



Independent Technical Review of Navigation Channel Improvement Studies

Evaluación Técnica Independiente de Estudios de Mejoras a los Canales de Navegación

Great Lakes Dredge & Dock Co.

Abril del 2004

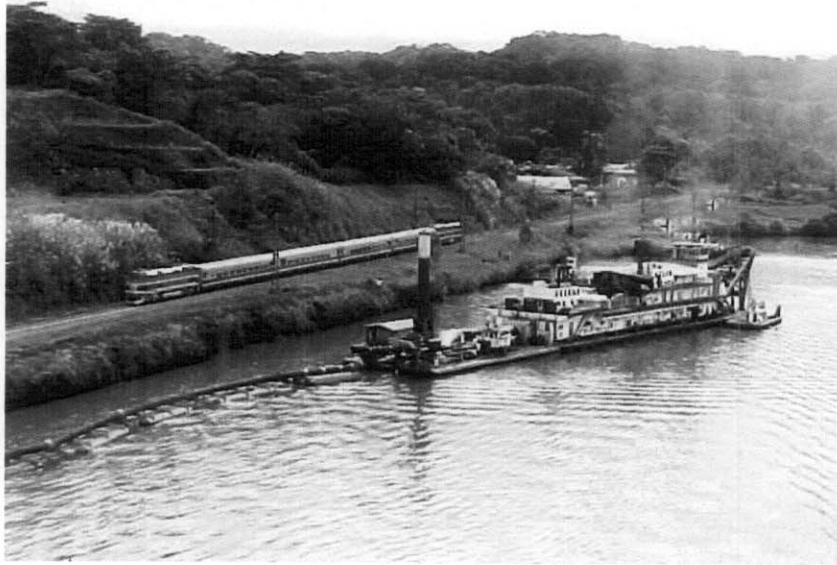
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Resumen Ejecutivo

Executive Summary

Great Lakes Dredge & Dock Company completed a review of four ACP canal expansion planning studies, an inspection of ACP dredging vessels, and interviews of ACP dredging personnel under contract to ACP. The purpose of the study was to conduct a review of the planned dredging studies and ACP dredging operations. GLDD's 114 years as an international dredging contractor and operator of similar equipment as well as its long-term relationship with ACP helped the process.

ACP equipment was found to be very capable and flexible. Crews were in good morale and professional. While there are always recommendations for improving dredge equipment (and GLDD does provide such recommendations) in general the equipment appears to function as designed. Additional operational planning prior to dredging would make the overall operation more efficient and can be accomplished by making geotechnical studies and utilizing the information in predetermining dredging equipment and methods. Tracking and cataloging actual dredge performance data will also provide opportunity to evaluate current operations as well as use said information in estimating future performance.



The reports themselves were found to be complete in scope, in terms of cost evaluation, production estimating, and technical issues. We note the following points further developed in the resulting report:

- ◆ Estimating dredging and excavation costs begins with real geotechnical information. A major information gap of the studies is a lack of available detailed geotechnical information in the canal waters. Assumptions made in relation to geotechnical conditions are mostly based on experience. In areas where the canal has dredging experience, this not an unreasonable approach, but in areas where there is little deepening experience such as the canal Pacific entrance, it is a difficult assumption.

- ◆ Estimated costs for Atlantic Entrance Deepening and Deepening of Gatun Lake and Gaillard Cut costs are believed to be conservative based on conservative estimates for dredge performance. Previous

successful dredging efforts in these areas reduce risk in the estimates, and allow for further study to optimize costs.

- ◆ Lack of geotechnical information makes estimated costs for the Pacific Deepening unreliable. Without previous experience with new work dredging, or drilling and blasting in this area, risk factors in the estimates are dramatic. Therefore assumptions required to be made are not supported as in the other studies. The difficult material expected to be dredged and the difficult site conditions make extrapolation of data from dissimilar work elsewhere in the canal unreliable. Information from the seismic survey performed in the Pacific entrance give a snapshot, but are not reliable enough to make a value judgment as to the extent or quality of the required work.
- ◆ Daily costs developed for ACP equipment are reasonable reflecting the difficulty of working within the canal and are otherwise within industry standards. They are derived from historical data that while incomplete in detail, does allow a reasoned approach. Recent additional cost controls will hopefully allow for future tracking of detailed costs related to the operations.
- ◆ Operation of ACP equipment on site is reasonable and in accordance with industry standards. It is apparent that the ACP has a thorough and well implemented safety program. The equipment appears to be in good shape and well maintained.
- ◆ Historical records are accumulated in a reasonable format, but would be more useful if actual performance records were compiled and used. The equipment records summaries for this study are not adequate to analyze equipment or project performance. As this information is

important in making judgment regarding previous production and costs, it is assumed that such information is available elsewhere.

- ◆ Important decisions to build new equipment are developed briefly in the reports, although it is unclear in these reports how final determinations were made. The need for the new build equipment is not clear based on information presented and perhaps should be reevaluated along with study of optimization of current dredging fleet or other sources of equipment such as existing inventory outside the canal or to private contractors. Data presented suggests that drill boat capacity will be stretched. Data also suggests that optimization of the dredge Mindi would be preferable to acquisition of a new CSD, while an additional dipper dredge type vessel could provide cost effective benefit.

- ◆ Dry Excavation costs result from historical projects where work is contracted to private companies. Accordingly, there is substantial historic price and scheduling data available. The ACP reports use this data in a correct manner, allowing for a high comfort level with the estimates.

- ◆ The sensitivity of the unit costs to the massive quantities to be moved given the magnitude of the project, makes review and optimization of every facet of the work important.

- ◆ As with all studies, there is recognized a need for additional detail. In addition, dredging questions are always best answered initially with “it depends”. The ACP studies do raise important issues relative to the study, and if an opportunity exists to revisit raw equipment performance data, reports will be more conclusive. Full fledged geotechnical studies likewise will allow more defined conclusions. We

do not pretend to predetermine the outcome of additional study or review of data, but would expect that such action will assure ACP that its determined course of action will result in best dredging value for the ACP.