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31 July 1978

SUBJECT: Transmittal of Technical Report D-78-28

TO: All Report Recipients

1. The technical report transmitted herewith represents the results of one of several research efforts (work units) undertaken as part of Task 3B, Upland Disposal Concept Development, of the Corps of Engineers' Dredged Material Research Program (DMRP). Task 3B, part of the Productive Uses Project (PUP), had a general objective of determining the feasibility of inland disposal of dewatered dredged material.

2. Because of increasing constraints on open-water disposal of dredged material, the Corps of Engineers has had to resort more and more to land disposal. In the past, land disposal sites have been located close to the dredging project, primarily to minimize material transport costs, afford easy access by water, and allow effluent to return to the waterway. However, location of new land disposal areas near dredging projects is severely constrained by environmental and land-use considerations. Consequently, the primary objective of this study was to identify and evaluate transportation systems for the movement of dredged material inland to areas with higher potential for acceptable disposal.

3. Pipeline slurry (hydraulic and pneumatic), rail haul, barge movement, truck haul, and belt conveyor transportation alternatives were analyzed on the basis of technical and economic considerations for the movement of large quantities of dredged material over relatively long distances. For all but the pipeline slurry mode, the material being moved was assumed to be in a relatively dry form. It was also assumed that the dredging system would not be part of the long-distance transport system and that all long-distance transport would originate from a rehandling facility. Annual quantity of movement was varied from 500,000 to 5,000,000 cu yd while the distance was varied from 6 to 325 miles.

4. It was concluded that generally the truck haul and belt conveyor systems would be the most expensive, irrespective of the annual volume and distance of movement. Hydraulic pipeline movements were generally

the cheapest although as volumes and distances increased, barge and then rail systems became more economical. Cost of transportation varied considerably depending on the system, annual volume, and distance transported. The cost varied from a low of $0.80 per cu yd for hauling 5,000,000 cu yd/per year 20 miles by hydraulic pipeline to a high of $34.00 per cu yd for moving 500,000 cu yd/per year 60 miles by conveyor belt.

5. The report offers costs estimates and comparison of estimates for planners and engineers to use in evaluating the economics of transporting dredged material long distances inland. It also contains a detailed methodology for designing long-distance hydraulic transport systems for dredged material movement.

JOHN L. CANNON
Colonel, Corps of Engineers
Commander and Director

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

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

The purpose of this study is to identify and evaluate transportation systems applicable for the movement of dredged material inland. As such, this report is intended to provide the Corps of Engineers with generalized data which can be utilized in evaluating the economic potential of inland disposal alternatives for specific applications across the country. In this regard, considerable detail from both a technical and economic point of view is

(Continued)

20. ABSTRACT (Continued).

provided to allow the users of this report to apply the information presented herein to their particular situations. Where a given application requires modification in a specific transportation concept and/or an alteration in specific cost elements, the level of detail in this report should facilitate any such required changes.

Five basic transportation modes have been examined in this study: pipeline slurry, rail haul, barge movement, truck haul, and belt conveyor movement. Combinations of these basic modes have been considered where appropriate. The dredged material which is to be transported is considered to be in either a slurry or a "relatively" dry material form. The slurry form will vary in density depending on the type and gradation of the material and the specific application under consideration. In this study the only transportation mode that is examined for the movement of a slurry mixture is the pipeline alternative. For the pipeline movement of dredged material in a slurry state, varying slurry and in situ densities are examined. The other transportation modes are concerned with the movement of relatively dry material because hauling large quantities of water is uneconomical.

The distances over which the dredged material is to be moved vary from about 6 to 300 miles. For a given application, the annual volume of movements examined in the study varies from 500,000 to about 5,000,000 cubic yards per year.

A final consideration associated with this study is that the results presented herein have been developed for a generalized application of the movement of dredged material from point A to point B anywhere across the country. It is recognized that each application will have unique features such as terrain, weather conditions, labor rates, etc. Given the potential myriad of applications which may occur, it would be impossible to cover all situations in this report. Therefore, it was acknowledged that this is a generalized study to be used as a guide in transportation planning but not in the absolute prediction of transportation costs for a given situation.