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USACE to improve access to water and power in southern Afghanistan

Kajaki Dam powerhouse, in Helmand province, Afghanistan, is on tap for repairs by the U.S. Army Corps of Engineers. (USACE Photo by Karla Marshall)

The United States military and its coalition partners may be drawing down their combat missions in Afghanistan, but the next two years will continue to be busy for the U.S. Army Corps of Engineers Afghanistan Engineer District-South.

Among the South District's 51 construction projects still to be awarded this fiscal year, three water and infrastructure projects sit high on the district's priority list —Dahla and Kajaki Dams and the Southeastern Electrical Power System — vital infrastructure systems in Afghanistan's arid south that are in need of substantial upgrades and repairs.

"These three projects are critical to improving the lives of Afghan citizens in Helmand and Kandahar provinces," said Air Force Col. Benjamin Wham, the South District commander. "Together they represent about $421 million worth of construction and will boost the supply of water and electric power to both provinces."

Dahla Dam

Located in Kandahar province on the Arghandab River, the Dahla Dam has suffered from years of neglect and war. Its intake and outlet works do not operate correctly and sediment reduced reservoir capacity. As a result, the water supply to Kandahar province does not reach 30% of the irrigation canals refurbished by the Canadian International Development Agency over the past several years.

Increased water for irrigation means the once productive "breadbasket of Afghanistan" can again produce the fruits and vegetables that Afghanistan needs to feed its people. "The Canadians already rehabilitated many of the irrigation canals south of Dahla Dam as part of their Arghandab Irrigation Rehabilitation Project," said Wham. "Our mission is threefold: to boost the holding capacity of the Dahla reservoir so more water is available for irrigation, raise the spillway height and shore up existing embankments and saddle dams."

The Corps of Engineers will oversee the construction at Dahla Dam in two phases.

The first phase will include improvements to the intake and outlet works. "We expect to award this phase of the Dahla Dam project in September," said Linda Murphy the South District's water and infrastructure branch chief. The existing intake tower will be retrofitted to accommodate an 8-meter dam raise, the existing tower gate and operating machinery will be refurbished, and the single tower gate design will be maintained by reinforcing of the tower gate

slot and providing a new tower gate and operating machinery.

The outlet works will consist of a new valve house adjacent to the existing one and connected to the outlet tunnel extension. Four new valves will replace the two existing valves and the valve house will be sized to accommodate two future valves for industrial water supply.

The second phase will include the embankment works. “We plan to raise the main dam embankment by five meters,” Murphy said. To stay within budget, we will use a mechanically stabilized earth wall.”

The plan also calls for earth fill to raise the six saddle dams and roller-compacted concrete to widen the main spillway, Murphy said. The second spillway will be replaced with an earthen saddle dam.

As soon as funding is available in fiscal year 2013, the district will award the second phase.

Kajaki Dam

Located in Helmand province on the Helmand River, the Kajaki Dam serves two functions: a source for irrigation and water along the lower Helmand River and hydroelectric power generation. USACE has several concurrent project plans associated with the Kajaki Dam with a total program amount of approximately $205 million.

Together, the projects will improve water flow for irrigation and electric power generation, said Murphy, who deployed from the USACE Louisville District.

The first phase will repair the dam’s intake structure. The gates currently do not close, so no maintenance can be performed on the gates or the irrigation outlet tunnels, said Nader Noori, the district project manager for Kajaki Dam. “This project includes the rehabilitation of existing intake structure components – intake bulkhead gate, steel sliding gate, crane, crane hoist assembly, lifting assembly, embedded parts, and hydrology gage,” said Noori, a native of Afghanistan who immigrated to the United States more than 30 years ago.

The second phase will rehabilitate the three 84-inch roto valves inside the irrigation tunnel and three 84-inch jet valves at the outlet end of the irrigation tunnel.

According to Noori, a roto valve is designed to open and close relatively easily, despite high fluid pressure. Jet valves are installed as part of the outlet structure, and decrease the pressure of the water exiting the bottom of the dam, which prevents erosion and scouring.

Another part of the project is to evaluate the current condition of inoperable piezometers at the dam and seek bids to repair or replace them. Noori said piezometers measure the flow of water through a dam; they help operators monitor the stability and “health” of a dam.

“There are a few challenges ahead of us at Kajaki,” said Murphy. “We have several moving pieces that are included in the contract. Tracking and funding them separately will involve more time but in the end will make the award and construction process cleaner, meaning that we will track expenditures and schedules more efficiently and effectively.”

South East Power System

This two-phased project promises to improve access to electric power for residents of Helmand and Kandahar provinces. The current system has been the victim of years of war and neglect, starting with the power house at the Kajaki Dam.
"The power house was built in the '70s," said Jim Murray the SEPS project manager. "It can hold three turbines, but only two were ever installed. USACE is not adding the third turbine as part of the SEPS upgrade, but what we are doing is improving the delivery of power. USAID will install the third turbine in the Kajaki Dam powerhouse."

Afghan electrical power technicians receive on-the-job training from U.S. Army Corps of Engineers Soldiers that will enable them to safely sink the power poles and replace 110 kV lines throughout Kandahar and Helmand provinces. (USACE Photo by Karla Marshall)

The SEPS – Helmand phase includes rebuilding the Kajaki Substation; replacing the 20kV line from the Kajaki Substation to Tangi; a new switchyard at Tangi; a new substation at Musa Qal'eh; a new 110kV line from Kajaki Substation to Musa Qal'eh Substation; a new 20kV line from Kajaki Substation to Kajaki Village, and the rebuilding of a 110kV line from Kajaki Substation to Sangin.

The project also includes rebuilding the Sangin North Substation, a new substation at Sangin South, rebuilding a 110kV line from Sangin to Durai Junction, and rebuilding a 110kV line from Durai Junction to Lashkar Gah. USACE awarded the project on June 22 to Perini Management Services, Inc. of Framingham, Mass., with a 550 day period of performance.

The SEPS-Kandahar project includes repairing an existing 110kV line from Durai Junction to Kandahar City, constructing new substations at Maiwand and Pushmool, and upgrading substations at Breshna Kot. This project is scheduled to be awarded by the end of the fiscal year.

These projects should improve distribution of electrical power to the people of the Lashkar Gah area in Helmand province, and the Kandahar City area.

"These three projects really are pretty complex," said Wham. "But when complete they will be a tangible demonstration to Helmand and Kandahar province residents of the commitment of the U.S. to improve their livelihoods. I am proud to be a part of this work as it represents our desire to see Afghanistan grow in its ability to provide vital services to the people."

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