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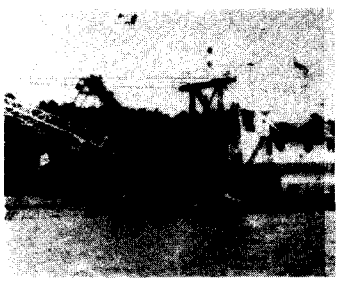

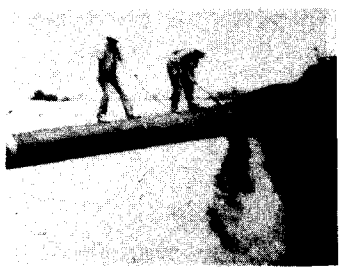

ENVIRONMENTAL LABORATORY

DREDGING OPERATIONS TECHNICAL SUPPORT PROGRAM

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ENGINEERING DESIGN AND ENVIRONMENTAL ASSESSMENT OF DREDGED MATERIAL OVERFLOW FROM HYDRAULICALLY FILLED HOPPER BARGES IN MOBILE BAY, ALABAMA

by

Douglas G. Clarke, Jurij Homziak, Robert L. Lazor, Michael R. Palermo

Environmental Laboratory

Glynn E. Banks, Howard A. Benson, Billy H. Johnson, Tamsen Smith-Dozier

Hydraulics Laboratory

DEPARTMENT OF THE ARMY
Waterways Experiment Station, Corps of Engineers
3909 Halls Ferry Road, Vicksburg, Mississippi 39180-6199

Gene Revelas

Science Applications International Corporation
Newport, Rhode Island 02840

Michael R. Dardeau

Dauphin Island Sea Lab
Dauphin Island, Alabama 36528

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Dredging Operations Technical Support

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Interagency Field Verification of Methodologies for Evaluating Dredged Material Disposal Alternatives (Field Verification Program)

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19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Barge overflow was investigated as a cost-effective option for future dredging needs in Mobile Bay, Alabama. Tests of hopper barge loading characteristics with overflow operations were conducted in Mobile Bay. In theory, overflow would allow denser materials to settle within the barge while less dense materials were shunted overboard. Increased density of barge-held materials would then translate to cost savings via a reduced requirement for transport to a distant approved disposal site. Thus, one major objective of the study was an engineering evaluation of equipment performance during the tests. A second major objective was to obtain field data for an assessment of the environmental consequences of overflow. In support of both objectives, modeling studies were performed to simulate overflows that would be associated with routine dredging operations.

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Engineering design
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Suspended sediments

19. ABSTRACT (Continued).

Eight separate tests were conducted. Three tests occurred at a site in lower Mobile Bay, and five tests at an upper bay site. Three tests (one lower bay, two upper bay) involved dredging in maintenance materials, and five tests (two lower bay, three upper bay) involved new work or deepening materials.

Measured increases in loading obtained by overflow of hydraulically filled hopper barges with the equipment and techniques used were too small to justify their routine application on strictly an economic basis. However, engineering solutions such as incorporation of y-valves to divert low-density flows from the barges could conceivably improve observed loading characteristics. Addition modifications to dredging techniques, such as allowance for wider sweeps of the cutterhead or shortening the length of pipeline between the dredge and the hopper barge, could contribute to overall improvements in performance. Overflow operations involving mechanically rather than hydraulically filled barges may provide another means of achieving economic benefits.

With respect to environmental concerns, overflow operations in which the point of discharge lies close to the channel represent a relatively safe dredging alternative. Evidence from both field and modeling studies indicates that acute impacts due to suspension of sediments in the water column or accumulation of overflow sediments on the bottom would be restricted to the side slopes of the navigation channel and small patches of adjacent shallow, flat habitat. Given the current state of knowledge regarding the adaptations and tolerances of organisms in the Mobile Bay system, these small areal-scale impacts would be short-term in nature and would not have significant impacts on biological communities in Mobile Bay.