

EXECUTIVE SUMMARY

Science Applications International Corporation (SAIC) conducted a monitoring survey at the Central Long Island Sound Disposal Site (CLIS) from 10 to 18 July 1994 as part of the Disposal Area Monitoring System (DAMOS) Program. The July 1994 field operations were concentrated over the New Haven 1993 (NHAV 93) and Mill-Quinnipiac River (MQR) disposal mounds and consisted of precision bathymetric, subbottom, surface sediment characterization, and Remote Ecological Monitoring of the Seafloor (REMOTS®) sediment-profile surveys, as well as grab sampling and geotechnical coring. These surveying techniques were used to monitor the stability, cap thickness, and benthic recolonization of the NHAV 93 and MQR mounds.

In September 1993, two disposal buoys were deployed at CLIS. The NHAV buoy was positioned at 41°09.122' N, 72°53.453' W in the center of a ring of disposal mounds as part of a large scale confined aquatic disposal (CAD) project. The CDA buoy was deployed over the previously capped MQR mound (41°08.637'N, 72°53.859'W) as part of a de facto capping and cap augmentation project. Approximately 65,000 m³ of sediment was deposited at the CDA buoy, adding to the existing layers of dredged material that compose the MQR mound.

Since 1984, the management strategy at CLIS has been to develop a ring of disposal mounds creating an artificial lateral containment cell for the deposition of large volumes of dredged material. Utilizing the ten-year dredging cycle in the central Long Island Sound region, the US Army Corps of Engineers, New England Division (NED) managed the disposal of small to moderate volumes of material in order to fabricate a containment cell at CLIS. During the 1993/94 New Haven Capping Project, this feature received approximately 590,000 m³ of unacceptably contaminated dredged material (UDM), followed by 569,000 m³ of CDM. The ring of mounds greatly reduced the lateral spread of the UDM mound apron, facilitating the efficient capping operations and yielding a flat, stable CAD mound.

During the 1993/94 disposal season, six bathymetric and two REMOTS® sediment-profiling surveys were conducted over the NHAV 93 mound to monitor the progress of the CAD mound construction. The latest field effort, four months after the completion of capping operations, found no major topographic changes in the NHAV 93 mound in comparison to the postcap bathymetric survey of March 1994. The MQR mound height increased 1.5 m, creating a new apex, with no increase in overall diameter relative to the bathymetric survey of December 1991.

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The cap thickness over the NHAV 93 mound was found to meet the minimum cap thickness requirements of the project, 0.5 m. A full spectrum subbottom profile survey (X-Star), in conjunction with precision bathymetric and geotechnical core data, detected an average of 0.75 m of cap material along the margins of the UDM deposit to 1.25 m at its center. The subbottom profiler allowed for the quantification of the cap material deposited northwest of the NHAV buoy that previously could not be discerned through conventional bathymetric data processing. Surface layer grain sizes were assessed with the use of SAIC's Sediment Acoustic Characterization System (SACS) as well as REMOTS® sediment-profile photography and bottom grab samples. The surface layers of cap material over the NHAV 93 mound were comprised mainly of silt and clay. The MQR mound exhibited a heterogeneous mixture of grain sizes ranging from silt and clay at the margins of the mound to pebble and cobble size grains at the center of the supplemental CDM deposit.

Benthic recolonization of the project mounds was also determined from the REMOTS® photographs. Data collected at the MQR and NHAV 93 mounds were compared to three reference areas surrounding CLIS. The MQR and the majority of NHAV 93 project mounds met or exceeded the predicted recolonization rates from the DAMOS tiered monitoring and management protocol. Stage I assemblages were predominant, and occasional Stage II or Stage III organisms were present at peripheral stations. However, three stations on the NHAV 93 mound were found to be areas of concern. Patchy Stage I communities and shallow redox potential discontinuity (RPD) depths were apparent in REMOTS® photographs collected at Stations 200N, CTR, and 400S.

In September 1994 additional sediment samples were collected to conduct *Ampelisca* bioassay testing and determine whether further action by NED was required (i.e., cap supplementation). The results of bioassay testing indicated no significant difference in comparison to reference area sediments. Therefore no immediate action was required, but as part of the DAMOS tiered monitoring protocol, RPD depths and successional stage status at Stations 200N, CTR, 400S continued to be closely monitored for changes in the benthic community.

REMOTS® photographs collected over reference area 2500W indicated a recent benthic disturbance consistent with the effects of trawling activity. Surface layer disturbances and shallow RPD depths made comparisons between 2500W and the project mounds difficult. However, the multiple reference area approach used by the DAMOS Program required the collection of REMOTS® data at two additional reference areas, CLIS-REF and 4500E. The data collected at CLIS-REF and 4500E displayed the

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characteristics of healthy, well-established benthic communities in ambient sediments for comparison to the NHAV 93 and MQR mounds.

Sediment samples were obtained for chemical analysis at the NHAV 93 and MQR mounds, as well as the three CLIS reference areas. The sediments were tested for grain size distribution, total organic carbon (TOC), polynuclear aromatic hydrocarbons (PAHs), and heavy metals. The results of the chemical analyses indicate that the sediments obtained from the surface of both disposal mounds were, in general, similar to the samples collected within the CLIS reference areas. In all cases, the sediment metals concentrations were categorized as "low" to "moderate" in accordance with the guidelines set forth by the New England River Basins Commission (NERBC). The PAH concentrations of the NHAV 93 and MQR mound sediments were found to be lower than the average values for several National Status and Trends (NS&T) stations within the central Long Island Sound region. The results of this sampling and chemical analysis verify the placement of suitable capping materials over both mounds.