

## **NS01. A Remotely Operated Excavator**

Force feedback enables a single operator to use the HAZ-TRAK operated excavator with ease at nuclear waste sites and during decommissioning of nuclear facilities. HAZ-TRAK is a remotely operated excavator and material handling system for nuclear waste site characterization, waste site remediation, and the decommissioning of nuclear facilities.

HAZ-TRAK combines the power and mobility of a commercial excavator, with the dexterity and controllability of a force feedback manipulator system. When operating HAZ-TRAK as an excavator, the operator can feel buried objects. A master/slave control method enables the operator to intuitively control all the excavator arm functions with one hand. The basic HAZ-TRAK system consists of a tracked vehicle excavator and a remote operator control console. HAZ-TRAK can be quickly mobilized and transported using commercial ground or air service.

*For more, "A Remotely Operated Excavator," Nuclear Engineering International, pp. 41-43, January 1994.*