



DEPARTMENT OF THE ARMY
MISSISSIPPI RIVER COMMISSION, CORPS OF ENGINEERS
VICKSBURG, MISSISSIPPI 39181-0080

ADDRESS REPLY TO:

PRESIDENT, MISSISSIPPI RIVER COMMISSION
CORPS OF ENGINEERS
P. O. BOX 80
VICKSBURG, MISSISSIPPI 39181-0080

CEMRC-DE

27 SEP 2004

MEMORANDUM FOR HQUSACE (CECG), WASH DC 20314-1000

SUBJECT: Bayou Sorrel Lock, Louisiana

SUMMARY OF MISSISSIPPI RIVER COMMISSION ACTION

The Mississippi River Commission concurred in the New Orleans District Engineer's plan for the replacement of Bayou Sorrel Lock, Louisiana. The Commission finds that improvements for flood reduction and navigation improvements associated with the Mississippi River and Tributaries (MR&T) comprehensive flood control project and the Gulf Intracoastal Waterway (GIWW) are justified and acceptable.

The recommendation contained in the Bayou Sorrel Lock, Louisiana, report has both an authorized (flood control) and unauthorized (navigation) feature. The authorized feature is the modification of Bayou Sorrel Lock to safely pass the project flood in the Atchafalaya Basin Floodway required by the Flood Control, Mississippi River and Tributaries project, and the unauthorized feature is the navigation improvement.

The recommended plan addresses the most deficient segment of flood protection along the east side of the Atchafalaya Basin and also increases the efficiency of navigation along the alternate route of the GIWW between Port Allen and Morgan City, Louisiana. The existing lock is 7.7 feet deficient in height as it relates to the flood control levee system, is an integral part of the flood protection, and is structurally sound but can not be structurally altered to withstand the higher water levels.

The recommended plan will significantly reduce inland navigation delays on the GIWW at the Bayou Sorrel Lock and will address flood damage reduction needs in the lower Atchafalaya Basin by constructing a new, larger capacity lock at Bayou Sorrel. The plan includes construction of a new 75-foot wide by 1,200-foot long, U-shaped

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lock located adjacent to the existing lock at Bayou Sorrel, the construction of two approach channels to the new lock, closure of the existing lock, erosion protection in the vicinity of the lock, and mooring buoy facilities adjacent to the erosion protection.

The least-cost flood control plan is a replacement lock with the same dimensions as the existing lock (56-feet wide by 797-feet long) but at the required MR&T project flood design elevation of +31.7 feet National Geodetic Vertical Datum (NGVD). At October 2003 prices, the estimated total first cost of the flood control features of the recommended plan is \$80,200,000, which would be apportioned 100 percent to the Federal government pursuant to the cost-sharing provisions of the Flood Control Act of 1928, as amended.

At October 2003 prices, the estimated total first cost of the navigation improvement feature of the recommended plan needed to reduce delays associated with the existing lock is approximately \$8,300,000. The inland navigation plan represents the incremental costs to increase the capacity of the existing lock from 56-feet wide by 797-feet long to 75-feet wide by 1,200-feet long. Per Section 102 of the Water Resources Development Act of 1986 (WRDA 1986), as amended, 50 percent of the cost of the recommended plan, \$4,150,000, would be paid from amounts appropriated from the General Fund of the Treasury, and 50 percent, \$4,150,000, would be paid from the Inland Waterways Trust Fund. The equivalent average annual costs attributed to inland navigation were computed at the October 2000 price levels and are \$977,000. The average annual benefits at 2000 price levels are \$16,300,000. The benefit-to-cost ratio for navigation improvements is 16.7 to 1.0, at a discount rate of 5-7/8 percent and 50-year period of analysis.

PROJECT OVERVIEW

1. AUTHORITY:

a. The inland navigation component of the Bayou Sorrel Lock, Louisiana, report responds to resolutions by the Committees on Public Works of the United States Senate and House of Representatives, dated 29 September 1972 and 12 October 1972, respectively. These resolutions requested a review of the reports on the Gulf Intracoastal Waterway, Louisiana-Texas Section, including the

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Morgan City-to-Port Allen route, with a view to determining the advisability of modifying the existing project in the interest of navigation. Pre-construction engineering and design activities for the Bayou Sorrel Lock, Louisiana, project will continue under the authority provided by the existing project and the resolutions cited above.

b. The flood damage reduction component, which was authorized by the Flood Control Act of 1928 (Public Law 70-391), as amended, addresses modifying the Bayou Sorrel Lock to safely pass a portion of the design flood of the MR&T project through the Atchafalaya Basin Floodway. Bayou Sorrel Lock is located in the East Levee of the Atchafalaya Basin Floodway and allows navigation access while maintaining a continuous line of protection for the MR&T project.

2. DESCRIPTION OF PROBLEMS AFFECTING BAYOU SORREL LOCK:

a. Bayou Sorrel Lock is located on the Morgan City - Port Allen Alternate Route of the Gulf Intracoastal Waterway about 20 miles south of Baton Rouge, Louisiana, in Iberville Parish. Bayou Sorrel Lock is a feature of the Atchafalaya Basin, Louisiana, project (ABLP), which is part of the Flood Control, MR&T. The lock was constructed in the East Atchafalaya Basin Protection Levee (EABPL) allowing navigation traffic in and out of the Atchafalaya Basin. The ABLP is designed to convey one-half of the MR&T project flood discharge, or 1,500,000 cubic feet per second, safely to the Gulf of Mexico. The project flood design elevation was modified in 1986 to the current elevation of 31.7 in the vicinity of Bayou Sorrel Lock following completion of MR&T Atchafalaya Basin, Louisiana, Project Flood Flow Line Design Memorandum No. 1, Hydraulic Design.

b. In addition, Bayou Sorrel Lock is one of the smallest locks in the GIWW system west of the Mississippi River. The lock was constructed and designed to handle the standard size barge, which at the time was 26-feet wide by 175-feet long. In recent years the towing industry has greatly increased its use of larger barges, such as, the "jumbo barge", 35-feet wide by 195-feet long, and the integrated "super jumbo" barges, 55-feet wide by 300-feet long. There is a need to increase the capacity of Bayou Sorrel Lock to reduce the cost to navigation caused by delays at

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the lock, which averaged 4.7 hours per tow in 1999, and are projected to climb to 12.7 hours by the year 2010. Although delays cannot be eliminated, they can be significantly reduced with a larger chamber.

3. ALTERNATIVES CONSIDERED: Plan formulation focused on two integral components affecting Bayou Sorrel Lock: flood control and navigation delays.

a. Flood Control Plans.

(1) Independent Float-In Flood Gate Plan. This plan provides for the construction of a navigable sector gate in the Atchafalaya Basin Floodway on the flood side of the existing Bayou Sorrel Lock. The gate would have a width of 56 feet, a floor elevation of -15 feet NGVD, and top of walls elevation of 31.7 feet NGVD. The structure would be constructed at an adjacent graving site surrounded by an earthen cofferdam to provide flood protection during construction. Upon completion, the cofferdam would be breached to allow the structure to be floated out and positioned above its foundation. Once lowered into place, the pile foundation would be grouted to the structure's concrete base. To complete the line of flood protection, approximately 240 linear feet of pile-supported reinforced concrete T-wall and I-wall would be constructed to tie into the existing East Atchafalaya Basin protection levees.

The float-in construction technique was chosen to minimize closure of the Morgan City-to-Port Allen route to navigation. The structure would be a pile-founded, post-tensioned, and reinforced concrete sector gate monolith. Bayou Sorrel Lock would be closed to navigation for a period of 60 days while the piles are driven for the foundation and the structure is floated into place. In addition, it would be closed to navigation for 8 hours per day for a period of an additional 490 days while work on the structure is completed.

(2) Replacement-In-Kind Lock. This plan provides for the construction of a new lock immediately adjacent to and west of the existing Bayou Sorrel Lock. The new lock would have the same chamber dimensions of the existing lock, 56-foot wide by 797-foot long, with a sill elevation of -15 feet NGVD.

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(3) Flood Fighting. Flood fighting at Bayou Sorrel Lock would provide for the implementation of temporary measures during a major flood to prevent overtopping of the lock walls. Temporary measures would include sandbagging and/or filling the chamber with fill material. A structural stability study of the existing south gatebay structure, completed in 1980, indicated that it would be overstressed for an upper pool of elevation 23.5 NGVD and a lower pool of elevation 4.00 NGVD. If no action were taken to replace the Bayou Sorrel Lock, emergency actions, such as sandbagging and piling-up fill material on the existing lock structure, would be necessary in the event of a major flood event. Such flood fighting measures would exert damaging loads on the lock structure and likely cause permanent damage to the lock. No further consideration was given to this alternative.

b. Flood Control/Navigation Plans

(1) Larger Replacement Lock. This plan would provide for the construction of a replacement lock at Bayou Sorrel with larger chamber dimensions than the existing lock. Two alternative chamber widths were considered, 75 and 110 feet. A 1,200-foot chamber length is standard on the GIWW system. The 75- and 110-foot widths were selected based on the packing of the lock chamber with combinations of the various width barges projected to move through a new lock over the planning horizon for the project.

(2) In addition to width, we considered both concrete and earthen chambers for the replacement locks. The construction duration for the concrete-chambered locks is about 3 years. The earthen-chambered locks cost less than their concrete counterparts; however, the construction duration for earthen-chamber locks is about 5.5 years. Poor soil conditions at the site of the replacement lock require a longer construction period to allow for consolidation of the earthen lock walls. The longer construction period delays the increase in benefits from the larger lock, which results lower the benefits for the earthened-chambered locks.

(3) This resulted in 4 combinations of lock sizes and chamber types as follows:

- (a) 75- by 1,200- by 15-foot earthen chamber
- (b) 75- by 1,200- by 15-foot concrete chamber
- (c) 110- by 1,200- by 15-foot earthen chamber
- (d) 110- by 1,200- by 15-foot concrete chamber

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4. RECOMMENDED PLAN:

a. New Lock. The new lock would have a U-shaped concrete chamber with dimensions of 75 feet by 1,200 feet. The sill depth of the lock would be at an elevation of -15 feet NGVD. Each set of lock gates would consist of two, 70 degree steel sector gate leaves which would be electrically operated. Emptying and filling of the lock would be accomplished by the controlled opening of the gates. The guide walls, 1,200 feet long on the west side of the lock and 400 feet long on the east side, would be constructed of a high density synthetic material attached to timber piles. The gates and gatebays on the floodway side of the lock which tie into the East Atchafalaya Basin Protection Levee would have an elevation of 31.7 feet NGVD, and the chamber walls and landside gates and gatebays would have an elevation of 26.8 feet NGVD.

b. Closure of Existing Lock. When the new lock structure is completed and becomes operational, the existing lock would be closed by an earthen levee extending from the East Atchafalaya Basin Protection Levee south of the existing lock across the floodway side approach channel to the floodway end of the new lock. The existing lock would be abandoned in place, and its approach channels and chamber would be filled with dredged material during periodic maintenance of the Morgan City-to-Port Allen Alternate Route.

c. Approach Channels. The construction of the new lock would require the construction of new approach channels on the northern, or protected, side of the lock and on the southern, or floodway side, of the lock. The Atchafalaya Basin Floodway East Access Channel, which currently joins the south approach channel of the existing lock immediately south of the lock, would be relocated west of its existing alignment and extended southward to tie into the Morgan City-to-Port Allen Alternate Route about

5,000 feet south of the new lock. During high water, cross currents from the East Access Channel cause significant problems to tows approaching the south guide wall. Relocating the channel west and extending its junction with the new lock's south approach channel will allow barge traffic ample time to negotiate the cross currents before reaching the lock guide walls. The northern approach channel to the new lock, on the protected side of the

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floodway levee, would parallel the existing northern approach channel for about 3,500 feet and then merge with the existing navigation channel.

d. Erosion Protection. Bank stabilization extending 1-1/2 miles to the north and south of Bayou Sorrel Lock will be placed to minimize the effect on residences of marine transportation activities in the vicinity of Bayou Sorrel Lock. Hydraulic analysis required a minimum 2-foot blanket of stone from the waters edge to natural ground elevation to protect against the most severe wave damage resulting from prop-wash. Geotextile separator fabric will be placed between the existing bankline and the stone paving.

e. Mooring Buoy Facility. In connection with the erosion protection feature of the recommended plan, a floating mooring buoy facility will be incorporated to provide a safe location for barges to utilize if needed when using the lock. The locations will include 14 mooring buoys in the vicinity of the new lock and 13 mooring buoys north of the Bayou Sorrel Bridge. In order to place the 13 mooring buoys north of the Bayou Sorrel Bridge, dredging will be required to provide at least 9 feet in the vicinity of the mooring buoy.

f. Disposal Areas. Material to be dredged from the new tailbay channel would be placed into two existing borrow pits. There would be impacts from the conversion of bottomland hardwood forest to open water resulting from the channel cut, but no net adverse impacts associated with the dredged material disposal. The new forebay channel would be cut through existing disposal areas and bottomland hardwood forest. Dredged material from this new channel would be placed in existing disposal areas to the west of the lock. After the new lock is operational, the East Access Channel would be relocated. Relocating this channel would also impact existing disposal areas and bottomland hardwood forest. Dredged material from this channel would be placed into the old lock's forebay and tailbay channels and the old lock chamber. Mitigation credit would come from the planting and management of disposal areas. The area between the new forebay channel and the relocated East Access Channel would become an uneconomic remnant of real estate to be acquired in fee by the Federal government. This area would be planted and managed as a hardwood forest. Mitigation credit would also come from eliminating the need for dredged material disposal in the Atchafalaya Basin. In the absence of a

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new Federal project, cypress swamp and bottomland hardwood would continue to be converted to disposal areas. With the project, existing channels would be used for disposal of material dredged during routine maintenance for up to 35 years after project completion. These disposal areas would be planted and managed as hardwood forest when they are filled to capacity.

g. Relocations. There is no relocation of pipelines, power lines, or other facilities required for the implementation of the recommended plan.

h. Real Estate Requirements. The construction of the new lock will utilize all of the existing fee-owned land at the present lock (262 acres), plus 273.2 acres of additional fee-owned land, and 102.4 acres of new easement land. All of the land, which will be acquired in fee, is encumbered with Corps of Engineers easements for the Gulf Intracoastal Waterway-Alternate Route or the East Access Channel, or with a levee easement held by the Atchafalaya Basin Levee District. The total fee-owned land at the new lock will be 535.2 acres. The proposed project does not entail any relocation of residences, businesses, or farms covered by Title II of the Uniform Relocation Assistance Act (Public Law 91-646). Included in the fee acquisition is an existing channel easement area that contains a few abandoned structures. However, benefit payments under the provisions of Title II of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended, are not currently anticipated since the construction of this project does not require the displacement of persons and habitable or commercial structures. Should current plans change and the displacement of persons and habitable or commercial structures be required, Title II of this Act may become relevant. Title III procedures are applicable.

i. Mitigation Features. The recommended plan was developed with the objective of avoiding and minimizing adverse impacts to fish and wildlife habitats and compensating for remaining adverse impacts. Most of the impacts of the project could result from dredging of the connecting channels, relocating the East Access Channel, and dredged material disposal. A primary focus of mitigation planning was to minimize adverse impacts to cypress swamp and bottomland hardwood forest within the Atchafalaya Basin. The habitat assessment models do not adequately capture the environmental effects of the conversion of wet, bottomland

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hardwood forest to more upland-type habitat that does not get periodically flooded. Also, the habitat assessment models cannot adequately capture the effect that dredged material disposal areas have on nearby cypress swamps by blocking headwater flows. In order to mitigate for these two effects, additional mitigation is planned. A new ditch would be constructed through existing dredged material disposal sites to connect the East Access Channel with the swamp to the west of the disposal sites. A sediment trap would also be built on an existing ditch located along the northern boundary of existing disposal sites. These features would be built during project construction. These mitigation features therefore serve two purposes: mitigation and environmental restoration.

The costs associated with planting and reforestation are those costs necessary for preparing the mitigation areas for planting, reducing competing vegetation, replanting as necessary to replace dead seedlings, and monitoring the mitigation sites. No real estate costs are associated with the fish and wildlife mitigation plan. All lands to be used for mitigation would be acquired in fee by the Federal government as part of the project.

5. RECOMMENDATIONS OF THE DISTRICT ENGINEER:

The District Engineer has considered all significant aspects of this study, including the environmental, social, engineering feasibility, and economic effects as they relate to the overall public interest.

The District Engineer recommends that the cost of the modification of Bayou Sorrel Lock to pass the Atchafalaya Basin project flood be allocated to the Flood Control, Mississippi River and Tributaries project, and the remaining cost be allocated to inland navigation. The cost allocated to the MR&T project, currently estimated at \$80,200,000, is the cost of the construction of an in-kind replacement lock at Bayou Sorrel Lock, which is the National Economic Development plan for passing the Atchafalaya Basin project flood at Bayou Sorrel Lock. The remaining cost of \$8,300,000 would be allocated to inland navigation. The cost allocated to the MR&T project would be apportioned 100 percent to the Federal government. The inland navigation cost would be apportioned 50 percent to Federal appropriations and 50 percent to the Inland Waterway Trust Fund.

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REVIEW BY THE MISSISSIPPI RIVER COMMISSION

6. GENERAL: The Commission's review encompassed the overall technical, economic, social, environmental, and policy aspects involved in the formulation of alternative plans of improvement and in the findings, conclusions, and recommendations of the District Engineer. The Commission considered the results of the Washington-level review and conformance of the recommended plan with the essential elements of the Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies and compliance with the other applicable administrative and legislative policies and guidelines. The Commission also considered the views of interested parties, including Federal, state, and local agencies.

7. FINDINGS AND CONCLUSIONS: The Mississippi River Commission concurs in the plan of improvements recommended by the District Engineer and in the review findings of the Policy Review Branch, HQUSACE. The Commission finds that the improvements for flood reduction and navigation improvements associated with the Mississippi River and Tributaries comprehensive flood control project and the Gulf Intracoastal Waterway project are technically sound, are justified based on economic benefits and environmental analyses, and are environmentally and socially acceptable.

The Commission believes there is a Federal interest in the proposed plan and that it is needed to protect lives, property, and environment in the area.

The Commission recommends that the selected plan for the replacement of Bayou Sorrel Lock, Louisiana, be implemented as a Federal project, generally in accordance with the District

Engineer's recommended plan, with such modifications as in the discretion of the Commander, HQUSACE, may be advisable. This recommendation is subject to cost sharing, financing, and other requirements of Public Law.

In summary, the Mississippi River Commission has met and reviewed the Bayou Sorrel Lock, Louisiana, project. The Commission concurs in the findings and recommendations of the District Engineer and, therefore, recommends implementation of this project to the Chief of Engineers.

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In summary, the Mississippi River Commission has met and reviewed the Bayou Sorrel Lock, Louisiana, project. The Commission concurs in the findings and recommendations of the District Engineer and, therefore, recommends implementation of this project to the Chief of Engineers.



ROBERT CREAR
Brigadier General, USA
President, Mississippi
River Commission



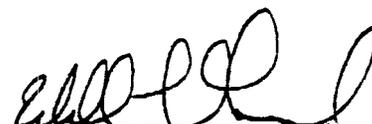
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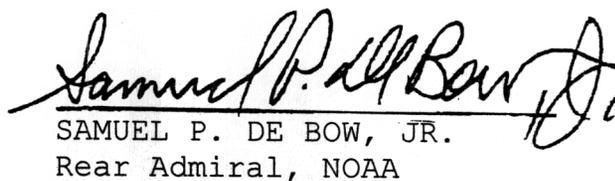


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Extended medical absence.
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