&FL is designed to handle specimens out of cell with radiation levels as follows (beta + gamma, single specimen):

- Charpy specimen - 2,000 mrem/hr at 30 cm
- Tension specimen - 2,000 mrem/hr at 30 cm
- Compact tension specimen - 7,000 mrem/hr at 30 cm

However, specimens with higher radiation levels can be handled if additional shielding is erected around the MTS test machine or the Charpy tester.
Elevated temperature tensile testing

Twenty sub-site tensile specimens produced from a small section of nozzle material

Services

- Charpy impact testing (ASTM E23 and A370)
- Tension testing (ASTM E8 and E21)
- Fracture toughness testing (ASTM E1820)
- Low cycle fatigue testing (ASTM E606)
- High cycle fatigue testing (ASTM E466)
- Fatigue crack growth rate testing (ASTM E647)
- Transition region fracture toughness testing (ASTM E1921)
- Vickers and Knoop microhardness testing
- Miniature specimen machining and testing