

SMITHLAND HYDROELECTRIC PROJECT SMITHLAND, KENTUCKY	YEAR COMPLETED	
	PROFESSIONAL SERVICES 2009 – Present	CONSTRUCTION (IF APPLICABLE) 2010
PROJECT OWNER'S INFORMATION		
PROJECT SPONSOR C.J. Mahan Construction/AMP Ohio	POINT OF CONTACT NAME Mark Hutchins	TELEPHONE NUMBER (614) 277-4528

RIZZO Associates (RIZZO) designed the excavation and associated dewatering system for this new hydroelectric generating plant on the Ohio River, at the site of the Smithland Dam. The hydroelectric plant will be constructed adjacent to the east side of the weir wall of the Dam. The plant will include three (3) turbines with a combined design output of 72 MW. The existing dam is owned by the U.S. Army Corps of Engineers and the project will be regulated by the FERC. The project consists of the following components: Marine Cofferdam, Slurry Wall, Dewatering System, Excavation, Flooding Structures, and Instrumentation. The project site is located along the left bank of the Ohio River at mile point 906.



As part of the dewatering system design, RIZZO conducted pumping tests at the site to better characterize the hydrogeologic properties of the subsurface materials at the site. The pumping tests consisted of installing three large capacity pumping wells (up to 1700 gallons per minute) and several vibrating wire piezometers. The data obtained during the tests were analyzed by RIZZO to determine the hydraulic conductivities of the upper sand, lower sand and gravel, and bedrock. The design of the dewatering system included performing two-dimensional seepage analyses using the Seep2D program and three-dimensional seepage analyses using the MODFLOW. The results of these analyses were used to design the dewatering system for the project that consisted of the installation of sixty five (65) 36-inch diameter deep wells.

The excavation design consisted of evaluating the subsurface conditions of the site from existing geotechnical data, assigning shear strength parameters to the subsurface materials, performing slope stability analyses and developing design drawings and associated technical specifications. Slope stability analyses were performed for several sections of the excavation for the following loading conditions: end of construction, steady seepage, 100-year flood, sudden drawdown, and earthquake. The excavation design had to meet both FERC and USACOE stability criteria and had to be approved by the Owners Engineer, the Board of Consultants, FERC, and the USACOE.

