Old River Control

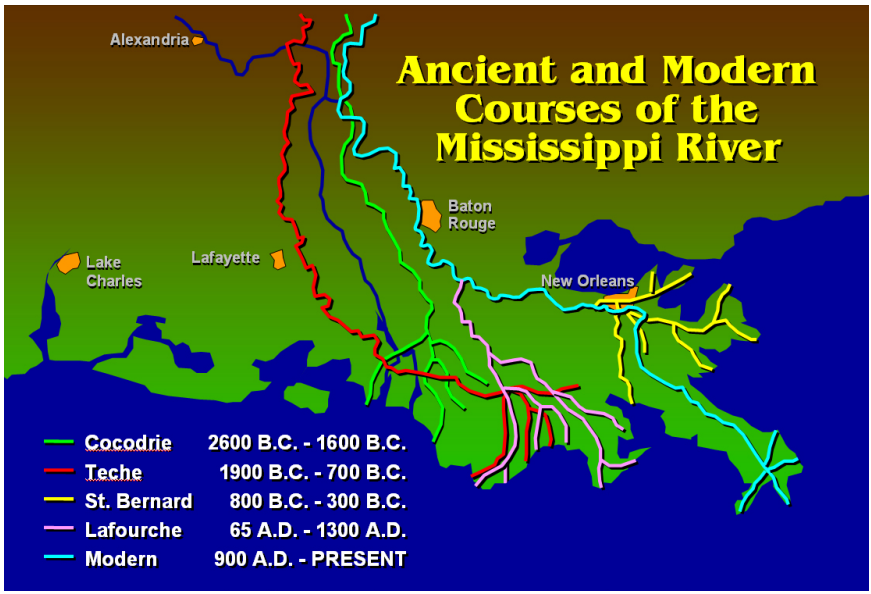
US Army Corps of Engineers®
New Orleans District

Front cover: *The Auxiliary and Low Sill structures straddle the inflow channels from the Mississippi River. Beyond the structures to the west the channels merge and flow into the Atchafalaya River. The Overbank Structure and Sidney A Murry Jr. Hydroelectric Power Station are located immediately above the Low sill Structure.*

Back cover: *Old River Lock, located on the west bank of the Mississippi River, provides passage to the Mississippi, Atchafalaya, Red, and Old rivers. Its purpose is to prevent the diversion of water from the Mississippi River into the Atchafalaya River via Old River and to keep Old River a navigable waterway.*

Introduction

Old River is a distinctive river with a remarkable history. Fifty miles northwest of Baton Rouge, it connects the Red, Atchafalaya and Mississippi rivers. It was once a part of the Mississippi and would have long ceased to exist had it not been for man. At one time, the Mississippi attempted to divert most of its flow through Old River and down the Atchafalaya. Having flowed in both directions in the past, today Old River functions only as a navigation canal.



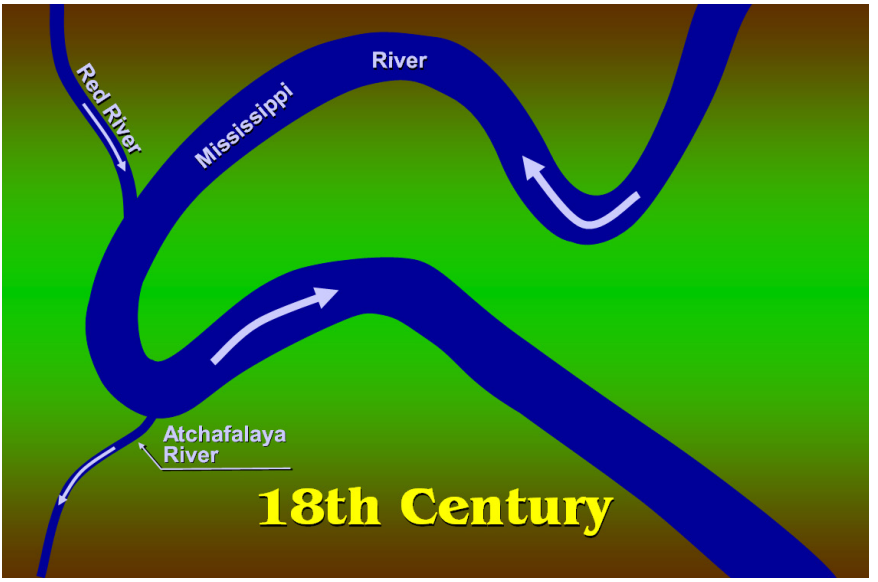
The source: The Mississippi

The Mississippi River south of Baton Rouge began to develop about 5,000-6,000 years ago as sea level approached its present height. It has migrated back and forth across Louisiana at least seven times, each time forming a delta by depositing tremendous quantities of sands, silts and clays.

Like all alluvial (sediment-bearing) rivers, the Mississippi winds through its valleys, caving banks and topping them in floodtimes. Occasionally, it cuts across the neck of a sharp loop, begins eroding another bank and gradually forms a new loop.

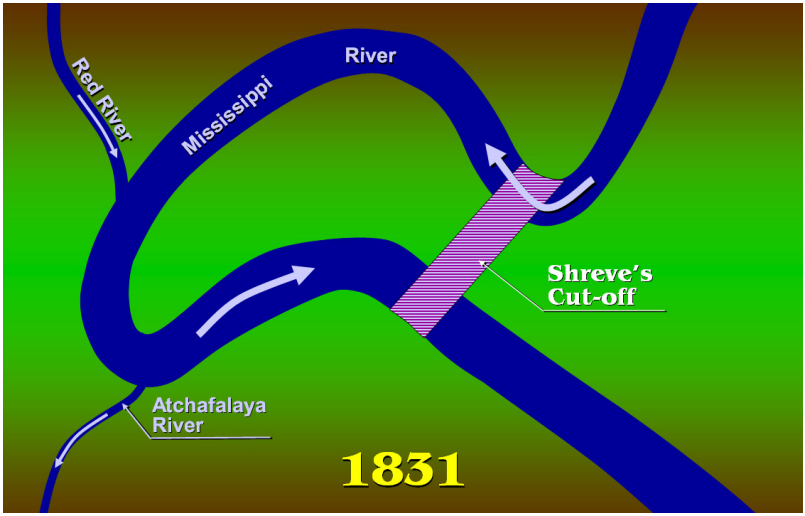
About the 15th century A.D., a westwardly meandering loop of the Mississippi River, later called Turnbull's Bend, broke into the basin of the Red River and captured the Red. The Mississippi also intersected a small distributary of the Red River which flowed south and later became known as the Atchafalaya.

When the first European settlers arrived, they found the Red River emptying into the Mississippi at Turnbull's Bend, and the Atchafalaya River a well-defined distributary flowing out of Turnbull's Bend a few miles to the south.



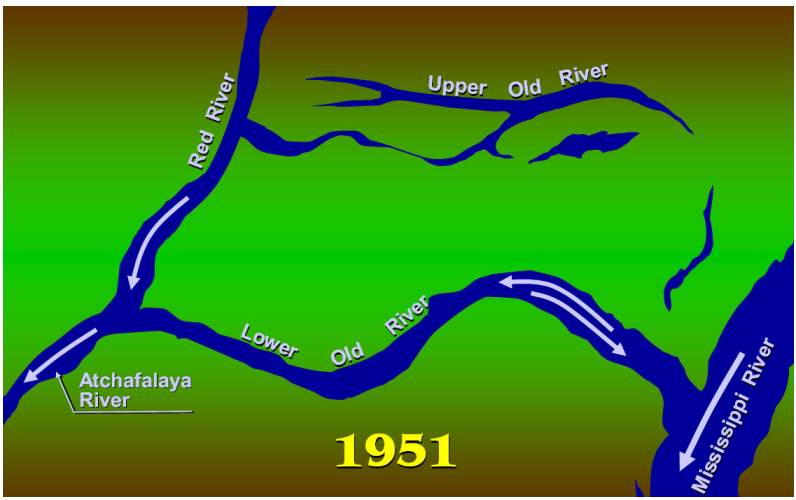
The beginning of the problem

In 1831 Capt. Henry M. Shreve, the distinguished steamboat man and founder of Shreveport, dug a cut across the narrow neck of Turnbull's Bend. The river accepted the shortcut and abandoned its old channel, the upper part of which eventually silted up, leaving the lower section, which came to be called "Old River," open.



The Red no longer flowed into the Mississippi, but into the Atchafalaya. Old River connected them to the Mississippi. The current usually flowed west from the Mississippi through Old River into the Atchafalaya; however, during high water on the Red the flow sometimes reversed. Thus, Old River linked the two river systems.

For years the head of the Atchafalaya River was blocked by a massive "raft"—a 30-mile-long log jam—that defied efforts of settlers to remove it. In 1839 the state of Louisiana began to dislodge the raft and open up the river as a free-flowing and navigable stream.



The problem grows

The removal of the log jam provided an opportunity for the Atchafalaya to become deeper and wider carrying more and more of the Mississippi's flow.

The Atchafalaya offered the Mississippi a shorter outlet to the Gulf of Mexico—142 miles compared to 315—and by 1951 it was apparent that, unless something was done soon, the Mississippi would take the course of the Atchafalaya.

The effects of a change of course

If the Mississippi changed course it would turn the present river channel into a saltwater estuary and the effects on southern Louisiana would be catastrophic. Corporations have constructed billions of dollars worth of petrochemical plants, refineries, grain elevators, and fossil fuel and nuclear electrical generating plants, most of which depend on fresh water for their manufacturing process, along both banks of the Mississippi River. Also, cities below Baton Rouge, including New Orleans, would be hard-pressed to find drinking water.

Grain Elevators along the Mississippi River.

The Atchafalaya Basin could not accept the Mississippi flow without massive flooding, extensive relocations, and the upheaval of the social and economic patterns of that area. A new route would render hundreds of millions of dollars worth of flood control projects useless along the lower Mississippi and expensive flood control projects would be required in the newly created Mississippi delta.

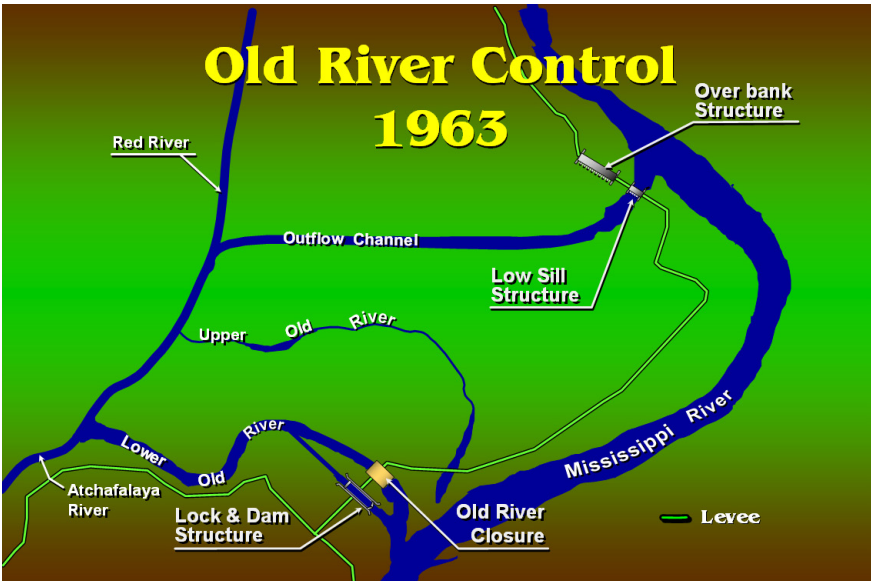
Navigation and Industry along the Mississippi River above New Orleans.

A tremendous volume of shallow draft navigation between the nation's heartland—the upper Mississippi—and the ports of Baton Rouge and New Orleans would be disrupted. A change in the river's course would also require modifications to channels and locks in the Atchafalaya Basin.

Something had to be done. In 1953, a report by the Mississippi River Commission recommended that the diversion of flow from the Mississippi into the Atchafalaya should be controlled by a complex of structures to be built at Old River.

The corps develops a solution

Design engineers proposed a plan to dam the natural stream Old River and build two control structures one to operate at all times and stages, and the other to operate only during floods. A lock to preserve navigation between the Mississippi River and the Atchafalaya-Red River system was also included.



The Old River control structures were to be operated so as to maintain the distribution of flow and sediments between the lower Mississippi River and the Atchafalaya River in approximately the same proportions as occurred naturally in 1950. That distribution was determined to be approximately 30 percent of the total latitude flow (combined flow in the Red River and Mississippi above the control structures) passing down the Atchafalaya River on an annual basis.

Congress Acts - Corps Responds

The Office of the Chief of Engineers in Washington, D.C., received the plan and passed it along with recommendations to the Secretary of the Army, who referred the matter to Congress. On September 3, 1954, Congress authorized the Old River Control Project. Construction began in 1955 and was completed four years later. The entire complex was finished by 1962 at a total project cost of $67 million.

New Orleans District began $15 million of construction in 1955 on the Low Sill and Overbank control structures. Completed in a dry hole in 1959, these structures began operation in 1962 after the Corps dredged and stabilized connecting channels to the Mississippi and Red rivers. The Old River navigation lock was constructed to allow navigation between the Mississippi, Red, and Atchafalaya Rivers. A dam was constructed north of the lock across the natural stream Old River, preventing the Mississippi River from changing its course.

Low sill and Overbank Structures

The Old River Lock

The Old River lock is located 11 miles downstream of the Old River Auxiliary Structure at the location where the Mississippi and Atchafalaya Rivers once connected. This navigation lock was completed in 1963 at a cost of $15 million. The lock dimensions are 75 feet wide by 1,185 feet long with a floor depth of 11 feet below sea level. This navigation lock allows recreational and commercial traffic between the Mississippi and the Red and Atchafalaya rivers. The majority of the traffic is petroleum, chemicals, agriculture, and aggregate products. Approximately 15 tows travel through the lock each day.

Old River Lock Structure

The Great Flood of 1973 takes its toll

Persistent, heavy rains during the fall of 1972 and the winter and spring of 1973 in the central plains and the Mississippi and Ohio valleys caused many of the Mississippi tributaries to rise above flood stage. The Mississippi crested several times that spring, and a prolonged flood fight raged up and down the big river, its tributaries and distributaries.

The sheer volume of water passing through Old River was awesome, and the Low Sill Structure bore the brunt. The Mississippi could not handle as much water as it had in 1950 because of changed conditions. The Atchafalaya, however, had been deepening and flowing faster, demanding even more water that would, in turn, command an even greater flow.

The Low Sill Structure was designed to regulate flow, and it did so. Unfortunately, the turbulence of the water during the 1973 flood scoured the foundation and destroyed a 67-foot-high concrete wing wall on the south end that guided the flow into the structure. A large scour hole also developed in front of and beneath the structure, exposing approximately 50 feet of the 90-foot-long steel pilings supporting the Low Sill Structure. Emergency repairs during the

Flood waters undermine the south wing wall of the Low Sill Structure, causing it to collapse. Emergency repairs involve construction of a stone dike at the end of the ramp to replace the failed wall.

flood prevented the structure from collapsing.

After the flood, the fallen wall was replaced by a rock dike. Specially developed cement grout was pumped into the void beneath the structure, and the method of gate operation was changed to provide for a more uniform flow distribution, thereby reducing the danger of scour.

Repairs and modifications

Outflow side view of the dewatered Low Sill under routine repair, 1987.

Engineering studies concluded that, although the structure had been seriously and permanently damaged, its residual capability was substantial and could be improved by various rehabilitation measures. An eight-year comprehensive rehabilitation program for the Low Sill and Overbank structures was completed in 1981.

The floods of 1974, 1975 and 1979 continued the relentless attack of a frustrated river on its man-made yoke. Although repairs and modifications had restored the capability of the Low Sill Structure to perform under normal operations, damages sustained in 1973 permanently impaired its foundation.

The Low Sill Structure was designed to withstand a 37-foot difference in water levels ("head") between the higher Mississippi River and the lower Atchafalaya River. Because of damages to the structure during the 1973 flood, engineers determined that a safe differential in water surfaces on either side of the structure should be no more than 22 feet.

Presently, to retain the 70-30 percent flow division, the head ranges from four to 19 feet, depending on the stages of the three rivers. The greater the head, the greater the stress on the structure.

Physical Data

Low Sill Structure:
- 11 gates, each 44 feet wide
- Weir crest elevation varies from -5.0 below sea level to 10.0 feet above sea level
- Total length, 566 feet
- Mazimun water elevation in forebay, 69.8 feet above sea level

Overbank Structure:
- 73 bays, each 44 feet wide
- Weir crest eleveation, 52.0 feet above sea level
- Total length, 3,356 feet

Auxiliary Structure:
- Six gates, each 62 feet wide
- Weir crest elevation, 5.0 feet above sea level
- Total length, 442 feet

Maximun discharge capacity of structures is approximately 700,000 cubic feet per second (300 million gallons per minute).

The Auxiliary Structure

Realizing that repairs and modifications to the two structures were not enough, New Orleans District recommended an auxiliary structure with a new inflow channel be constructed. The Chief of Engineers approved, and construction started in July 1981. The Auxiliary Control Structure was completed in December 1986 at a total cost of $206 million.

The Auxiliary Structure works together with the Low Sill Structure to maintain a 70-30 flow distribution between the Mississippi and Atchafalaya rivers, respectively.

Today, the Auxiliary Structure operates together with the Low Sill Structure to provide protection during emergencies. In case of an accident that restricts the flows or affects operation of the gates, the Auxiliary or Low Sill can be closed safely. With the addition of the Auxiliary Structure, the Old River Complex has not only been restored to its original capabilities, but substantially improved beyond its original design.

In addition to flood control, the Old River structures provide fresh water to the Atchafalaya Basin, one of the last great primitive areas in the nation not part of the national refuge or park systems. This fresh water is needed by the extensive plant and animal life in the basin swamps.

Recreation

The Old River Control Complex provides more than 2,500 acres of land for public recreation. Lands and waters near the Old River Lock and Control Complex Lake allow public access for boating, fishing, hunting, birding, ATV riding, dog training, berry and pecan picking, and camping. Several boat launches and a primitive camping area, located near the Old River Lock, are open year-round and are provided to the public free of charge. The highest use of these areas occurs during the fall and winter when hunting season is open on the adjacent Three Rivers State Wildlife Management Area.

Many gather during hunting season to camp on public lands.

White-tailed deer, gray and fox squirrels, feral hogs, and wild turkey are the most popular wildlife that are hunted in the area. Recreational and commercial fishing is equally as popular because of the easy bank and boat access to the Mississippi and Atchafalaya Rivers.

The economic impact of commercial fisheries in the waters around the Old River Control Complex is significant to the area. The constant availability of bait fish attracts fishermen who use large dip nets to catch shad that are sold for crawfish and crab bait throughout south Louisiana. Commercial hoop net and trotline fishermen catch large numbers of catfish, buffalo, carp, and gar fish that are sold at the fish markets in the local communities.

Endangered and threated species

The pallid sturgeon (Scaphirhynchus albus) is a bottom-dwelling prehistoric fish that feeds on aquatic insects and small fish. The pallid sturgeon prefers the main channels of large rivers including the Mississippi, Missouri, and Atchafalaya. This fish was listed as an endangered species in 1990 because they were thought to only occur on the upper Missouri River. Since their listing, pallid sturgeon have been found to be very abundant behind the Old River Low Sill and Auxiliary Control structures. This area provides an excellent location for the capture and study of pallid sturgeon by the U.S. Fish and Wildlife Service, the Louisiana Department of Wildlife and Fisheries, and the U.S. Army Corps of Engineers.

Pallid Sturgeon research is conducted at Old River Control.

The Louisiana black bear (Ursus americanus luteolus) is one of 16 recognized subspecies of the American black bear. The Louisiana black bear is distinguished from other black bears by a longer and narrower skull and larger molar teeth. Weights can range from 200 pounds for females to 400 pounds for males. Black bears prefer bottomland hardwood forests where they overwinter in large hollow cypress trees. Since its listing as a threatened species in 1992, the Louisiana black bear has been found in two viable subpopulations in the Tensas and Atchafalaya River basins. The Old River Control Complex property provides a critical corridor to the interconnection of the Tensas and Atchafalaya subpopulations. The restoration of bottomland hardwood forests in the Old River area provides cover for the successful migration of bears throughout their range. The Louisiana Department of Wildlife and Fisheries and U.S. Fish and Wildlife Service have been transplanting female bears with cubs to this area since the year 2000. It is hopeful that through continued habitat restoration and restocking efforts the Louisiana black bear can be removed from its threatened species listing.

Black bear eintroduction of mother and cubs.

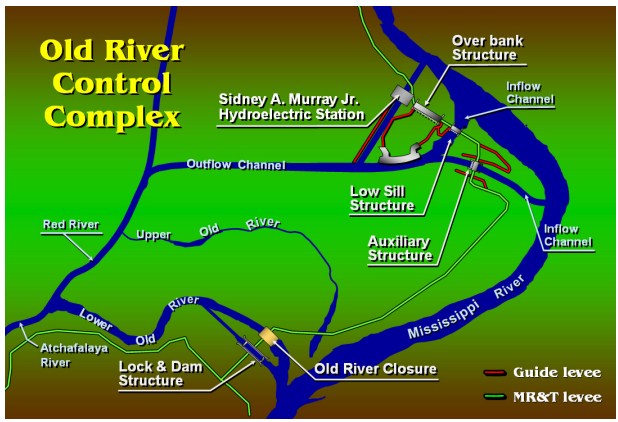
Sidney A. Murray Jr. Hydroelectric Station

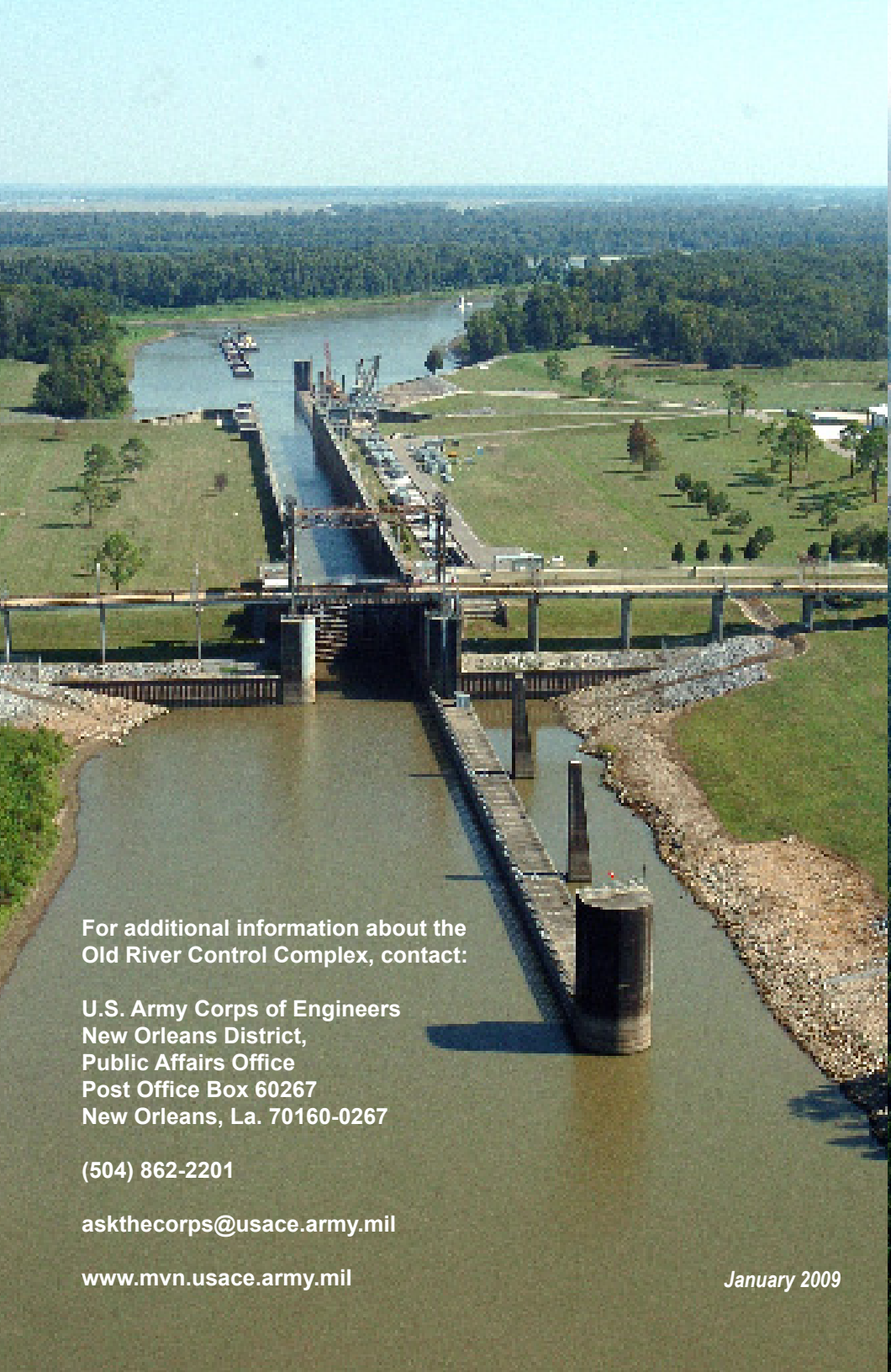
In 1977, Sidney A. Murray Jr., the mayor of Vidalia, investigated the feasibility of hydroelectric power to help reduce rapidly escalating electricity rates. What resulted was the construction of the world's largest prefabricated power plant structure.

Construction of the 192-megawatt, $520-million power plant began in 1985. A prefabricated scheme allowed the foundation and associated works to be built in the dry at the actual project site, just upriver of the Old River Control complex, at the same time the power plant itself was constructed at Avondale Shipyards in New Orleans. The 12 story, 25,000-ton structure was towed 208 miles up the Mississippi River from New Orleans. Named the "Merrimac," it remains the largest "vessel" ever towed up the Mississippi past Baton Rouge.

The Sidney A. Murray Jr. Hydroelectric Station is the largest prefabricated power plant in the world and Louisiana's first hydroelectric power plant.

The power plant, operating in conjunction with the Old River Control Project, utilizes the difference in head between the Mississippi and Atchafalaya rivers to produce electricity. The Corps adjusts daily the percentage of flow allocated to the power plant according to conditions of the Mississippi, Atchafalaya and Red rivers. This determined amount provides benefits to both projects without threatening flood control, navigation interests or ecological conditions.





For additional information about the Old River Control Complex, contact:

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