APPENDIX 3.9.6-1

COSTS AND BENEFITS FOR CHANNEL CONFIGURATION ALTERNATIVES

Three Federal channel improvement alternatives were evaluated on the Wando River, representing increasing levels of development and operational efficiency. The Federal interest in these alternatives was evaluated by comparing projected construction costs with projected gains in operational efficiency.

Simulation modeling was performed to design the least-cost navigation channels that would safely accommodate the operational conditions that were being evaluated (one-way traffic, two-way traffic, added turning capacity). Charleston's harbor pilots were used to conduct tests of new channels using a ship simulation model at the Corps' Waterways Experiments Station. These tests accounted for the maneuverability of vessels and the hydrodynamics of the modified channels under extreme tidal and weather conditions. The results of these tests form the basis for the Corps' channel designs.

Estimates of construction costs were then developed for each of the final channel designs. These costs reflect the Corps' best information regarding construction practices, unit costs, and geotechnical conditions, and include unit costs of $4 per cubic yard, mobilization, construction management, Post-authorization Engineering and Design [PED], and interest during construction.

The economic benefits of these alternatives are the result of reduced transportation costs incurred by the users of Charleston Harbor. Because efficiency gains for one class of users may create inefficiency for other users, benefit estimates reflect all commercial use of Charleston Harbor. The entire transit from the mouth of the harbor to the wharf and back to the mouth of the harbor was modeled for all users of the Federal navigation channel. The total intra-harbor costs associated with projected levels of usage were estimated under each of the operating conditions that were evaluated. Benefits were computed as the reduction in total intra-harbor costs associated with the each operating condition.

Net average annual benefits were computed by subtracting average annual costs from average annual benefits. The Corps' recommended plan is the plan that maximizes net average annual benefits. Plan 3, which provides access to the new and existing terminals, accommodates passing on the Wando River, and provides additional turning capacity for commercial vessel using the new terminal, maximizes net average annual benefits and is the Corps' recommended plan.

Plan 1 provides access to both the new and existing berths on the Wando River, but does not provide additional turning capacity for commercial vessels and does not allow commercial vessels to pass on the Wando River. The cost of constructing Plan 1 is $33.4 million or $2.6 million annually, expressed as an average annual cost over the 50-year planning horizon. The economic benefits of Plan 1 are $8.5 million annually over the same 50-year planning horizon, yielding net average annual benefits of $5.9 million and a benefit-to-cost ratio of 3.3 to 1.0.

Plan 1A provides access to both the new and existing berths on the Wando River and allows commercial vessels to pass, but does not provide additional turning capacity for commercial vessels. The cost of constructing Plan 1A is $36.4 million or $2.8 million annually, expressed as an average annual cost over the 50-year planning horizon. The economic benefits of Plan 1A are $9.3 million annually over the same 50-year planning horizon, yielding net average annual benefits of $6.5 million and a benefit-to-cost ratio of 3.3 to 1.0.

Plan 3 provides access to both the new and existing terminals on the Wando River, allows commercial vessels to pass, and allows commercial vessels that call on the new terminal to turn from the berth. The cost of constructing Plan 3 is $40.7 million or $3.1 million annually, expressed as an average annual cost over the 50-year planning horizon. The economic benefits of Plan 3 are $11.1 million annually over the same 50-year planning horizon, yielding net average annual benefits of $8.0 million and a benefit-to-cost ratio of 3.6 to 1.0.