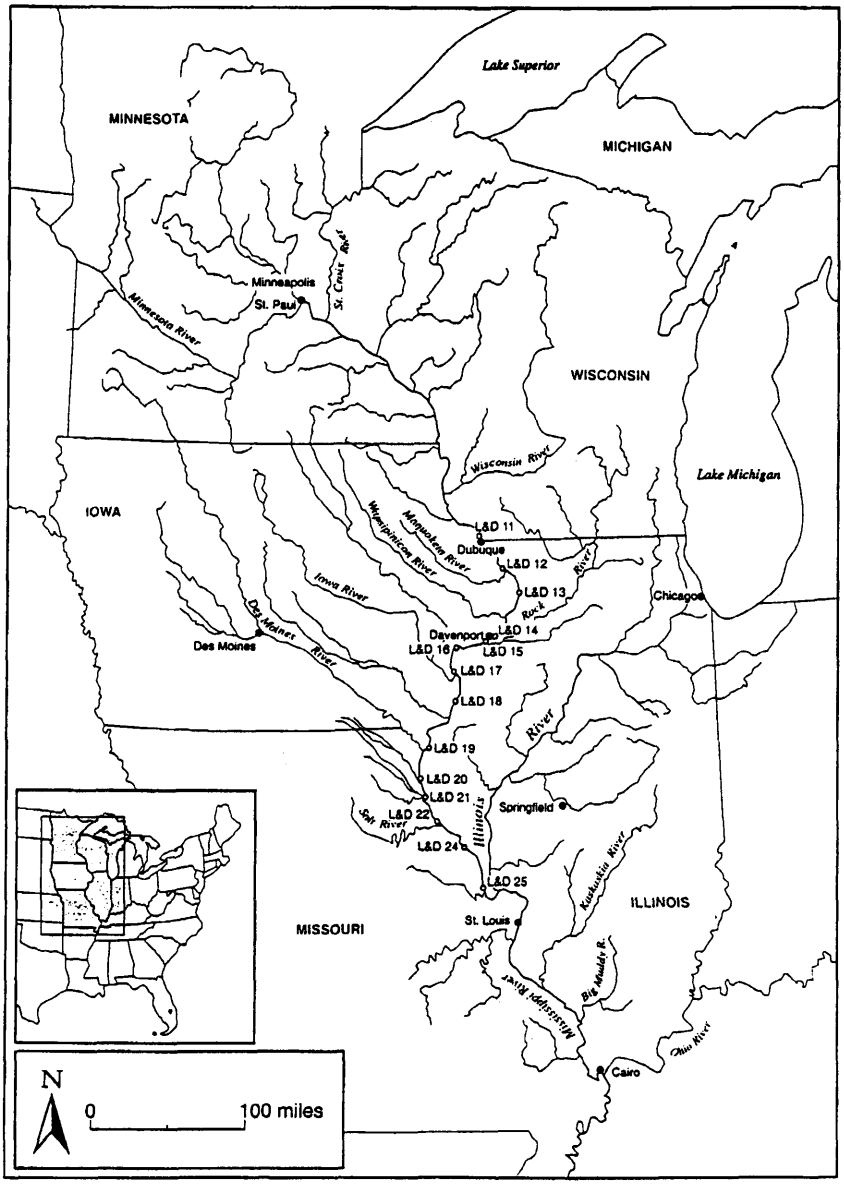
LOCK AND DAM NO. 19 HISTORIC DISTRICT



General Project Location.

NPS Form 10-900
(Rev. 10-90)

OMB No. 1024-0018

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
REGISTRATION FORM

1. Name of Property

historic name **Lock and Dam No. 19 Historic District**
other names/site number **Keokuk Lock and Dam** ____ N/A

2. Location

street & number **525 N. Water Street** ____not for publication ____N/A
city or town **Keokuk** vicinity _____ ____N/A
state **Iowa** code **IA** county **Lee** code **111**
zip code **52632**

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this X nomination ____request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property X meets ____does not meet the National Register Criteria. I recommend that this property be considered significant X nationally ____ statewide ____locally. (See continuation sheet for additional comments.)

Paul D Rubenstein Deputy FPO, USACE — 3 Dec 2003
Signature of Certifying Official — Date

Wilhelm L. Uhle ISHPO — 4-8-03
Illinois State Agency or Society Official — Date

Russell J. Sorke — June 12, 2003
Iowa State Agency or Society Official — Date

4. National Park Service Certification

I hereby certify that this property is:

____entered in the National Register ____See continuation sheet.
____determined eligible for the National Register ____See continuation sheet.
____determined not eligible for the National Register
____removed from the National Register
____other (explain)_____

_____ _____
Signature of the Keeper — Date

5. Classification

Ownership of Property (Check as many boxes as apply)

_x_ private
___ public-local
___ public-State
_x_ public-Federal

Category of Property (Check only one box)

___ building(s)
_x_ district
___ site
___ structure
___ object

Number of Resources within Property

Contributing	Noncontributing	
7	**7**	buildings
0	**0**	sites
12	**4**	structures
1	**7**	objects
20	**18**	Total

Number of contributing resources previously listed in the National Register **5**

Name of related multiple property listing (Enter "N/A" if property is not part of a multiple property listing.) **Upper Mississippi River 9-Foot Navigation Project, 1931-1948**

6. Function or Use

Historic Functions (Enter categories from instructions)

Cat:	**TRANSPORTATION**	Sub:	**water-related**
	INDUSTRY		**energy facility**

Current Functions (Enter categories from instructions)

Cat:	**TRANSPORTATION**	Sub:	**water-related**
	INDUSTRY		**energy facility**

7. Description

Architectural Classification (Enter categories from instructions)

OTHER: **lock and dam**
Commercial Style
Bungalow/Craftsman

Materials (Enter categories from instructions)

foundation OTHER: **bedrock**
roof **ASPHALT**
walls **CONCRETE**
STUCCO
other gates **STEEL**
machinery **STEEL**

Narrative Description (Complete text printed on the following eight continuation sheets.)

Description

The 160.47-acre Lock and Dam No. 19 Historic District is made up of two navigation lift locks, a dry dock, two power plants, a nonnavigable dam, and 32 associated resources. The oldest resource in this district was built in 1870 as part of the Des Moines Rapids Canal. A general contractor and numerous subcontractors built more than half of the main features of this district between 1910 and 1914. Since May 31, 1913, the district has been in continuous use as a part of the Upper Mississippi River 6-Foot Channel Navigation Project and after July 3, 1930, the Upper Mississippi River 9-Foot Channel Navigation Project. Although significant features associated with the operation of the navigation system have, by necessity, been added and subjected to continuing maintenance, upkeep, or replacement throughout these 85 years, the district looked the same for 40 years (1913-1953). Between 1953 and 1957, contractors demolished about half of the features of the historic complex and built in their place, as part of the new 1,200-foot-long lock construction project, about a quarter of the extant features of this district. Neither this new lock nor its appurtenances contribute to the historic character of the district. After the new lock was completed and a visitors center added, the district entered another 34-year era (1961-1995) of no obvious visible change. The two 1995 additions to the complex were both appended to a noncontributing resource—the new lock. As noted in the original 1976 Nomination Form, and still true more than 20 years later, "The major structures included in this nomination—the dam and powerhouse, the old lock and the drydock [sic]—are in original condition with no major modifications to the basic concrete structures."[1] However, no preservation measures have been taken except for the 1978 addition of a sheet pile, cell closure wall upstream from the old lock and dry dock and a rock retaining wall at the downstream end of the old lock. These two features ensure that the old lock and dry dock will not be flooded should their original gates fail, and allowed the Corps to dewater both historic structures. The two dams also ensure that the over all bank-to-bank structure continues to fulfill its function in creating a slackwater navigation pool upstream from it regardless of the level of deterioration of the old lock and dry dock. The resources contributing to the historic character of this district are in good condition.[2] Moreover, although the district is adjacent to downtown Keokuk, Iowa, and just upstream from Hamilton, Illinois, the steep bluffs on either side of the river, the river itself, and the historic Keokuk and Hamilton Railway and Highway Bridge's position between the district and the new highway bridge have conspired to keep the district's overall setting the same as it was in 1957 and its feeling the same as in 1948. Therefore, the district retains integrity of location, design, materials, feeling, and association.

Detailed Description

The Lock and Dam No. 19 Historic District spans the Upper Mississippi at the lower end of a narrow stretch of river that extends upstream about 25 miles. The limestone bluffs on either side of the river are a mere three-quarters of a mile apart for most of this distance. The site was also at the foot of the notorious 11.25-mile-long Des Moines Rapids which reached from Keokuk to Montrose, Iowa.

The complex is adjacent to downtown Keokuk, Iowa, and just upstream from Hamilton, Illinois. However, neither community is particularly noticeable from within the district. That is because the bulk of Keokuk is on top of the bluff and the district begins on approximately 6 acres of flat, manmade land at the base of the Iowa side bluff. The heart of the smaller community of Hamilton, Illinois, is not only downstream and atop a bluff, but also a mile east of the river. However, a new bridge connecting the two communities was erected downstream from the district in the last 10 years. This bridge is visible from the district. The visual impact of this bridge on the district is significantly reduced by the fact that the old Keokuk and Hamilton Railway and Highway Bridge has been left in place. This bridge, and one of the piers of which are incorporated in the downstream river wall extension of the new lock, obscures the view of the new bridge from the district.

The new lock itself, however, is a significant alteration to the historic setting. Before the new lock was built, the flat, manmade land below the Iowa side bluff had an entirely different size and shape. Between 1914 and 1953, when contractors began constructing the new 1,200-foot-long lock, a concrete sea wall, extending at a 40-degree angle from the Iowa shore to the upstream end of the dry dock, held the northern end of the manmade land in place. The land only abutted the navigation structures for about 600 feet, that is, it only extended as far south as the downstream ends of the dry dock and old lock walls—in line with the earth berm lying between the new lock's river wall and the land wall of the dry dock (visible in accompanying Photo 6). Today, manmade land abuts the new lock and its guide walls for over 2,000 feet from north to south. The land that was there in 1948, although shorter, was much wider, extending for a full 300 feet east from the main line of the Chicago, Burlington and Quincy Railroad tracks at the base of the bluff to the land wall (the west wall) of the dry dock. Today, that distance is reduced, at its widest point to 120 feet from the tracks to the land wall of the new lock.

This is the third configuration that this manmade land has had. From 1877 until 1912, this flat area adjacent to the Iowa shore was a little smaller and at least 25 feet lower than it was from 1914 until 1953. It extended, at most, 250 feet east of the main line railroad tracks at the base of the bluff to the land wall of the Keokuk Canal Lock which was at the downstream end of the Des Moines Rapids Canal. The lock chamber was 80 feet wide at its surface. The Des Moines Rapids Canal Bullnose, which is still extent and part of this historic district (see accompanying Map 3), was on the downstream end of the river wall of that lock. The bullnose is made of cut and dressed limestone blocks which are approximately 2 feet by 3 feet by 18 inches laid in courses on a limestone bedrock foundation. The upstream end ties to the downstream wall of the 1912-1914 dry dock. The downstream end of the bullnose is horizontally rounded and faces south. On the curve, approximately one course down from the top is a carved relief shield representing an anchor. A now abandoned, c. 1927 water level gauge sits on the top of the structure. This gauge sits inside an approximate 4-foot-square glass and wood cube topped with a pyramidal roof. A walkway with hand railings extends from the lower end of the downstream dry dock wall to the gauge housing (see accompanying Photo 6).

Because the 1910-1913 lock was only 310 feet long, the so-called lock grounds were also a little shorter than they were from 1914 to 1953, about 500 feet long from

1877 to 1912 as compared to approximately 600 feet long between 1914 and 1953. Because the difference in elevation between the level of the canal upstream from the lock and the level of the river downstream from the lock was less than 13 feet, the manmade land at the level of the top of the lock walls was only 13 feet above that of the natural shore downstream. After 1913, when the difference in elevation became 38.2 feet, the top of the walls rose accordingly and the manmade land had to be built up.

Between 1877 and 1912, the manmade land was a service area and land access to the Des Moines Canal and Keokuk Canal Lock. It included a 27 square foot, hip-roofed, stone engine house which held the 30 horsepower steam engine used to operated the lock gates, lockmaster's and assistant lockmaster's residences, and service buildings. All of these structures were demolished between 1912 and 1914.[3]

On October 12, 1912, the Des Moines Rapids Canal was closed for good to allow construction to begin on the portions of the bank-to-bank structure west of the commercial power house. Although Hugh Cooper and Montgomery Meigs (see Section E, Multiple Property Documentation Form) had designed the 140-foot-wide dry dock to overlap the position of the old canal lock by at least 60 feet and its bottom was to be at the same level, its top was to be at least 25 feet higher. Therefore, Stone and Webster Engineering did not start building on the western side of the dry dock. Rather they started at the new lock power house and worked west, gradually covering the old lock and lock grounds with the material from the lock power house, new lock, and dry dock excavations. By the time they were excavating the final portion of the dry dock, they were digging in fill they had placed on the site.[4]

By the spring of 1914, Stone and Webster had built a sawmill, lumber shed, ice house, store house, and various shops on the new ground adjacent to the Iowa shore. By the end of 1927, that small area contained 16 buildings, plus a locomotive crane, a pillar crane, and two large oil tanks. All these structures were demolished between 1953 and 1956 to make room for the new lock that was dug into part of this land and for the new esplanade structures: the land wall control station, the office and shop, and the city of Keokuk Service Building (which were all completed by 1957 as part of the lock construction project) plus the visitors center (constructed in 1961) and the standardized smoking shelter (built in 1995). None of these buildings nor the river wall control station contribute to the historic character of this district, so they are not described here.[5]

Although this new Lock No. 19 is within the boundaries of this historic district, it is also not described here because it, too, does not contribute to the historic character of the district. This registration form amends a 1976 form by identifying specific boundaries for the district and classifying the resources within it as either contributing on noncontributing. Although the 1957 lock was specifically mentioned in the 1976 form, it was not one of the four "major structures included in this nomination."[6] The new lock and its appurtenances (including the above named buildings and the landward ice fender dam, the four boat launch davits, two stage recorders, and the incoming power transformer) are still identified as noncontributing resources in this amended registration form. They are just too new.

They were not present during the Period of Significance of this district which is 1870-1948.

Although the new Lock No. 19 was authorized as part of the original 9-Foot Channel Project in 1930 and the Corps began planning the new lock in 1931, the designers encountered serious problems concerning where to locate it without interfering with the operation of either the dry dock, which they wanted to continue to be able to use, or the commercial power plant at the site. The Corps finalized the lock's location in 1937, but then the engineers began to tinker with the design of the upstream lock gates. The standard 9-Foot Channel Project upstream miter gates (see Section F, Multiple Property Documentation Form) wouldn't work here because the dam creates a 40-foot head. The wider miter gates are the less head they can operate against. The miter gates at Lock and Dam No. 1 in Minneapolis can operate against a head of 36 feet because the lock is only 56 feet wide. Here, with a minimal 110-foot-wide lock, miter gates can not operate.

The Corps could not apply the Tainter gate model they were simultaneously considering for the locks at St. Anthony's Falls to Lock No. 19 for the same reason.[7] Although Tainter gates had already been built as wide as 80 feet at Lock and Dam No. 24 on the Upper Mississippi (see Section E, Multiple Property Documentation Form and the Lock and Dam No. 24 Historic District Registration Form), those gates were not operating against a head of 40 feet. The difference in elevation between the upper and lower pools at Lock and Dam No. 24 was only 15 feet. Tainter gates wider than 56 feet would not operate against a head of more than 20 feet. The new lock at Keokuk was to be at least 110 feet wide rather than 56 feet wide as those at St. Anthony's Falls.

Montgomery Miegs and Hugh Cooper had faced this same problem between 1908 and 1910 when they were designing the 1910-1914 lock and dry dock at Keokuk. They came up with two solutions: air-pressure operated, single-leaf, submergible, vertical lift gates which they had built on the upstream end of the lock and the dry dock, and vertically mitered, double-leaf gates with buoyancy chambers within the lower third of each of the two leaves, which they had built on the downstream end of the lock (see below and Section 8). The Corps adapted Meigs and Cooper's upstream gates as the model for the new lock, changing from pneumatic to hydraulic operation in the process.

In 1945, before the specifications and model studies had been completed on the newly designed upstream gates, the Rock Island District recommended that the new Lock No. 19 be expanded to a length of 1,200 feet. The larger size would allow new, longer tows to pass through the lock in one piece rather than being broken into lockable pieces, as was becoming routine at the other locks in the 9-foot channel system. In 1952, Congress authorized the Corps to build the lock at this enlarged size. The project was carried out in four phases. Stage I was carried out between 1952 and 1954. It consisted of construction of the lower approach to the lock. Stage II, carried out from 1954 to 1956, consisted of construction of the lock proper, including installation of lock gates, valves, and lock operating machinery. Stage III, carried out in 1956, involved a supply contract for manufacturing and

delivery of certain electrical control equipment and the upstream gate operating equipment. Stage IV, carried out in 1956 and 1957, consisted of the installation of the power, control, and lighting system, and some miscellaneous construction.

The new lock, as completed and brought into service in 1957, adjoins the east side of today's esplanade. The ground level of the esplanade is not all at the same level as the top of the lock wall. Only the easternmost approximately 600 feet of the esplanade is at that level. The rest slopes steeply downhill behind the land wall of the lock.

The 1912-1914 dry dock adjoins the upstream end of the riverward wall of the new lock. The overall waterproof chamber formed by an upstream gate, three walls, and a floor is 130 feet wide and 463 feet long by 20 feet high. It is founded on bedrock. It has reinforced concrete, cut stone, and rock-filled walls. The land wall is the river wall of the 1953-1977 lock and the chamberward face is sloped to its top. A new concrete surface was put on this slope in 1977. The riverward wall is the land wall of the 1910-1913 lock and is vertical and straight now, although it originally had arches to hold extensions of the land wall of the old lock. Four cylindrical, air-pressure operated filling valves situated above the penstock in the land wall controlled filling of the dry dock. When the valves were open, the penstock fed water to longitudinal tunnels in the dry dock floor. When the valves were closed, no water could enter the chamber. The chamber was emptied directly into the downstream pool through two discharge tunnels in the downstream wall of the dock. The discharge flow was controlled by hand-operated valves in the downstream wall. The access gate is a single-leaf, submergible, vertical-lift, pneumatically operated floating gate identical to the service gate and guard gate on the 1910-1913 lock (see below). The pneumatic operating system for both the access gate and the filling valves was controlled by lever switches on the main control panel in the second floor of the lock operator's house (see below) on the river wall of the lock beside the upper gates. The dry dock was abandoned and permanently dewatered in 1977. The structure is suffering from deferred maintenance, but has integrity of location, design, materials, feeling, and association.

The 1910-1913 lock adjoins the east, or riverward, side of the dry dock. Its chamber, formed by two massive stone walls, two sets of gates, and a floor, is 110 feet wide by 358 feet long by 57 feet high. It is founded on bedrock. The lock could raise or lower vessels 40 feet. Its reinforced concrete land wall also serves as the riverward wall of the dry dock. The lock's riverward wall ties to the old lock and dry dock power house on the east. Four cylindrical, air-pressure operated filling valves (similar to those in the dry dock) situated vertically above the cast in place penstock in the river wall of the lock controlled the filling and emptying of the lock. The valves were remotely controlled by lever switches on the main control panel in the second floor of the lock operator's house (see below) on the river wall of the lock beside the upper gates. There are two identical upstream gates with the guard gate lying upstream from the service gate. The guard gate allowed the service gate to be repaired and could also be used in emergencies if the service gate failed. The top of either gate is wide enough to serve as a service bridge, giving access to the lock power house and the commercial power plant. Both gates are single-leaf, submergible, vertical-lift floating gates operated by air-pressure conducted to them

in pneumatic pipes via steel hoist towers (one serving each gate-see Photo 13) on the river wall of the lock, next to the gates. The full extent of each gate when open fits into a large slot in the floor of the upper breast wall of the lock. After having been lifted by air pressure, their tops are at the same level as the tops of the lock walls and they are secured in place by catches. The downstream gates are a pair of vertically mitered curved steel skin-plated leaves with buoyancy chambers in their lower thirds. Each leaf is balanced on a pintel. They are operated by a strut connected to air pressure operated engines located in shelter houses (see below), one beside each leaf. The engines were remotely controlled by lever switches on the main control panel in the second floor of the lock operator's house (see below) on the river wall of the lock. The valves, the system of cast in place tunnels that carried the water in and out of the lock, the operating systems, and the lock gates appear to be intact but have not been operated since 1977 when a cell closure wall (see below) was built upstream from the upstream gates of both the lock and dry dock, a cofferdam was placed across the lower gate recess pining the gates in the open position (see Photo 6), and the lock was permanently dewatered. All three vertical-lift gates have been kept in the raised position since then. The structure is suffering from deferred maintenance but has integrity of location, design, materials, workmanship, feeling, and association.

The cell closure sea wall (see Photo 8) is a 515-foot-long series of sheet pile cells filled with rock and extending from the river wall of the 1963-1957 lock to the never completed commercial power plant extension wall. This structure is in excellent condition but does not contribute to the historical character of the district.

The 1910-1913 lock operator's house (see Photo 4) sits on the river wall of the lock near the upstream lock gates. All of the 1910-1913 lock and 1912-1914 dry dock operating equipment was controlled from this approximately 15 feet by 50 feet, two-story, masonry, craftsman style building. The brick walls are covered in concrete stucco and it has a hipped roof covered with tile shingles. There are 39, six-paned windows (24 on the second floor and 15 on the first floor) and one door in this structure. The main control room occupies the entire second floor. It is a corridor along a large, black metal control panel with brass switches. The stairway access from the first floor is directly opposite the entry door. The building is suffering from deferred maintenance but has integrity of location, setting, design, materials, workmanship, feeling, and association.

One 1910-1913 downstream lock gate operating machinery shelter (see Photo 5) sits on the river wall of the lock near the downstream gates. The other identical shelter sits in the same position on the land wall of the lock. Each is an 8-foot by 10-foot, one-story building with a hipped roof and craftsman stylistic overtones. They have masonry structural systems, with the brick covered by concrete stucco. Each has 13 full length, six-over-six double-hung, wooden windows and one doorway. Each has only one room which provides access to the downstream gate operating machinery. These two buildings are suffering even more than the rest from deferred maintenance but have integrity of location, setting, design, materials, workmanship, feeling, and association.

The 1910-1913 lock and dry dock power house (see Photo 3) adjoins the riverward, or eastern, side of 1910-1913 lock. It developed all the air pressure needed to operate the lock and dry dock operating machinery, valves, and gates. The craftsman style power house, which is about 40 feet by 240 feet by 30 feet high above the water line, forms the east-west connecting wall between the river wall of the 1910-1913 lock and the incomplete commercial power house extension wall. A 1927 locktender's shop and ladies restroom addition sit on top of the main power house. This structure is about 12 feet by 50 feet with a sloping stairway cover on the east end. The main power house has reinforced concrete walls and structural system. The addition has a masonry structural system with brick walls covered with concrete stucco. There are two ice chutes extending through the power house from the upstream side to the downstream side on the east or riverward side of the building. There are two water intakes toward the center of the upstream side of the power house. These intakes are connected to trash racks leading to scroll chambers containing turbine runners. The scroll chambers are connected, in turn, to two steel draft tubes which discharge directly into the downstream pool from the downstream side of the power house. There are also six large, arched metal casement windows on the downstream side of the power house and a four-paned skylight. The shop and restroom addition has six wooden, double hung six-over-three windows, two six-paned windows, and two doors.

The approximate 125-foot by 30-foot three bay room with a vaulted concrete ceiling on the first level below the top of the old lock and dry dock power house contains two, 200-hp, 262-rpm S. Morgan Smith Company turbines with individual governors attached to double, 165-rpm, 15-foot by 116-foot Ingersoll Rand Company air compressors. Their transmission belts are very prominent. The addition has one large, 12-foot by 33-foot workroom on the west and a 10-foot by 7-foot restroom on the east. There are no interior doors between the rooms. The entrance to the main workroom is from the north. The entrance to the restroom is from the west. A simple, reinforced concrete stairway leads from the west end of the workroom in the addition to the main room of the power house and the lower level tunnels that extend from it to carry pneumatic tubes, water pipes, electrical conduits, etc., from the power house to the lock and dry dock. Although suffering from deferred maintenance, this building and its addition have integrity of location, setting, design, materials, workmanship, feeling, and association.

The west wall of a 150-foot by 800-foot base for a never completed addition to the commercial power plant adjoins the upstream northern, side of the old lock and dry dock power plant. This base includes a foundation, underwater turbine wells and tubes, as well as the more complete west wall. This base connects to the 150-foot by 800-foot completed commercial power house (see Photo 2) which is the equivalent of 10 stories high. It has a flat roof on which are mounted four static towers and 12 transmission towers. The commercial style plant is a conventional, rectangular, rub-of-the-river hydroelectric power house which generates 135,000 kilowatts at capacity. Six of its 15 generators have been rewound to produce 60 hertz power, rather than the original 25 hertz power. As the other structures in this district, the commercial power house is founded on bedrock. It has reinforced concrete walls and a structural system with 38 approximately 20-foot by 50-foot metal frame casement windows with an arched light above. Water enters the plant from the forebay on the west side of the plant (see Map 3, the bay is formed by the riverward ice fender dam,

the landward ice fender dam [these dams are described in Section F, Multiple Property Documentation Form], the Iowa shore, the new lock, the cell closure wall, the old lock and dry dock power house, the west wall of the never completed section of power house, and the commercial power plant itself. The mouth of the bay is between the two fender walls). The water flows through trash racks into the gate room and continues from there into the 15 scroll chambers (one for each of the generating units). From the scroll chamber the water flows downward through a draft tube which discharges into the trail race on the east side of the plant.

The main room on the inside of the commercial power plant is on the east side of the building over the thrust deck and contains 15 generators, each about 25 feet wide. The generator rotors are connected to the turbine runners at the center of the spiral scroll chamber below the thrust deck by 25-inch-diameter vertical shafts. Offices, the operations center, and utility rooms are located on the top two floors of the building. The commercial power house is in excellent condition. Although in continuous use since 1913, and equipment within it has been replaced and updated as necessary to keep it in good operating condition, this building has integrity of location, setting, design, materials, workmanship, feeling, and association.

The dam adjoins the east side of the commercial power house . It extends 4,630 feet from the power house to the Illinois shore. It contains 119 rectangular, steel skin-plated, sliding gates located between 120 piers on 36-foot centers. Flow is controlled by the number of gates that are open. Gates are operated by a traveling gantry crane (see Photo 10) which moves on rails on the outside of the entire length of the service bridge atop the dam. There are four other vehicles which travel on another set of tracks on the top of the dam. They are the coal boiler car (a box car equipped with a steam boiler unit used to thaw gates), the air pressure operated crane car (a flat car equipped with a crane used to repair gates), the electric trolley car (a flat car used to repair gates), and the electric-powered "hand" car (which is used to transport people across the top of the dam). The dam terminates in a storage yard on the Illinois shore. This yard contains various sheds and service buildings erected from time to time as demands required, including ruins of an original construction mixing plant, metal shed, concrete and brick storage building, and brick power transmission building. All are astylistic, utilitarian buildings and none have particular significance or contribute to the district. The dam, like the commercial power house, is in excellent condition although it has been in continuous use since 1913. It has integrity of location, setting, design, materials, workmanship, feeling, and association.

Contributing Resources with date completed or placed in operation and keyed to photographs with those specifically included in the 1976 nomination identified

Buildings

Commercial Power Plant	1913	PHOTO 2 in 1976 nomination
Old Lock and Dry Dock Power Plant	1913	PHOTO 3
Old Lock Operator's House	1913	PHOTO 4
2 Old Lock Downstream Lock Gate Operating Machinery Shelters	1913	PHOTOS 5 and 6

2 Stairway Buildings	1913	PHOTO 7
Ladies Restroom and Lockman's Shop	1927	PHOTO 3
Structures		
Des Moines Rapids Canal Bullnose	1870	PHOTO 6 in 1976 nomination
Old Lock	1913	PHOTO 8 and 6 in 1976 nomination
Dam	1913	PHOTO 9 in 1976 nomination
Dry Dock	1914	PHOTO 8 in 1976 nomination
Traveling Gantry Crane	1913	PHOTO 10
3 Transmission Towers on dam	1913	PHOTOS 2, 9, and 10
Flat Car	1913	PHOTO 11
Electric Powered Flat Car	1913	PHOTO 12
Electric Trolley Car	1913	not pictured
Boiler Car	1913	not pictured
3 Pneumatic Hoist Towers	1913	PHOTO 13
Riverward Fender Wall	1913	PHOTO 1
Objects		
Stage Recorder	c.1925	PHOTO 6

Noncontributing Resources with date completed or placed in operation and keyed to photographs

Buildings		
River Wall Control Station	1957	PHOTO 15
Land Wall Control Station	1957	PHOTO 16
Visitors Center	1961	PHOTOS 16 and 17
Office and Shop	1957	PHOTO 18
City of Keokuk Service Bldg.	1957	PHOTO 16
Maintenance Building	c.1995	PHOTO 19
Smoking Shelter	c.1995	PHOTO 30 in Multiple Property Documentation Form
Structures		
New Lock	1957	PHOTOS 20 and 21 in this form
Landward Fender Wall	1957	PHOTO 1
Sheet Pile Cell Closure Wall	1978	PHOTO 8
Rock Retaining Dike	1978	PHOTO 6
Objects		
4 Boat Launch Davits	1957	PHOTO
2 Stage Recorders	1957	not pictured
Incoming Power Transformer	1957	PHOTO 22

SECTION 7 NOTES

1. Larry McLean, "Keokuk Lock and Dam," National Register of Historic Places Nomination Form, 1976, Section 7.

2. Current condition ratings are in accord with definitions supplied by Ann Swallow, Illinois Historic Preservation Agency National Register Coordinator, on Aug. 19, 1992. By these definitions good means almost all major elements (foundations, walls, windows, and roof) are in repair but missing some original details; requiring some work but no stabilization.

3. Roald D. Tweet, *A History of the Rock Island District U.S. Army Corps of Engineers 1866-1983* (Rock Island, IL: U.S. Army Engineer District, 1984) (hereinafter cited as Tweet, *Rock Island District*), p. 97. Contrary to p. 18 of "Lock & Dam No. 19, HAER No. IA-27" in Rathbun Associates, "Upper Mississippi River 9-Foot Channel Project Locks and Dams 11-22, An Inventory for the U.S. Army Corps of Engineers, Rock Island District" (Lakewood, CO: Rocky Mountain Regional Office, National Park Service, 1988) (hereinafter cited as HAER), the 1883-1889 dry dock designed by Montgomery Meigs was not located here. It was located over 2.5 miles upstream, near the middle lock of the canal.

4. Tweet, *Rock Island District*, pp. 247-248.

5. *Ibid.*, p. 249; and U.S. Army Corps of Engineers, Rock Island District, "Keokuk Lock, Dry Dock and Grounds Showing Improvements, Property Lines and Location of Block 57," drawing dated December 27, 1927.

6. McClean, Section 7.

7. The Rivers and Harbors Act of August 26, 1937, extended the 9-Foot Channel Navigation Project to the upstream side of the Falls of St. Anthony. According to the 1938 plan the Corps developed as a result of this authorization, there would be two locks and dams. The lock on the lower dam was to be 56 feet wide by 400 feet long and provide a lift of 26.4 feet. The lock on the upper dam was to be 56 feet wide by 400 feet long and provide a lift of 49.7 feet. Naturally, the people designing the 38.5-foot lift lock at Keokuk for the same organization would have been aware of what was being considered for St. Anthony's Falls and vice versa. Actual lock design for the lower lock at St. Anthony's Falls was not scheduled to begin until 1940. It did not begin in earnest until 1950 because of the demands on the staff related to World War II. The first structure was not completed until 1963, 6 years after the Keokuk lock. Jon Gerjde, "Historical Resources Evaluation: St. Paul District Locks and Dams on the Mississippi River and Two Structures at St. Anthony's Falls" (St. Paul: U.S. Army Corps of Engineers District, 1983), p. 162.

8. Statement of Significance

Applicable National Register Criteria (Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

__x_ A Property is associated with events that have made a significant contribution to the broad patterns of our history.

____ B Property is associated with the lives of persons significant in our past.

__x_ C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents asignificant and distinguishable entity whose components lack individual distinction.

____ D Property has yielded, or is likely to yield information important in prehistory or history.

Criteria Considerations (Mark "X" in all the boxes that apply.)

____ A owned by a religious institution or used for religious purposes.

____ B removed from its original location.

____ C a birthplace or a grave.

____ D a cemetery.

____ E a reconstructed building, object, or structure.

____ F a commemorative property.

____ G less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance (Enter categories from instructions)
Transportation
Engineering
Maritime History
Economics
Commerce
Conservation
Military
Politics/Government
Social History
Industry

Period of Significance **1870-1948**

Significant Dates **1870**
1910-1913
1913

Significant Person (Complete if Criterion B is marked above)
N/A

Cultural Affiliation **N/A**

Architect/Builder **Meigs, Montgomery**
Cooper, Hugh L.

Narrative Statement of Significance (Complete text printed on the following four continuation sheets.)

Architect/Builder

Stone & Webster Engineering Co., NY
Wilson, James H.
Jenne, D.C.
Macomb, John N.
Stickney, Amos
U.S. Army Corps of Eng., Keokuk
U.S. Army Corps of Eng., R. I. Dist.
U.S. Army Corps of Eng., Chief Eng.
Wm. Heegen & Son, Mt. Vernon OH
J. J. Dull, Harrisburg PA
H. C. Baade
McCarthy Improvement Co., Davenport
Jones Construction Co., Charlotte NC
A-1 Electric Service, Keokuk IA
R. W. Reade Co., Berkeley CA
Saether & Cherry, Keokuk IA
Cyclone Fence Co., Davenport IA
R. L. Patton Const. Co., Keokuk IA
C. R. McDowell Const. Co., Keokuk IA
Cameron & Joyce Co., Keokuk IA
Oil Gear Co., Milwaukee WI
Evans Elect. Const. Co., Omaha NE
Burlington Tent & Awning Co., IA
Economy Builders, Keokuk IA
George H. Holiday, Keokuk IA
Corahunter Tile & Marble Co., NE
Galesburg Glass Co., Galesburg IL
Westcott Const. Co., Ft. Cook, NE
Koraboj Const. Co., Inc. Blair NE

Statement of Significance

Unlike all the other 9-foot channel lock and dam historic districts which could be listed on the National Register of Historic Places as part of the Upper Mississippi River 9-Foot Channel Navigation Project, 1931-1948, multiple property listing, the Lock and Dam No. 19 Historic District has national significance as an individual district under Criterion C in the area of engineering. It includes rare, intact examples of nationally significant historic engineering and represents the work of several of the Nation's masters of waterway improvement and hydraulic engineering.

The Lock and Dam No. 19 Historic District also has national significance as an individual district under Criterion A in the areas of transportation, maritime history, commerce, and industry.

The Lock and Dam No. 19 Historic District is also nationally significant under Criterion A in the areas of transportation, maritime history, commerce, conservation, military, politics/government, economics, and social history because it is a part of the Upper Mississippi River 9-foot channel navigation system.

Despite the fact that, in 1837, Lieutenant Robert E. Lee (later Commander-In-Chief of the Armies of the Confederate States of America) and Second Lieutenant Montgomery Meigs (later Quartermaster General of the Union Army and supervisor of the construction of the Capital Dome, the Washington Aqueduct, and the Pension Building in Washington, D.C.) conducted a survey of the Des Moines Rapids and developed a plan for their improvement and, in 1838 and 1839, Lee supervised the implementation of this plan, the Lock and Dam No. 19 Historic District does not have historic significance under Criterion B. The property does not reflect the time period when either Lee or Meigs were nationally significant. Their Des Moines Rapids work predates their significant accomplishments. Other properties associated with Lee and Meigs better represent their activities during the period when they were nationally significant.

For a detailed discussion of the Upper Mississippi River 9-foot navigation system's significance in transportation, maritime history, commerce, conservation, economics, military, politics/government, and social history see Section E, Multiple Property Documentation Form. Because one of the major purposes of a Multiple Property Submission is to avoid needless repetition of information and keep the individual registration forms for related significant properties briefer than they would be if the resources were being nominated individually, only those aspects of these stories which are entirely specific to this historic district are included here.

The individual Criterion A significance of this district in transportation, maritime history, commerce, and industry is also covered in Section E, Multiple Property Documentation Form. Providing dependable navigation through the Des Moines Rapids was necessary to open the Upper Mississippi River to powered commerce. Resources within this lock and dam district did that. The significance of the low-head power generation at this site is also discussed in that document.

The Period of Significance for the Lock and Dam No. 19 Historic District began in 1870 when the oldest resource contributing to the historic character of the district was built. The oldest element of the district is the Des Moines Rapids Canal Bullnose that was, simultaneously, the termination of the canal embankment and the downstream end of the river wall of the third lock in that canal system, the Keokuk Lock. The canal was built between October 1867 and 1870 (hence Significance Date No. 1) by constructing an embankment in the water 200 or more feet from the shore to form the river wall of the canal. A prism was then excavated to a depth of 5 feet between the embankment and the shore. Next, between 1870 and 1874, three locks, including the lift lock at Keokuk, were built within the prism. The locks were constructed of dressed magnesian limestone blocks laid in hydraulic cement. The embankment, of which the bullnose is the end, served as the river walls of the locks.[1]

The Period of Significance ends in 1948, which is 50 years ago, the recommended closing date for Periods of Significance where activities began historically to continue to have importance, and no more specific date can be defined to end the historic period. The post-1948 transportation, commercial, and industrial activities

of the Lock and Dam No. 19 Historic District do not meet Criterion Consideration G. The district's significance in engineering, maritime history, conservation, economics, military, politics/government, and social history also falls within the 1870-1948 Period of Significance.

Significance as Part of the 9-Foot Navigation Project

The River and Harbors Act which President Herbert Hoover signed into law on July 3, 1930, incorporated the already existing structures at the Keokuk Lock and Dam into the 9-Foot Channel Project as Lock and Dam No. 19. It also authorized the construction of a new 220-foot by 600-foot lock to replace the 110-foot by 400-foot lock already in place. Therefore, although no new navigation structures were added to the district until 1953-1957, the older parts of the complex went on line as part of the system in July 1930.

Stone and Webster Engineering Company of New York City built the Keokuk Power Dam, the old lock and dry dock power house, and the old lock between January 1, 1910, and May 31, 1913 (hence Significance Date No. 1). These structures went on line as part of the Upper Mississippi River 6-Foot Channel Project on May 31, 1913 (hence Significance Date No. 3).

Individual District Significance in Engineering

At the time that it was constructed, the Keokuk Power Dam was longer than any other dam in the world, except the Aswan Dam across the Nile River, and only the power plant at Niagara Falls was larger than the Keokuk Power Plant. Moreover, the plant at Niagara Falls included two power houses while the plant at Keokuk only had one. Thus, at the time it was built, the Keokuk Plant was the largest capacity single power house in the world, as well as being the largest low-head hydroelectric station in the world. The dam and power plant are still functioning and relatively unaltered today, over 80 years later. The plant remains the only one of two commercial hydroelectric power producers on the portion of the Upper Mississippi River covered by the context under which this nomination is being submitted (see "Tapping the Power of the Upper Mississippi River: 1844-1940," Section E, Multiple Property Documentation Form). The other one is at the high dam at Lock No. 1 in St. Paul. It did not begin producing power until 4 years after the Keokuk installation. The successive hydroelectric generation stations at the Falls of St. Anthony and at both the Upper and Lower 9-Foot Channel locks and dams at the Falls of St. Anthony are not within the portion of the river covered by this context.

Montgomery Meigs' and Hugh Cooper's pneumatically operated, single-leaf, submergible, vertical lift gates on the upstream ends of the old lock and dry dock are also significant as a solution to the problem of operating 100-foot or wider lock gates against a head of water greater than 20 feet. The lock's downstream gates represent another attempt, via a different design, to solve this same problem. They are miter gates with the curved upstream faces to make use of the strength of an arch and allow the bottom third of each gate to serve as a buoyancy chamber, reducing the friction and wear on the pintels and making the gates easier to operate.[2]

The lock and dry dock power house which developed all the air pressure needed to operate the lock and dry dock still contains both its original turbines and hydropower generators and the original compressors and transmission belts. This is a rare, intact example of a nationally significant industrial technology.

Individual District Significance as the work of masters of waterway improvement and hydraulic engineering

Common engineering wisdom at the turn of the century (and in the U.S. Army Corps of Engineers for three decades after that) held that the only cost-effective technique for generating hydroelectric power required a difference in elevation of 150 feet or more between the upper and lower pools. Yet, a few bold hydraulic engineers in Chicago thought otherwise and set out to prove their ideas in concrete and steel. Isham Randolph, Chief Engineer of the Chicago Sanitary Commission, was one. Lyman Edgar Cooley was another. In 1901, Cooley began formulating plans for a hydroelectric facility to utilize the 40-foot difference in elevation between the approximate 54-mile-long basin which the dam he proposed building all the way across at the Upper Mississippi River at the foot of the Des Moines Rapids between Keokuk, Iowa, and Hamilton, Illinois, would create and the tail waters of the dam at low water. At that time, the fact that Cooley's plan was for a multiple-use project was not as much of a novelty as the fact that if was a low-head hydroelectric generation project.

In 1901 and 1902, Montgomery Meigs, a Rock Island District civilian employee, evaluated Cooley's plan for the Corps and recommended that the government allow the Keokuk and Hamilton Water Power Company to build the bank-to-bank structure. Meigs was the son of the Montgomery Meigs who, in 1837, assisted Robert E. Lee in surveying the Des Moines Rapids and recommending a plan of improvement (see Section E, Multiple Property Documentation Form). The younger Meigs was not as well known nationally as his illustrious father, but he was a very distinguished and widely known engineer. He received his engineering degrees from Harvard University and the Royal Polytechnic School of Stuttgart, Germany. He joined the Rock Island District of the Corps of Engineers in 1874 when he was 27 years old. For the first few years of his employment there he did survey work and helped develop the plans for wing dams for the 4.5-foot channel project on the Upper Mississippi River. In 1881, he was given charge of the Des Moines Rapids Canal. He remained the principal Corps engineer in its Keokuk office from that point until his retirement in 1926—52 years later. In addition to supervising work on the successive structures at Keokuk, Meigs worked a great deal with steamboat design. His interest in photography and model building had a lasting impact on district policy. However, his most lasting claim to fame, aside from his involvement with the Keokuk structures, probably lay in his originating the idea of oiling country roads to improve them. This 1898 idea was adapted throughout the United States.[3]

Between 1905 and 1910, when Hugh L. Cooper designed the dam, commercial power house, old lock and dry dock power house, and the old lock and the dry dock, he already had a worldwide reputation for his achievements in Jamaica and Brazil and for designing the hydroelectric generating facilities and Niagara Falls, New York, and McCall's Ferry, Pennsylvania. He was clearly already a master of waterway improvement and hydraulic engineering.

SECTION 8 NOTES

1. Tweet, *Rock Island District*, pp. 92-93 and 97.

2. Throughout both the design and construction phases of the project, Hugh Cooper worked closely with Montgomery Meigs. At times it is difficult to determine what is Cooper's design and what is Meigs' design. However, it appears Cooper had a freer hand on the dam and power plant while Meigs' role was more important in the design of the navigation structures. Apparently, the two engineers worked together on the design of this lock and its gates between 1908 and 1910.

3. For a fuller biography of the younger Meigs see Tweet, *Rock Island District*, pp. 357-358.

9. Major Bibliographical References

(Sources used in preparing this form are listed on the following two continuation sheets.)

Previous documentation on file (NPS)
___ preliminary determination of individual listing (36 CFR 67) has been requested.
_x_ previously listed in the National Register
___ previously determined eligible by the National Register
___ designated a National Historic Landmark
___ recorded by Historic American Buildings Survey # _____
_x_ recorded by Historic American Engineering Record # **IA-27**_____

Primary Location of Additional Data
___ State Historic Preservation Office
___ Other State agency
_x_ Federal agency
___ Local government
___ University
___ Other
Name of repository: **USACE, Rock Island District**_____

10. Geographical Data

Acreage of Property _____

UTM References (Place additional UTM references on a continuation sheet)

	Zone	Easting	Northing		Zone	Easting	Northing
1	__	_____	_____	3	__	_____	_____
2	__	_____	_____	4	__	_____	_____

___ See continuation sheet.

Verbal Boundary Description and Boundary Justification printed on the same continuation sheet.

11. Form Prepared By

name/title_**Mary Yeater Rathbun, Principal Historian**_____

organization_**Rathbun Associates**_____ date **June 1998**_____

street & number_**1792 Sandy Rock Road**_____ telephone **608-967-2144**____

city or town_**Hollandale**_____ state_**WI**_ zip code _**53544**_____

Additional Documentation

3 maps and 22 black-and-white photographs printed on the following ____ continuation sheets.

Property Owner

name **U.S. Government–Rock Island District, Army Corps of Engineers**

street & number_**Clock Tower Building**_____ telephone_**309-794-5185**____

city or town_**Rock Island**_____ state_**IL**__ zip code **61204-2004**

Selected Bibliography

Because one of the purposes of a Multiple Property Submission is to reduce the amount of documentation on each property, only those sources which are entirely specific to this historic district are included here. If a listing seems incomplete or there is no reference here for a source cited in the endnotes in this form, please check Section I: Major Bibliographic References of the Multiple Property Documentation Form for a complete reference.

Interviews

Elschlanger, Dave. Administrator, Union Electric Co., Keokuk Power Plant, Keokuk, IA. interviewed by Mary Rathbun, June 16, 1998. Notes archived at American Resources Group, Ltd., Carbondale, IL.

English, Ray. Locktender, Lock and Dam No. 19, interviewed by Mary Rathbun, July 24, 1984. Notes on file with Environmental Impact Section, Planning Division, U.S. Army Corps of Engineers, Rock Island, IL.

Robinson, Bill. Lockmaster of Lock and Dam No. 19, interviewed by Mary Rathbun, February 6, 1998. Notes archived at American Resources Group, Ltd., Carbondale, IL.

Weiman, Larry. Hydraulic Engineer, Union Electric Co., Keokuk Power Plant, Keokuk, IA., interviewed by Mary Rathbun, July 24, 1984. Note on file with Environmental Impact Section, Planning Division, U.S. Army Corps of Engineers, Rock Island, IL.

White, Dennis. Lockmaster of Lock and Dam No. 19, interviewed by Mary Rathbun, July 24, 1984. Tape and Notes on file with Environmental Impact Section, Planning Division, U.S. Army Corps of Engineers, Rock Island, IL.

Drawings

The alphanumeric designation appearing on the drawings related to Lock and Dam No. 19 is M-L 19, followed by a drawing specific number.

Photographs

U.S. Army Corps of Engineers, Rock Island District, Lock and Dam No. 19, Keokuk, IA. Photographic Collection.

Union Electric Company, Keokuk Power Plant, Keokuk, IA. 1910-1914 Photographic Collection.

Government Documents

U.S. Congress, House of Representatives. *Letter from the Secretary of War, Transmitting a Report Furnishing Information in Relation to the Improvement of the Des Moines Rapids,* E. Doc. 83, 35th Cong., 1st sess., 1858.

Reports

Rathbun Associates. "Lock and Dam Complex 19" in "Historical-Architectural and Engineering Study: Locks and Dams 11-22, 9-Foot Navigation Project, Mississippi River," Vol. 1, pp. III-31 to III-37 and figures III-122 to III-135 (1985). Environmental Impact Section, Planning Division, U.S. Army Corps of Engineers, Rock Island, IL.

——. "Lock & Dam No. 19, HAER No. IA-27" in "Upper Mississippi River 9-Foot Channel Project Locks and Dams 11-22, An Inventory for the U.S. Army Corps of Engineers, Rock Island District," 29 data pages, 38 exterior photographs, 15 interior photographs, one photographic copy of aerial photograph (1982), 10 photographic copies of photographs (1912-1955), and 16 copies of original construction drawings (1912-1954). Historic American Engineering Record Documentation (HAER). Lakewood, CO: Rocky Mountain Regional Office, National Park Service, 1988.

U.S. Army Corps of Engineers, Rock Island District. "Completion Report on the Construction of New Lock 19, Mississippi River." Rock Island: U.S. Army Corps of Engineers, Rock Island District, March 1958.

——. *"Mississippi River Lock and Dam No. 19: Repairs to Keokuk Lock Miter Gates."* Rock Island: U.S. Army Engineer District, *Rock Island District, March 1934.*

Books

Tweet, Roald. *Taming the Des Moines Rapids: The Background of Lock 19*. Rock Island: U.S. Army Engineer District, Rock Island, 1978.

Articles

Barr, G. Walter. "Interesting Details About the Keokuk Dam," *Iowa Factories* 2: 6-10.

Wilson, Ben Hurr. "The Des Moines Rapids Canal," *Palimpset*, V, No. 4 (April 1924).

Unpublished Papers

Elders, Donald. "The Des Moines Rapids Canal: A History of Its Adverse Effects on Mississippi River Traffic and Its Use as a Source of Water Power to 1860." Unpublished Master's Thesis, Brigham Young University, 1973.

Meigs, Cornelia. "Some Recollections." Iowa State Historic Preservation Office, Historical building, Des Moines, IA.

Meigs, Montgomery and family. Papers, 1866-1931. Illinois State Historical Society Library, Springfield, IL.

Verbal Boundary Description

The boundary of the Lock and Dam No. 19 Historic District is shown as the solid gray line on the accompanying map entitled "Lock and Dam No. 19 Historic District Based on June 30, 1953, Map by Rock Island District: Sheet 25, Mississippi River, River and Harbor Project, Lock, Dry-Dock, & Power Dam No. 19 at Keokuk, Iowa." Lock and Dam No. 19 Historic District consists of approximately 160.47 acres.

Vertex points noted on Map 1 correspond to the following UTM coordinate information from Zone 15. 1- N4473670 E637910, 2- N4473680 E638090, 3- N4473560 E638210, 4- N4473420 E638310, 5- N4473210 E638400, 6- N4473130 E639800, 7- N4473010 E639800, 8- N4473110 E638360, 9- N4472480 E638120, 10- N4472510 E637940, 11- N4472020 E637760, 12- N4472160 E637640, 13- N4472260 E637720, 14- N4472310 E637660, 15- N4472470 E637760, 16- N4472620 E637850, 17- N4472830 E637900, 18- N4473140 E637960, 19- N4473370 E637940, 20- N4473590 E637890.

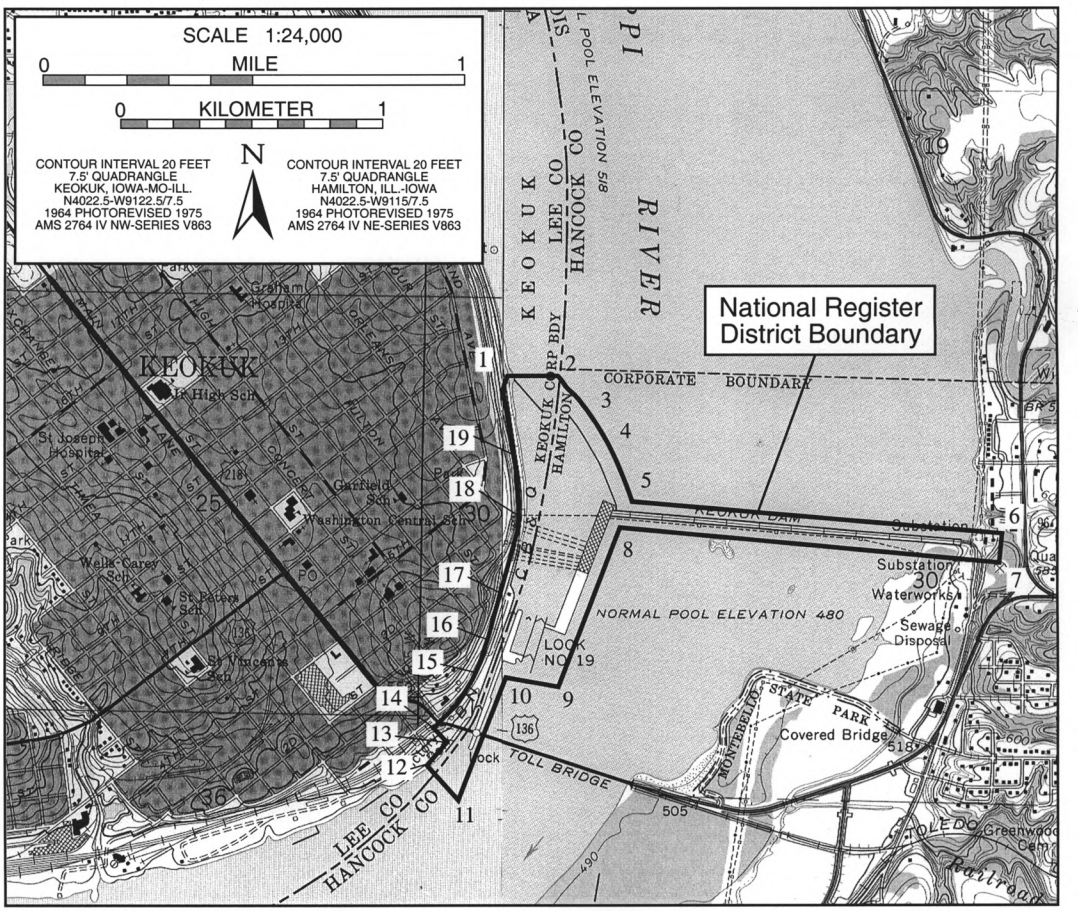
Boundary Justification

The district's boundaries encompass all extant resources from its Period of Significance, except the now abandoned Keokuk and Hamilton Railway and Highway Bridge. This registration form, in addition to being part of the Upper Mississippi River 9-Foot Navigation Project Multiple Property Submission, is an amendment to the Inventory-Nomination Form that Larry McLean prepared in March 1976 that resulted in an October 1978 listing of the Keokuk Lock and Dam on the National Register of Historic Places. That listing does not include the bridge, even though the 550-foot-long and 33.5-foot-high permeable extension to the downstream river wall of the 1953-1957 lock encases the swing span pier of this bridge. The 1978 listing was clearly intended to be limited to the components of the bank-to-bank navigation and power generation facility. The boundaries set in this registration form mirror the intent of the original nomination; therefore, they do not include the historically significant highway bridge.

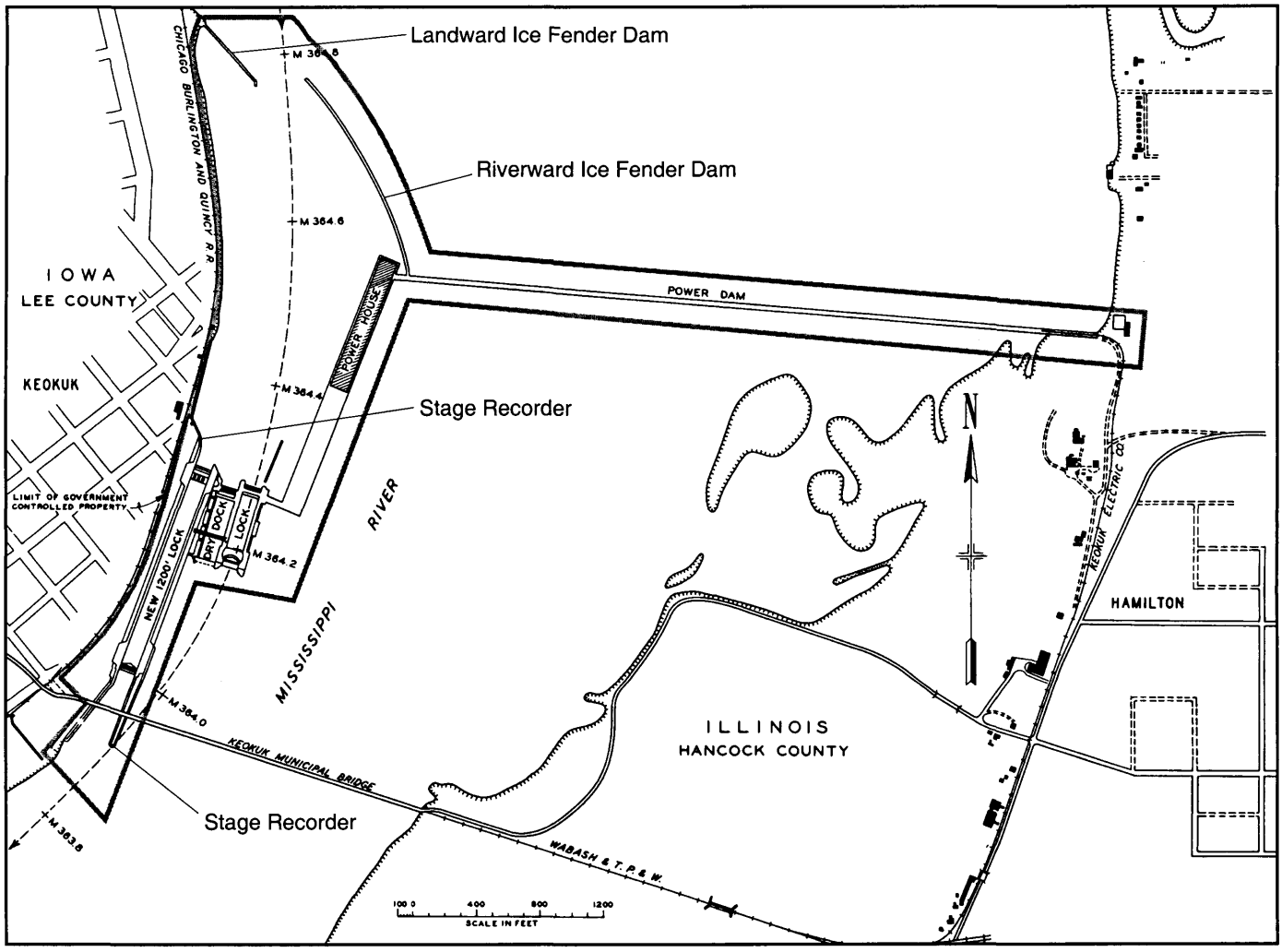
The boundaries defined in this clarification of the original listing are irregular so that they can follow the shape of the man made resources as closely as possible, while avoiding including in the district any more of the river than is absolutely necessary. The river in ineligible for listing because it is not man made.

The district is clearly distinguished from the Iowa shore by the Chicago, Burlington and Quincy Railroad tracks that hug the base of the bluff upon which Keokuk sits. A visitor to the district is largely unaware of the urban development surrounding it because the bluff rising sharply just behind the tracks blocks the view of that development on the Iowa side. The small town of Meyer, Illinois, is just far enough upstream from the dam end of the district to be out of sight while the somewhat larger, small town of Canton, Missouri, is just far enough downstream to be hidden by the J-shaped levee that crosses U.S. 61 about a third of a mile west of the district and then turns south just on the other side of the tracks from the district at a point parallel with the southern end of the district.

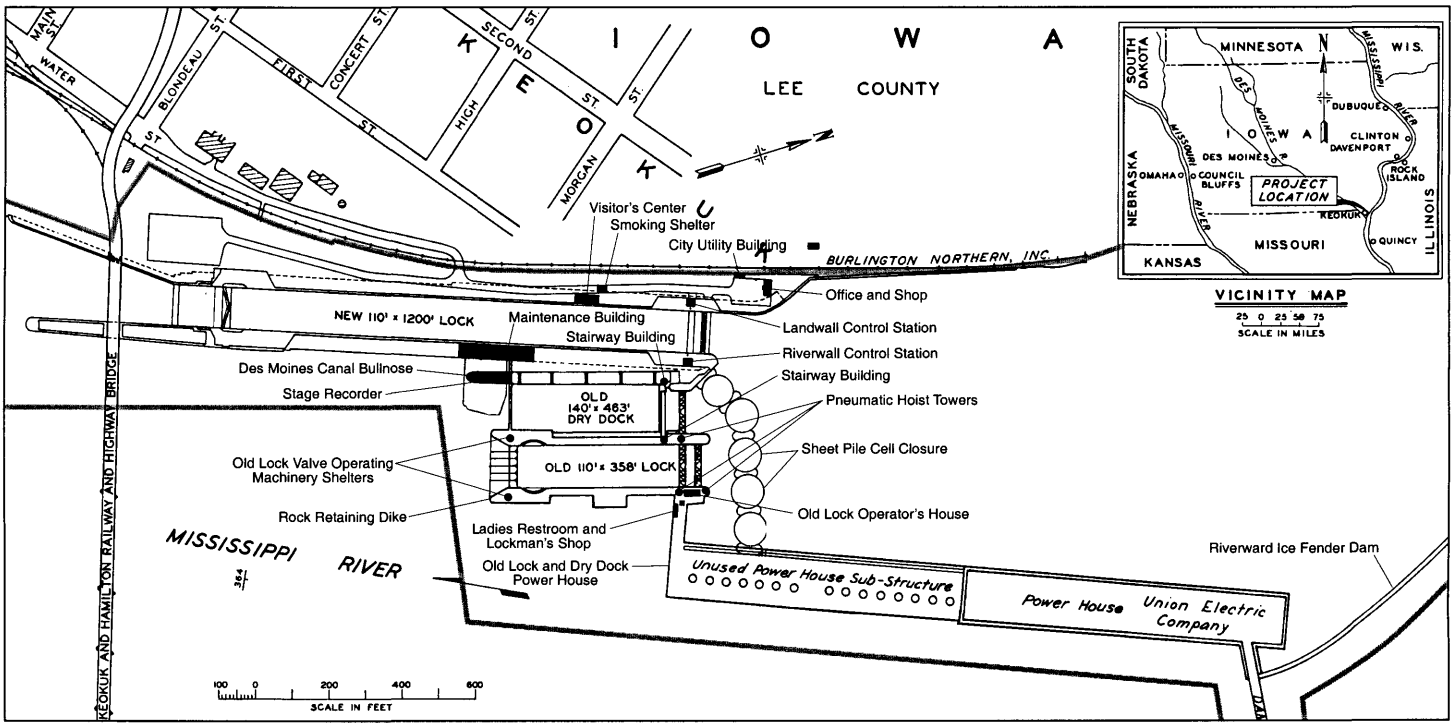
The mooring levee, 1,300 feet upstream from the northern boundary of the district, is not included in the district because, unlike the mooring cell just downstream from the intermediate wall of the lock, it is not integral to the use of the lock and dam and was not built in conjunction with any of the other features of the district in addition to being discontinuous with the rest of the district.



MAP 1. Lock and Dam No. 19 Historic District Boundaries Superimposed on Hamilton, Iowa/Illinois 7.5' USGS Quadrangle Map.



MAP 2. Lock and Dam No. 19 Historic District Based on June 30, 1953, Map by Rock Island District: Sheet 25, Mississippi River, River and Harbor Project, Lock, Dry-Dock, & Power Dam No. 19 at Keokuk, Iowa.



MAP 3. Detail of the Iowa End of the Lock and Dam No. 19 Historic District Based on September 30, 1978, Map by Rock Island District: Mississippi River, River and Harbor Project, Lock 19, Major Rehabilitation.

Lock and Dam No. 19 Historic District
525 North Water Street
KEOKUK, Lee County, IA

The above information is identical for each photo listed below.

PHOTO 1. Aerial Photo.
Photographer: ?
Date of Photograph: ?
Location of Original Negative: Survey Branch, Rock Island District, U.S. Army Corps of Engineers, Rock Island, IL.

View:

PHOTO 2. General View of Commercial Power Plant Main (South) Facade and West Side. The four pointed towers on the roof are static towers which help ground the current. The other 12 towers, somewhat behind the static towers, are the transmission towers. All 16 of these towers are attached ancillary structures to the power plant. They have been on the roof since the plant began producing power. Therefore, they are not counted separately from the power plant. Consequently, they do not appear in the contributing resources count in Section 5 or the contributing resource list in the Section 7 Continuation Sheets.

Photographer: Peter A. Rathbun
Date of Photograph: September 1987
Location of Original Negative: IA-27-10, HAER, I0WA, 56-KE0K,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View: From closure dam at upstream end of old lock and dry dock, looking northeast.

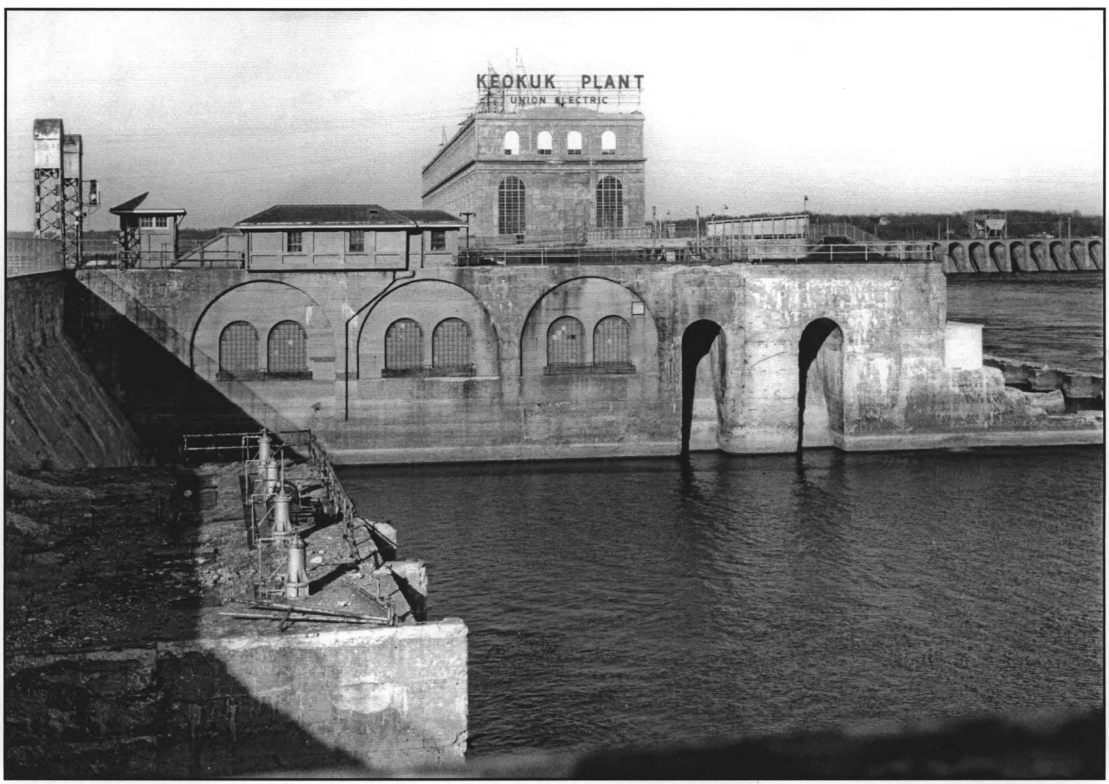


PHOTO 3. General View of Old Lock and Dry Dock Power Plant, South Side. 1927 ladies restroom and locktender's shop addition on top of the power plant. Note: stairway entry which is part of the restroom/shop addition. It looks remarkably like the two stairway buildings on either side of the dry dock. Only the narrow, south side of old lock operator's house is visible. Riverward pneumatic hoist towers on the other side of the old lock operator's house are at the left hand edge of the photo. Commercial power plant and dam in the background.

Photographer: Peter A. Rathbun
Date of Photograph: September 1987
Location of Original Negative: IA-27-17, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View: From Keokuk Municipal Bridge, looking northeast

PHOTO 4. Old Lock Operator's House, South and East Sides. New lock land wall control station and then Keokuk shore in the background. Top of emergency gate pneumatic hoist tower visible over roof.

Photographer: Peter A. Rathbun
Date of Photograph: September 1987
Location of Original Negative: IA-27-13, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View: From top of old lock power plant, looking northwest

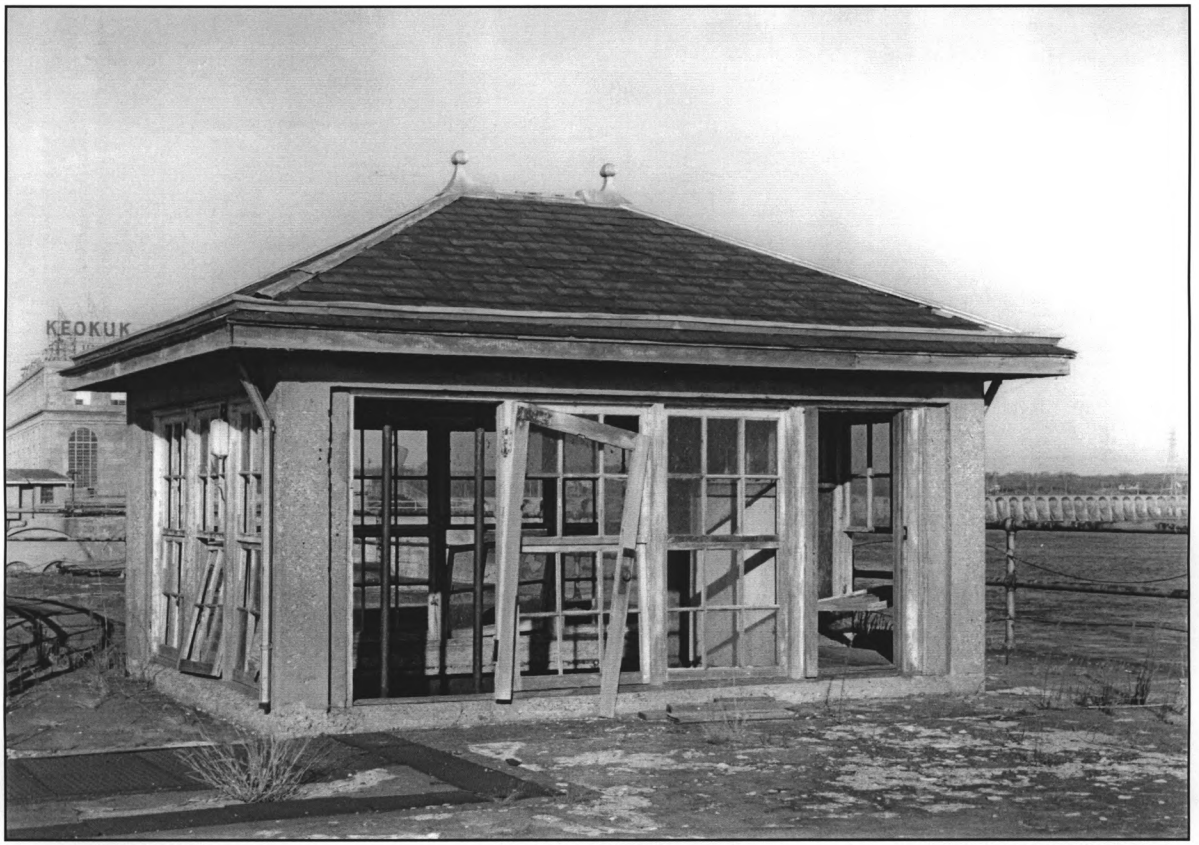


PHOTO 5. Old Lock River Wall Downstream Lock Gate Operating Machinery Shelter, West and South Sides. The old lock land wall downstream lock gate operating machinery shelter is identical to this one and its location mirrors this one.

Photographer:	Peter A. Rathbun
Date of Photograph:	September 1987
Location of Original Negative:	IA-27-28, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View:	From downstream end of river wall of old lock, looking northeast

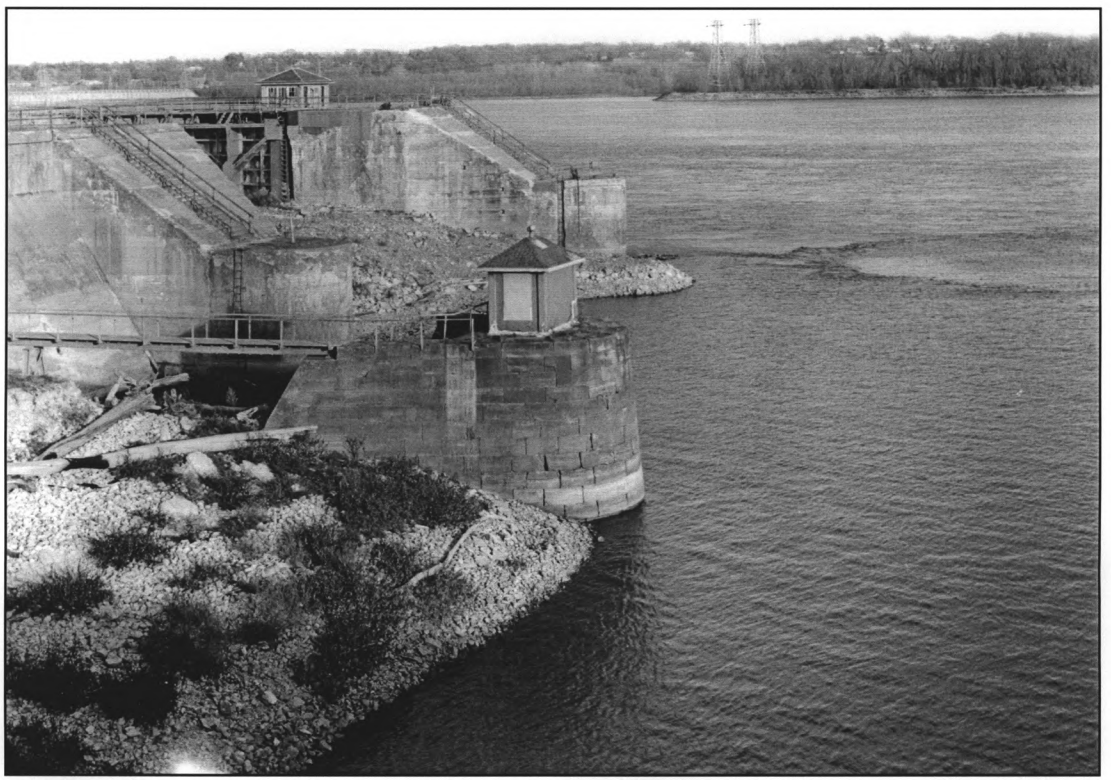


PHOTO 6. West Side of Des Moines Rapids Canal Bullnose. Stage recorder on top and depth recorder on west side installed before 1927. Downstream end of old lock in background. Note: old lock valve operating machinery shelter on the river wall of the old lock. Downstream side of rock retaining dike filling space in which miter gates would close visible. Earth berm in foreground lies between the new lock's river wall and the land wall of the dry dock.

Photographer:	Peter A. Rathbun
Date of Photograph:	September 1987
Location of Original Negative:	IA-27-34, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View:	From river wall of the new lock, looking northeast

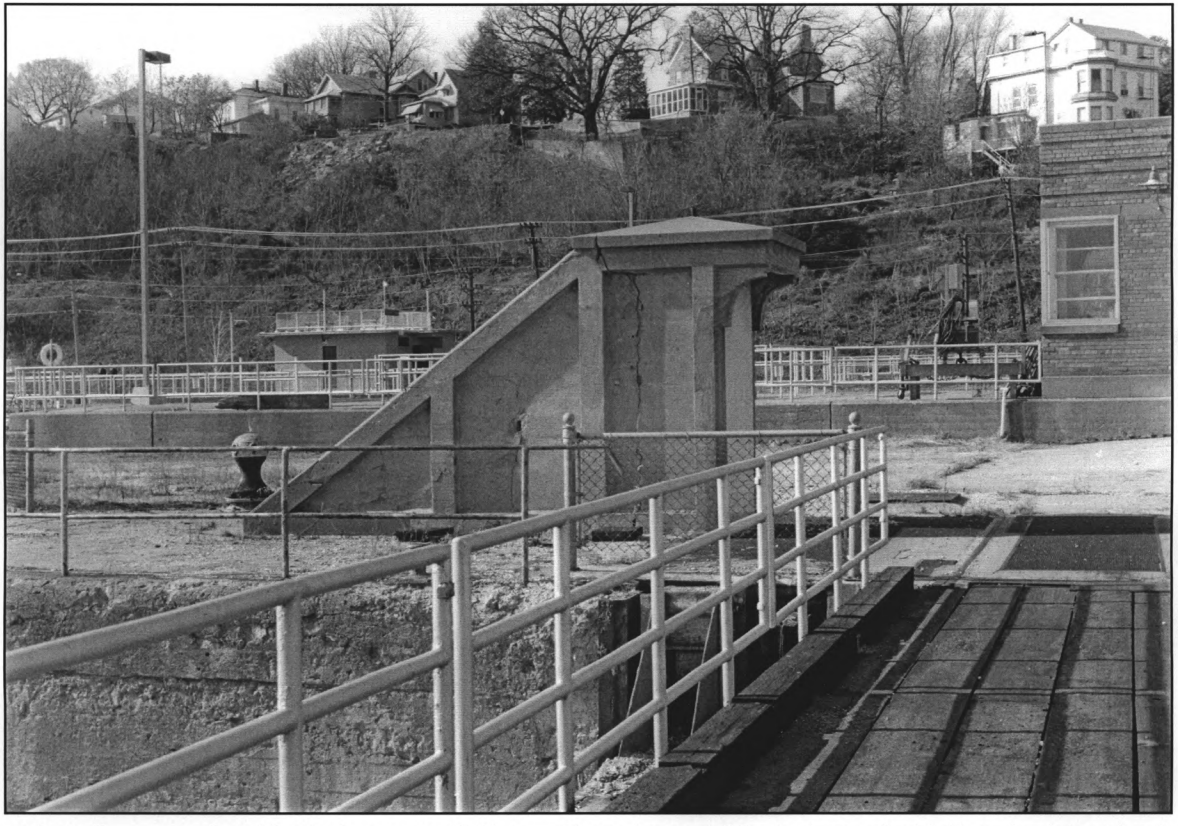


PHOTO 7. Land Wall Stairway Building. The river wall stairway building is identical to this one and mirrors its placement. New lock river wall control station at right side of photo. Visitor's center in background, to the left of the stairway building. Houses in background atop the bluff along the Iowa shore.

Photographer: Peter A. Rathbun
Date of Photograph: September 1987
Location of Original Negative: IA-27-27, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View: From dry dock gate, looking west

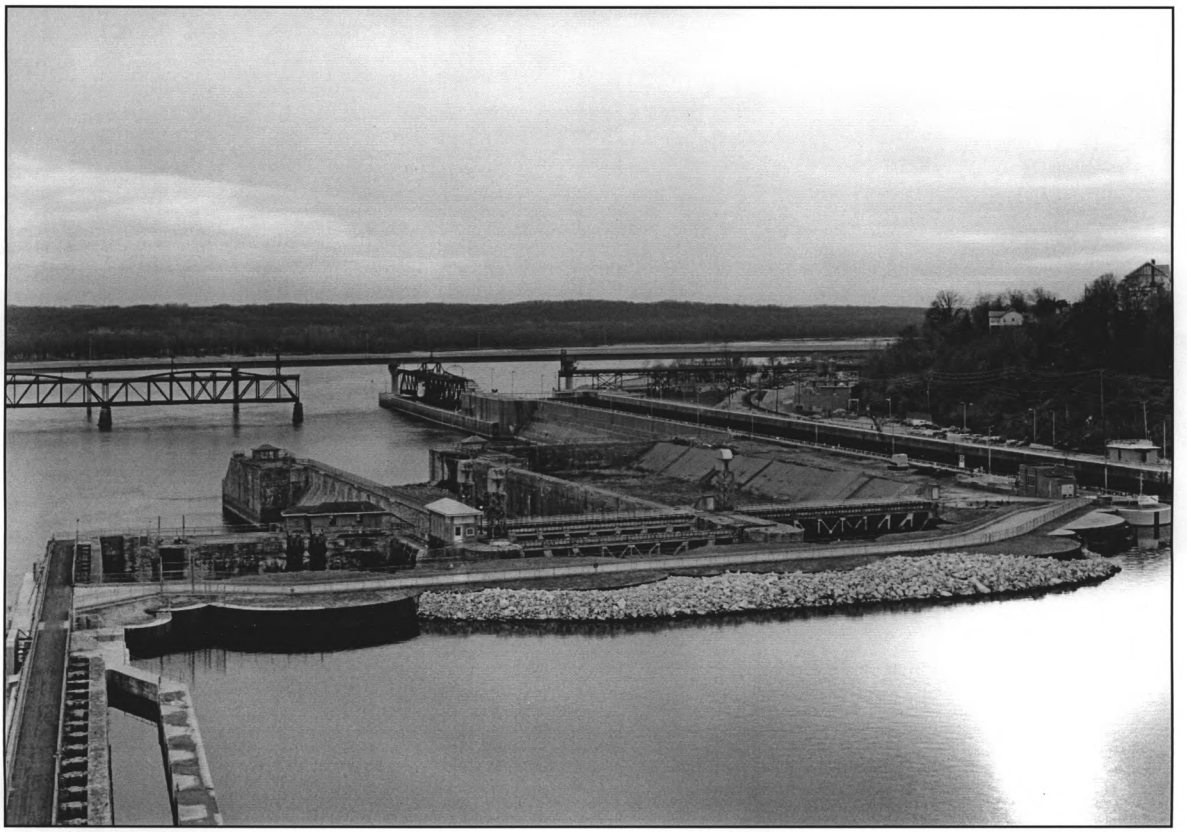


PHOTO 8. General View of Old Lock, Dry Dock, and Sheet Pile Cell Closure Wall. New lock and Keokuk Municipal Bridge in background. Taken before construction of new bridge.

Photographer:	Peter A. Rathbun
Date of Photograph:	September 1987
Location of Original Negative:	IA-27-12, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View:	From roof of commercial power plant, looking southwest

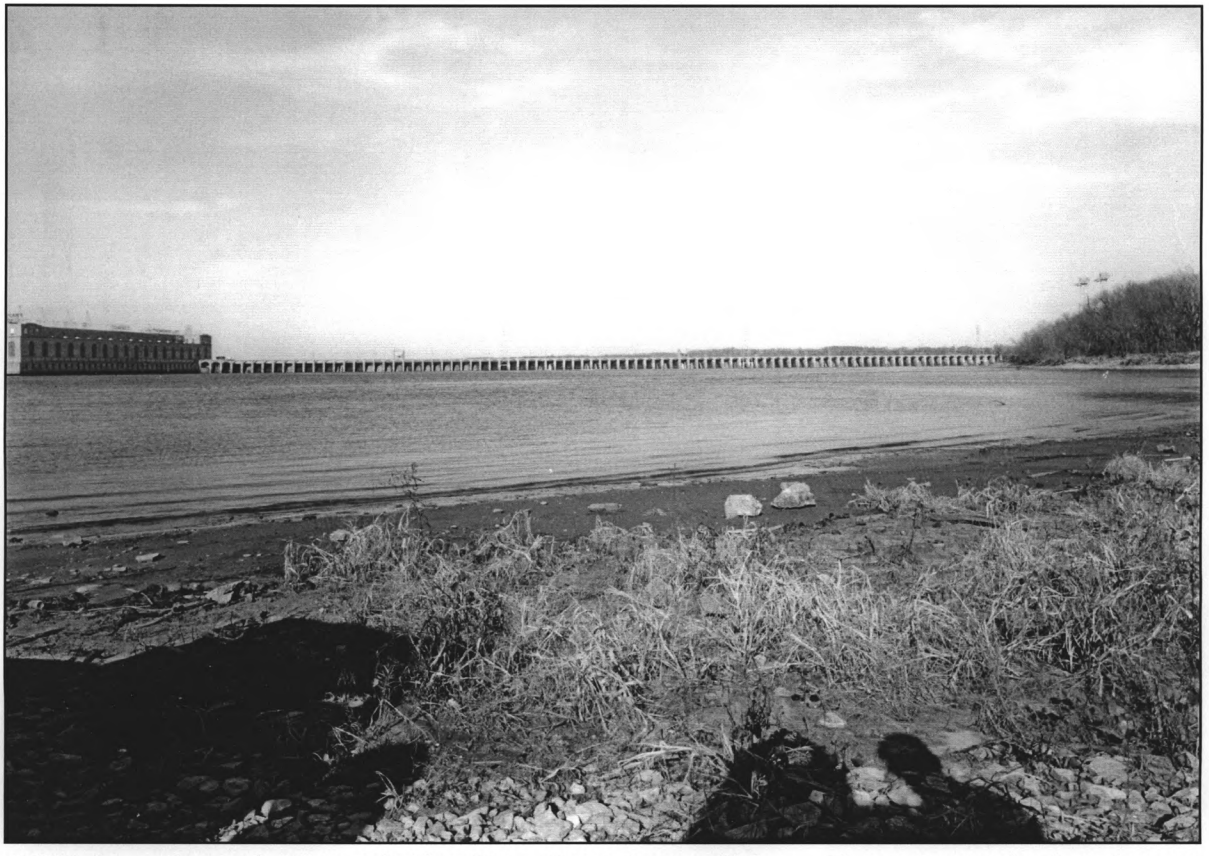


PHOTO 9. General View of the Dam, Downstream Side. Three transmission towers visible under close examination.

Photographer:	Peter A. Rathbun
Date of Photograph:	September 1987
Location of Original Negative:	IA-27-1, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View:	From Illinois shore, looking north

PHOTO 10. Traveling Gantry Crane Atop the Dam. Note large transmission towers visible behind the crane. The 22 smaller "phone pole scale" lattice towers on the dam are not important enough or large enough to be listed as individual components of the site. They are, in National Register terms, minor resources that do not contribute strongly to the property's historic character. The wires that run on these lattice towers only supply power for operating things on the dam.

Photographer:	Peter A. Rathbun
Date of Photograph:	September 1987
Location of Original Negative:	IA-27-9, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View:	From top of dam, looking west

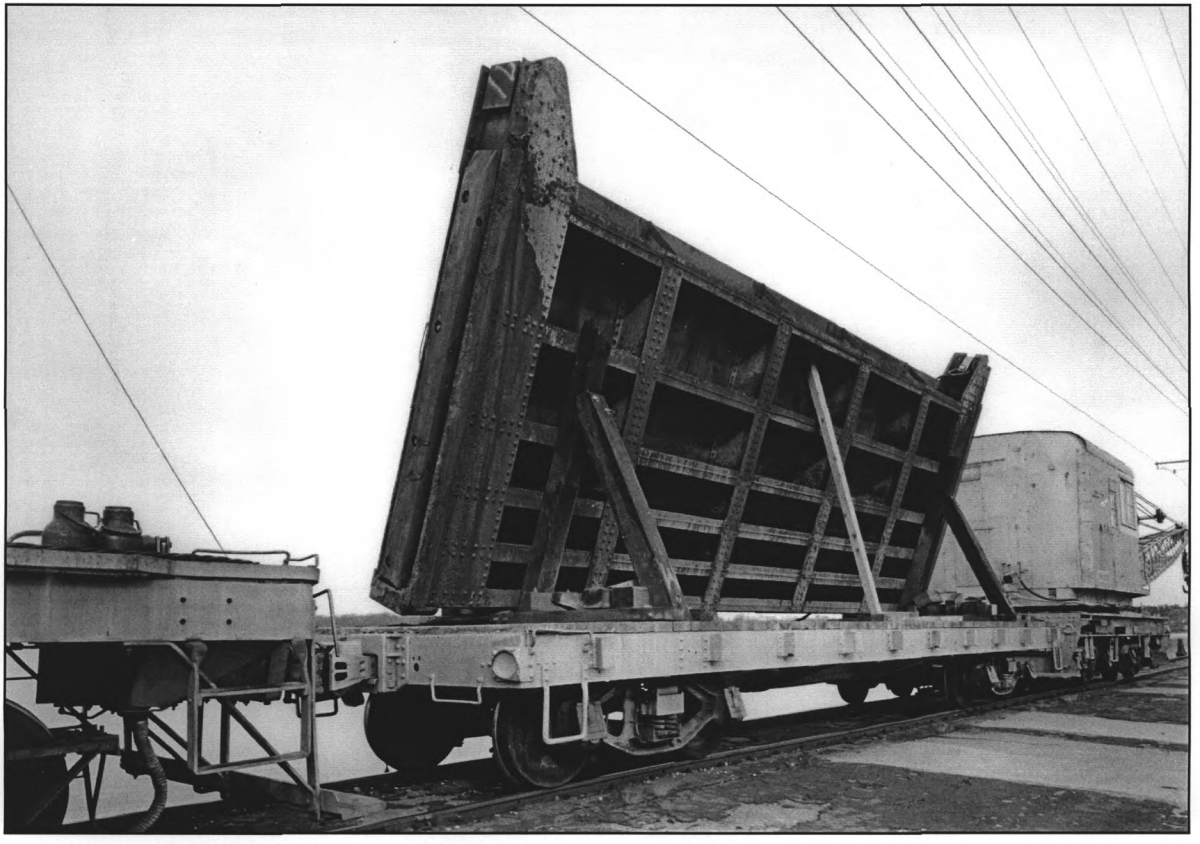


PHOTO 11. Flat Car Atop Dam Carrying Dam Gate.

Photographer:	Peter A. Rathbun
Date of Photograph:	September 1987
Location of Original Negative:	IA-27-7, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View:	From top of dam, looking northeast

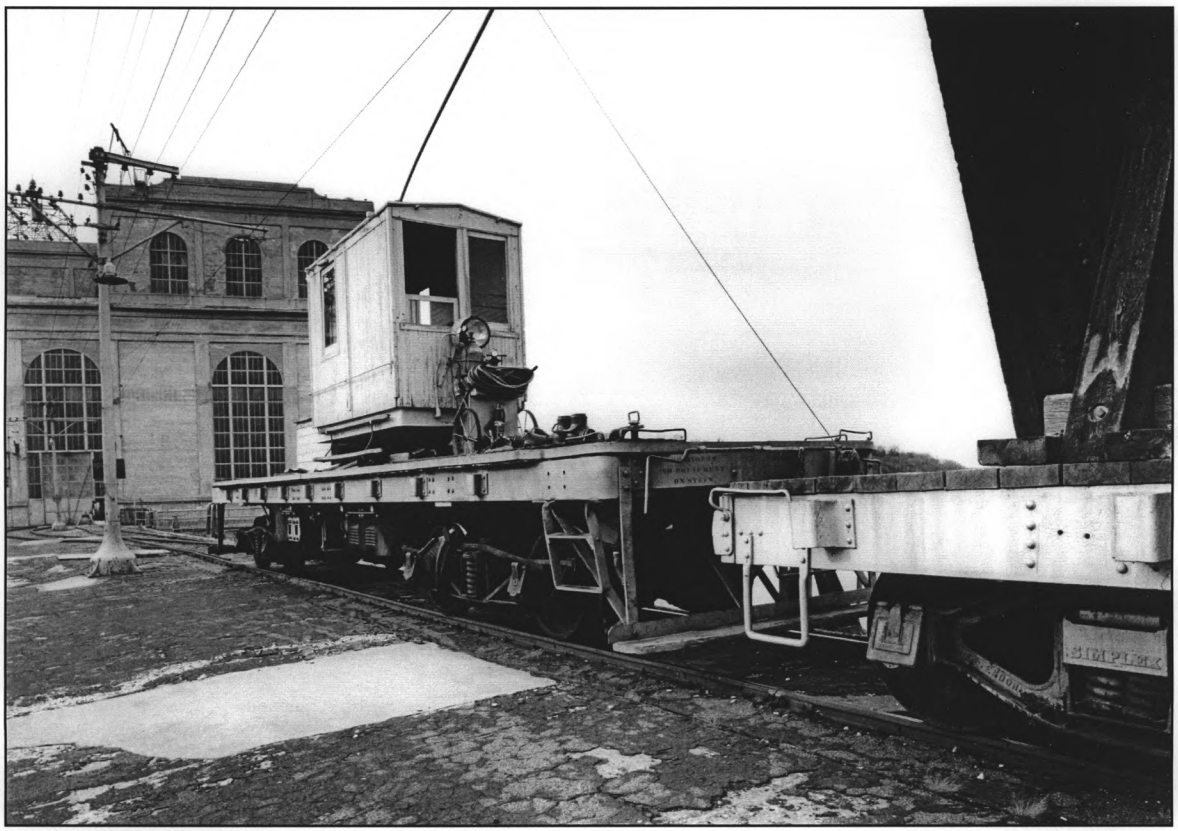


PHOTO 12. Electric-Powered Flat Car, with Top Floor of the Power Plant in Background.
Photographer: Peter A. Rathbun
Date of Photograph: September 1987
Location of Original Negative: IA-27-8, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View: From top of dam, looking northwest

PHOTO 13. Three Pneumatic Hoist Towers. The one in the foreground operated the dry dock gate. The one in the left rear operated the emergency lock gate. The one in the right rear, the main upstream lock gate.

Photographer:	Peter A. Rathbun
Date of Photograph:	September 1987
Location of Original Negative:	IA-27-26, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View:	From land wall of dry dock, looking southeast

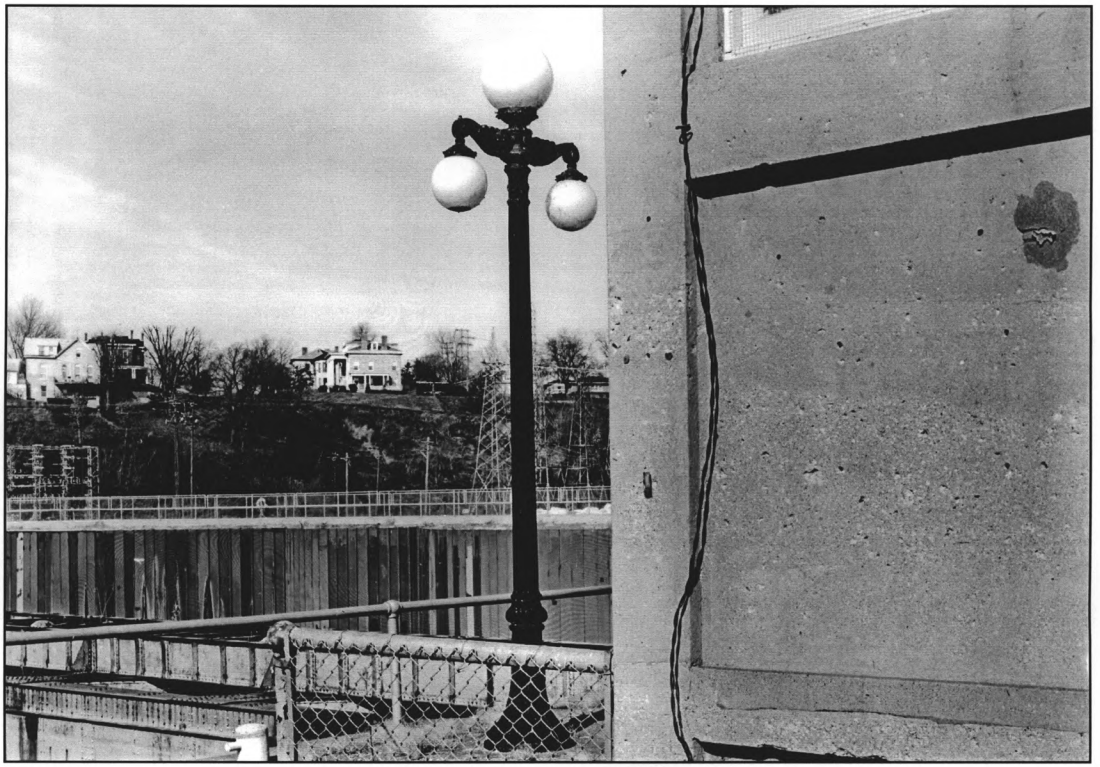


PHOTO 14. Original Freestanding Light Standard Beside Old Lock Operator's House. In keeping with National Register guidelines, landscape features such as these are not counted separately from the part of the site where they are found. Thus, they do not appear in the contributing resources count in Section 5 or the contributing resources list in the Section 7 Continuation Sheets. However, their continued existence is part of what gives the old lock and dry dock complex its outstanding significance. They contribute to the integrity of the complex.

Photographer:	Peter A. Rathbun
Date of Photograph:	September 1987
Location of Original Negative:	IA-27-25, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View:	From land wall of dry dock, looking southeast

PHOTO 15. River Wall Control Station with Tainter Gate Well in the Foreground.
Photographer: Peter A. Rathbun
Date of Photograph: September 1987
Location of Original Negative: IA-27-36, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View: South and west sides, from river wall of new lock, looking northwest

PHOTO 16. General View of Esplanade. Land wall control station in center of picture, visitors center behind that. City of Keokuk service building at the right edge of the photo.

Photographer:	Peter A. Rathbun
Date of Photograph:	September 1987
Location of Original Negative:	IA-27-4, HAER, IOWA, 56-KEOK,3- HAER Collection, *Prints and Photographs* Division, Library of Congress, Washington, D.C.
View:	North and west sides of land wall control station and visitors center and south and east side of City of Keokuk service building, from north end of the esplanade, looking southwest

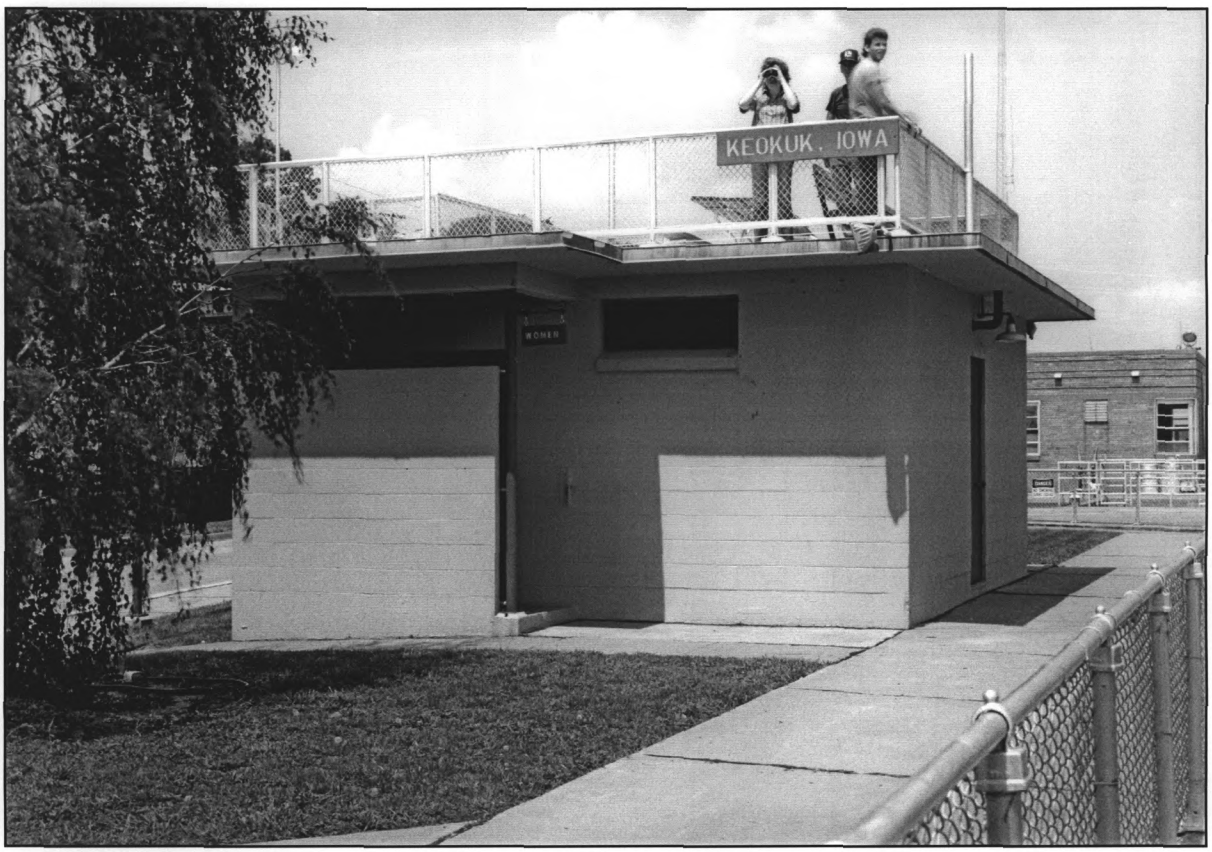


PHOTO 17. South and East Sides of the Visitors Center.

Photographer:	Peter A. Rathbun
Date of Photograph:	September 1987
Location of Original Negative:	IA-27-48, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View:	From land wall of the new lock, looking northwest

PHOTO 18. South and East Sides of Office and Shop Building. Note: the transmission towers in the background are not part of the district. They are on a hillside northwest of the complex. The communications tower atop the office/shop is an attached ancillary structure to the office/shop and is not counted as a separate resource in the district.

Photographer: Peter A. Rathbun
Date of Photograph: September 1987
Location of Original Negative: IA-27-50, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View: From esplanade, looking northwest

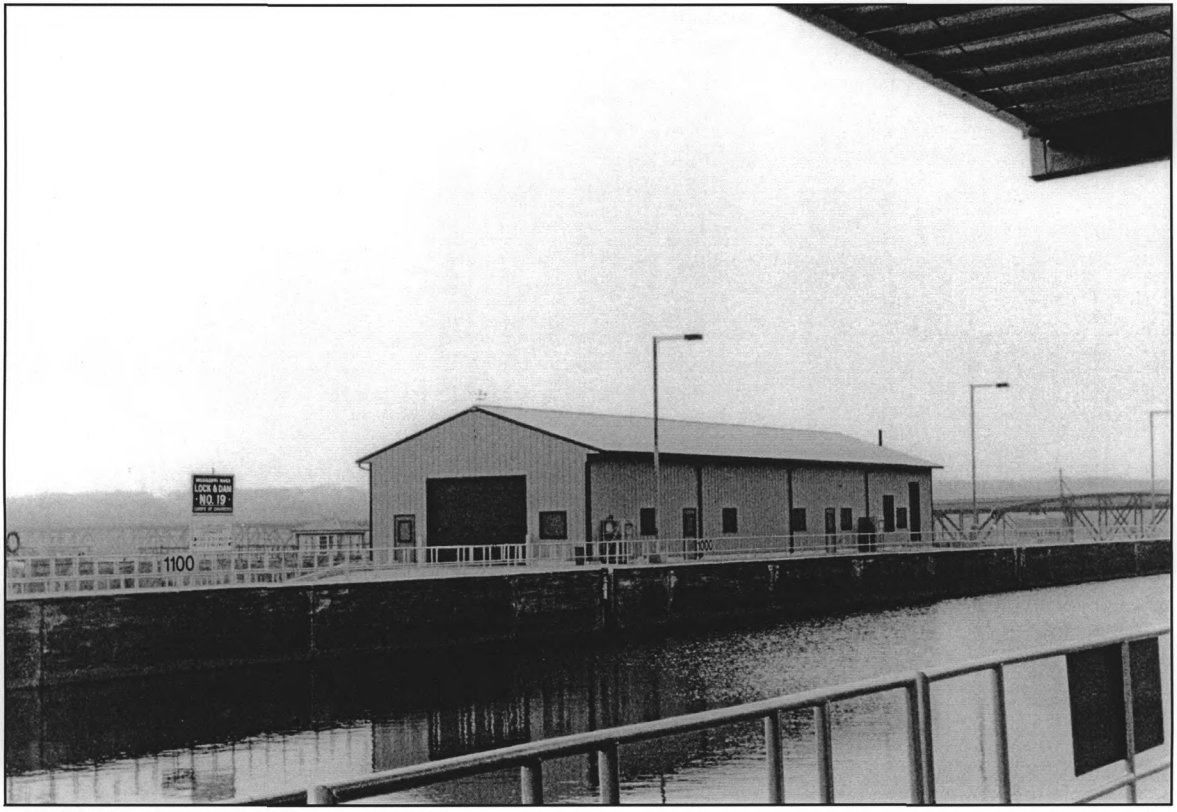


PHOTO 19. Maintenance Building.

Photographer	Mary Yeater Rathbun
Date of Photograph:	February 1998
Location of Orginal Negative:	UMR-NATIONAL REGISTER, roll 4, frame 2, Environmental Impact Section, Planning Division, Rock Island District, U.S. Army Corps of Engineers, Rock Island IL.
View:	From land wall of new lock, looking south

PHOTO 20. Downstream Miter Gates of New Lock, Downstream Side.
Photographer: Peter A. Rathbun
Date of Photograph: September 1987
Location of Original Negative: IA-27-3, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View: From new lock's downstream river wall extension, looking north.

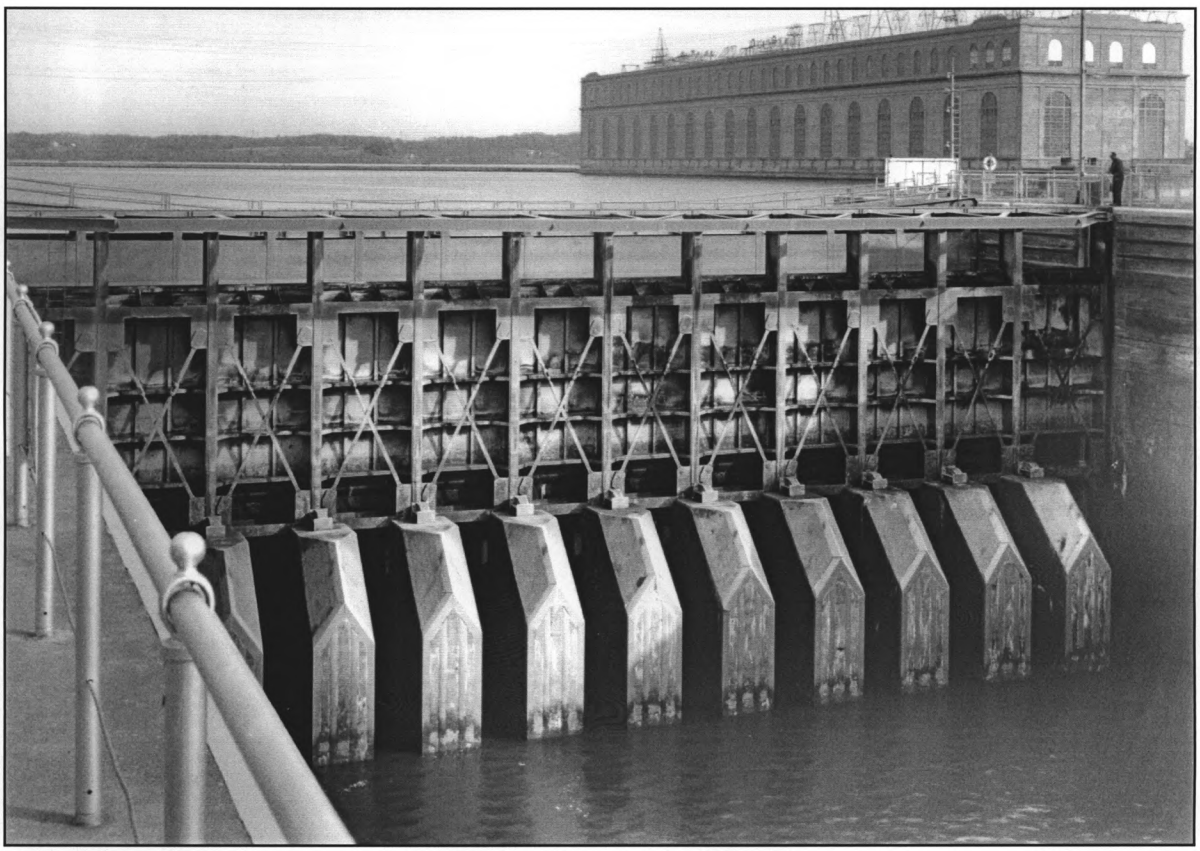


PHOTO 21. Upstream Vertical-lift Service Gate of New Lock, Downstream Side.
Photographer: Peter A. Rathbun
Date of Photograph: September 1987
Location of Original Negative: IA-27-43, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View: From land wall of new lock, looking northeast.

PHOTO 22. Upstream Land Wall Boat Davet on New Lock. Office and shop in the background. Incoming power transformer immediately to left of office and shop building. The other three boat davets on the new lock are identical to the one pictured here.

Photographer: Peter A. Rathbun
Date of Photograph: September 1987
Location of Original Negative: IA-27-53, HAER, IOWA, 56-KEOK,3- HAER Collection, Prints and Photographs Division, Library of Congress, Washington, D.C.
View: From land wall of new lock, looking northeast.