



## Soil and Sediment Transport Laboratory

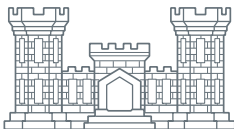
### Description

As the scientific advisor to the Department of Energy (DOE) for the Waste Isolation Pilot Plant (WIPP) project, Sandia has developed many capabilities that are applicable to other agency needs. The Soil and Sediment Transport Lab was recently constructed as part of Sandia's new Carlsbad Operations facility. Investigations are being conducted concerning the erosion and transport of WIPP repository materials during an inadvertent drilling intrusion and the effects of surface soil transport on the passive institutional controls upon site closure. Specific applications of this facility and Sandia's expertise provide essential information in the development of predictive tools for assessing potential adverse environmental impacts of erosion-inducing events on both marine sediments and surface soils.

Since its opening in January, 2000, the Soil and Sediment Transport Laboratory located at Sandia National Laboratories – Carlsbad Programs Group (SNL-CPG) in Carlsbad, New Mexico, has conducted various experiments for a variety of projects. Federal agencies such as the U.S. Army Corps of Engineers, the Environmental Protection Agency (EPA), the DOE, and the United States Department of Agriculture (USDA) have demonstrated interest and provided funding for utilizing Sandia's Carlsbad facility.

Sandia was responsible for the design and construction of a mobile flume and erosion-testing device funded by the Army Corps of Engineers, Coastal Hydraulics Laboratory in Vicksburg, Mississippi. The mobile flume includes measurement instruments and is fully contained in an enclosed trailer that can be towed from site to site. This is an ongoing collaborative project with the U.S. Army Corps of Engineers. The flume is designed to perform erosion experiments on mixed sediments under high-shear stress conditions. It also is used in research and mission support investigations of storm-induced erosion. The flume has been used in Massachusetts and Alaska and the Pecos River, NM.

Other lab funded research projects include the investigation of the erodibility of two sediments from the Boston Harbor. Again, the Army Corps of Engineers requested Sandia's expertise and shipped about 35 gallons of two sediments from the Boston Harbor for analysis in bulk density, particle size, mineralogy and organic carbon content.



**U.S. Army Corps  
of Engineers**



The EPA also sought Sandia's assistance to do a similar study on four sediment samples from the Canaveral Ocean Dredged Material Disposal Sites (ODMDS). Again, sediment samples were analyzed for determination of bulk density, particle size, mineralogy, and organic carbon content. This specific study can be used to effectively manage the Canaveral ODMDS to minimize the environmental impact of dredged material disposed there and its erodibility.

## Research and Existing Projects

- Analysis of sediment grain coatings from the Housatonic River was done by using an X-ray Diffractometer (XRD) and a Scanning Electron Microscope (SEM), which are both housed at the lab in the Carlsbad facility.
- Provide technical assistance to small businesses in New Mexico. This program received support from the 2000 New Mexico Legislature and is designed to help small businesses in the state, particularly in rural areas such as Carlsbad. The program provides Sandia's assistance at no cost to small businesses.
- Ranchers and farmers in the Carlsbad area who are users of the Carlsbad Irrigation District (CID) are participants in the Pecos River Project. The project specifically addresses analysis of sediment properties on the Pecos River by use of the high shear stress flume. This particular program has received a high rate of participation and support from the CID and its members. The study involves determining turbidity and water quality of the river, along with water use and management for conservation efforts. Research done on this project will also assist with conservation efforts for the Bluntnose Shiner, a fish on the endangered species list.
- Modification of the high shear stress flume for bedload and suspended bedload measurements, a project involving the Army Corps of Engineers. The modification provides for a device to be attached to the high-shear stress flume and would separate these types of loads from the bulk erosion currently measured by the flume.
- Design and construct a new flume that will be used for oscillatory flow induced erosion, another project that will include work with the Army Corps of Engineers. This new development will enhance the flume's capabilities to perform high-shear stress erosion experiments in coastal waters.

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