EXECUTIVE SUMMARY

A monitoring survey was conducted at the Field Verification Program (FVP) dredged material disposal mound in June 2005. The FVP mound was created at the Central Long Island Sound Disposal Site (CLDS) during the 1982-83 disposal season as part of the joint USEPA/USACE Interagency Field Verification of Testing and Predictive Methodologies for Dredged Material Disposal Alternatives Program, also known as simply the Field Verification Program. The primary objective of the 2005 survey was to determine current benthic community conditions and the distribution of contaminants across the FVP disposal mound. A second objective was to provide background information in support of determining future management options for the FVP mound. The FVP mound has been one of the most intensively monitored mounds in the DAMOS Program over the past two decades. It is a unique case study of the long-term effects of placing material unsuitable for unconfined open-water disposal at an open-water location and, by default, employing an alternative remediation strategy of monitored natural recovery (MNR).

Black Rock Harbor (BRH) sediment was used in a series of disposal experiments in the early 1980's and placed in upland, wetland, and aquatic settings. The unconfined, open-water FVP disposal mound was created from the disposal of approximately 55,000 m^3 of BRH sediment in May 1983. The mound was sampled frequently during the first five years after creation as part of the FVP, with concurrent and subsequent monitoring under the auspices of the DAMOS Program. Periodic monitoring has evaluated ecosystem recovery and long-term trends in benthic recolonization on the mound. The mound has shown a wide range of benthic community responses, from an initial classic primary successional recovery, to episodes of retrograde succession following regional events affecting Long Island Sound.

In June 2005, cores and Sediment Profile Imaging (SPI) stations were selected randomly on both the bathymetrically detectable mound and the historical extent of the flanks. The survey results showed the widespread presence of Stage III fauna at the disposal mound, with benthic communities on both the mound and flanks functionally equivalent to reference areas. The notable characteristics, as measured by the SPI camera, included the persistence of the dark optical signature in the subsurface sediments, the relatively shallow redox potential discontinuity (RPD) found in stations located on the center of the mound, and the lack of intense, bioturbational reworking of the sediments at depth. Most of the chemicals of concern showed a distinct pattern between the cores collected from reference areas, on the central mound, and on the historical mound flanks. Contaminant concentrations were low or below detection limits in reference samples, slightly higher in the flank cores, and highest in the central mound cores in samples collected from >10 cm below the sediment-water interface. The decrease of BRH-associated chemicals in the surface sediments of the FVP area suggests that active diagenesis is taking place, most rapidly in the flank where only thin layers of dredged material were originally present. Active sedimentation, combined with bioturbation, and sediment microbial metabolism are likely the main drivers of diagenesis that dilute the chemical signature of BRH sediment.

Natural recovery of the historical flank sediments of the FVP mound has resulted in little biological and chemical difference relative to reference sediment, although the underlying Black Rock Harbor material remains. Ambient sedimentation is the dominant catalyst for this recovery. Bioturbation is an important process in creating a mixing zone, and promoting oxygenation and successional recovery of the upper sediment layers. The mound has received an estimated 5-10 cm of new sediment from natural deposition processes since mound disposal. The BRH sediment at the central portion of the mound is covered by a thin ambient cap of oxygenated, relatively clean sediment, but the presence of contaminated sediment below this cap continues to hamper recovery. The cumulative record of monitoring to date at the FVP mound suggests that surface sediments at the center of the mound are susceptible to occasional retrograde biological succession due to periodic hypoxic events in bottom water, and potential resuspension of surface sediment.

One management alternative for the FVP mound is to cap, to ensure encapsulation of the BRH-associated contaminants in the center of the mound. Alternatively, a strategy of continued monitoring that is focused on both natural sedimentation processes in LIS, and MNR processes for dredged material deposits, may prove useful for a variety of applied and research objectives. The questions raised by analysis of historical FVP data suggest that there could be benefits for the dredged material management and sediment remediation community as a whole from future targeted monitoring. Some future monitoring and research objectives are suggested, including high resolution acoustic imaging, and creating a predictive model for the rate of continued MNR at the FVP mound.