

## EXECUTIVE SUMMARY

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Science Applications International Corporation (SAIC) conducted a monitoring survey at the Central Long Island Sound Disposal Site (CLIS) from 27 August to 1 September 1995 as part of the Disposal Area Monitoring System (DAMOS) Program. The field operations were concentrated over the New Haven 1993 (NHAV 93), CLIS 1994 (CLIS 94), and Field Verification Program (FVP) mounds and consisted of precision bathymetric surveys, Remote Ecological Monitoring of the Seafloor (REMOTS®) sediment-profile photography, and geotechnical coring. These surveying techniques were employed to monitor the stability, cap thicknesses, consolidation rates, and benthic recolonization of the NHAV 93, CLIS 94, and FVP mounds.

The NHAV 93 mound represents the culmination of ten years of thoughtful planning and controlled disposal at CLIS. This mound was developed during the 1993/94 disposal season as part of a large scale confined aquatic disposal (CAD) project. From 1984 through 1992, disposal operations at CLIS led to the construction of a ring of disposal mounds. This ring formed an artificial containment cell that was capable of accepting a large volume of unacceptably contaminated dredged material (UDM), limiting the lateral spread of the deposit and, in turn, facilitating efficient capping operations. The NHAV 93 mound was formed by the placement of approximately 590,000 m<sup>3</sup> of UDM within the ring of seven historic disposal mounds. The UDM deposit was then covered to a thickness of 0.5 m to 1.0 m by 569,000 m<sup>3</sup> of capping dredged material (CDM).

SAIC has conducted a total of seven bathymetric, four REMOTS® sediment-profiling, and five geotechnical coring surveys over the NHAV 93 mound since September 1993. The comprehensive time-series data set documents the formation of the mound within the containment cell as well as its gradual consolidation and benthic recolonization. In addition, the wealth of data has provided SAIC and the US Army Corps of Engineers, New England Division (NED), with significant insight into the short- and long-term effects of disposal and oceanographic processes on large dredged material mounds.

The results of the September 1995 field effort indicate a moderate amount of consolidation (0.25 m) over the majority of NHAV 93 with several pockets of 0.5 m consolidation near the center of the mound. The heterogeneity of the material collected in the five-member geotechnical coring data set makes tracking a single sediment horizon throughout the project difficult. However, indicators such as shell fragments, gravel, and detritus were useful in differentiating ambient, historic, UDM, and CDM sediment strata. REMOTS® sediment profile-photography found the biota occupying the surface sediments of the NHAV 93 mound to be recovering as anticipated. A seasonal reduction in dissolved oxygen within the central Long Island Sound region appeared to be responsible for

## EXECUTIVE SUMMARY (continued)

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shallow redox potential discontinuity (RPD) depths over the NHAV 93 mound as well as the CLIS reference areas. As a result, lower than expected organism-sediment index (OSI) values were found near the center and extreme southern and eastern stations despite the presence of Stage III organisms at eleven of thirteen stations over the NHAV 93 mound.

In September 1994, a disposal buoy marked "CDA" was deployed at 41°09.343' N, 72°53.099' W by SAIC to the northeast of the NHAV 93 mound. Approximately 129,900 m<sup>3</sup> of UDM was deposited at the buoy from late November through mid-December 1994 to form the foundation of the CLIS 94 mound. At the conclusion of UDM disposal operations, the CDA buoy was struck by a disposal barge and dragged off-station. The buoy was repositioned to 41°09.334' N, 72°53.084' W before the start of CDM deposition over the CLIS 94 mound. The UDM deposit was capped to a thickness of 0.5 to 1.0 m from January through May 1995 with an estimated volume of 161,000 m<sup>3</sup> of CDM. The placement of the CLIS 94 mound approximately 630 m northeast of NHAV 93 began the formation of a second containment ring capable of accommodating a future CAD mound project.

Bathymetric data collected over the CLIS 94 mound exhibited a moderate sized, stable, and completely capped feature of the CLIS seafloor. The new CLIS bottom feature is approximately 470 m wide at the center with a mound height of 3.25 m at the apex. The CLIS 94 mound has completely incorporated the CS-90-1 mound, a capped mound developed during the 1989/90 disposal season. Benthic recovery of CLIS 94 was advanced with Stage III organisms present at the majority of REMOTS® stations in spite of the recent impact of disposal and added stress of seasonal hypoxia.

The FVP mound is a small mound in the northeast corner of CLIS composed of uncapped UDM dredged from Black Rock Harbor in the spring of 1983. It was formed as part of an Environmental Protection Agency (EPA) and US Army Corps of Engineers, Waterways Experiment Station (WES) joint effort to evaluate various dredged material disposal alternatives. Since 1991, FVP has displayed instability in the benthic infaunal population inhabiting the surface sediments. September 1995 REMOTS® results from FVP continue to show a lack of a stable, healthy benthic environment with the presence of depressed RPD and OSI values near the center of the mound. However, the effects of a decrease in available oxygen on the organisms inhabiting FVP might be amplified due to the preexisting stress of occupying a deposit of uncapped UDM. The FVP mound has been monitored periodically as a source of comparison for other mounds at CLIS since its formation in 1983. Now that the WES/EPA experimentation has concluded, capping of the FVP mound in order to isolate the UDM from the marine environment is recommended.