

## DAVID D. TERRY LOCK AND DAM

Pulaski County, AR



**T**he Arkansas River is one of the Mississippi River’s largest tributaries, flowing more than 1,400 miles through Colorado, Kansas, Oklahoma and Arkansas. Despite its size, the waterway was unable to support river traffic in several shallow areas through Arkansas and Oklahoma. The McClellan-Kerr Arkansas River Navigation System (M-KARNS,) an extensive lock and dam system, was designed to enable vessels to overcome the 420-ft difference in elevation along the waterway.

Located in Pulaski County, AR, the David D. Terry Lock and Dam, was completed in 1968 and is one of the 18 M-KARNS locks and dams located on the Arkansas River.

### PROJECT BACKGROUND

The David D. Terry Lock and Dam consists of a 110-foot-wide by 600-foot-long navigation lock and 17 tainter gates, 60-foot-wide by 27-feet-high.

Several of the concrete spillway piers had cracked over the years due to Alkali-Silica Reactivity (ASR) resulting in difficulty when operating the tainter gates. ASR can cause

#### Owner:

US Army Corps of Engineers,  
Little Rock District

#### General Contractor:

Nicholson Construction Company

#### Technique(s):

Anchors, Cement Grouting

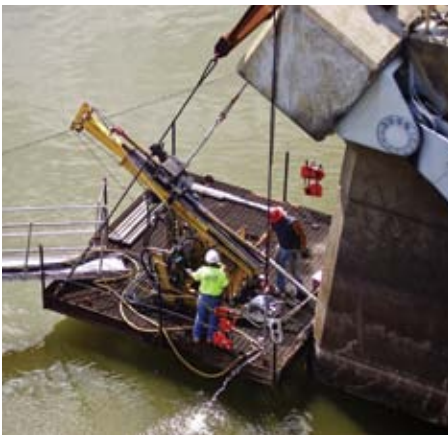
#### Approximate Key Quantities:

High-Capacity Dam Anchors	34
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In addition, Nicholson performed the recovery of sequenced and oriented core samples, down-hole imaging of the interior of exploratory core holes, surveying/video mapping of underwater cracks, epoxy patching of pier cracks, water-pressure testing and consolidation grouting of the piers, and the drilling of test cores to verify grout penetration and overall quality of crack repairs.

Oriented coring and geophysical fracture characterization of each anchor location allowed for individual anchor design and installation in order to limit further expansion of the concrete.



*Self contained drilling and grouting support barge (top); Side view of drill platform (bottom left); Close-up view of anchor drilling (bottom right)*

expansion and cracking in concrete, which can then result in severe structural damage.

## THE WORK

Nicholson was initially contracted to perform structural repair and instrumentation installation on six of the 18 piers of the David D. Terry Lock and Dam that were most severely damaged by the ASR.

Twelve, 74-foot-long double corrosion protection bar anchors with a design load of 237 kips

were installed. In addition specially designed titanium extensionmeters were constructed and installed to monitor any continued expansion of the piers.

Nicholson's work on the David D. Terry Lock and Dam continued several years later, when a second contract was issued for additional exploratory coring and anchor installation on the remaining 11 piers. The contract included 11 exploratory core holes and 22 anchors to be installed on the downstream side of the dam.

## THE RESULT

The construction of the M-KARNS was, at the time, the largest civil works project ever undertaken by the U.S. Army Corps of Engineers. The David D. Terry Lock and Dam, along with the other locks and dams that make up the M-KARNS, create a major trade waterway on the Arkansas River, creating billions of dollars in yearly trade transportation for both Oklahoma and Arkansas. Nicholson's initial contract for the structural restoration and instrumentation installation at David D. Terry provided for a constructible solution in limiting further concrete cracking and expansion associated with ASR. The subsequent contract for further structural restoration at David D. Terry on the remaining piers has ensured that the M-KARNS will continue to provide flood control, recreation and the safe passage of goods and people along the Arkansas River for future generations.