

BRIAN IRSCH, P.G.

ASSOCIATE GEOLOGIST

Expertise

Dam Engineering, Engineering Geology, Hydrogeology, Grouting in Karst, Geotechnical Investigations, Instrumentation, Construction Management

Education

Bachelor of Science, Geology, Illinois State University

Registrations

Professional Geologist / FL

Certifications

OSHA-MSHA Certification
FDOT Drilled Shaft Certification
FDEP Storm Water Erosion Certification

Affiliations

AIPG, FAPG, ASDSO

Years with Schnabel/Total

1/24

Brian Irsch brings over 24 years of experience in dam construction and remediation and environmental assessment and remediation projects throughout the United States, ranging from \$2-\$600 million. His areas of expertise include engineering geology, custom designed grouting in karst and highly fractured rock, ground stabilization design, hydrogeology, geotechnical investigations and testing, dam safety investigations (200+), and dam construction management. Brian has experience with full life cycle dam engineering as a Resident Engineer for projects ranging from new dam construction to various dam remediations and associated works; direction of new dam instrumentation programs and forensic analysis of existing instrumentation; ground stabilization design and implementation with shotcrete, secant walls, anchors and rock bolts; and design and direction of 3D construction data base systems. He has authored dam construction permits in compliance with Florida Mining Regulations (in excess of FERC).

USACE Rough River Dam Remediation, Falls of Rough, KY

Construction Operations Manager and Geologist of Record for this \$100 million, 130-foot High Urgency (failing) dam remediation that involved a composite seepage barrier in a complex epikarst geology. Directed all drilling and grouting activities and managed engineering, science, and technical staff to install parallel cutoff walls along the axis of the dam, treating the embankment, epikarst, and fractured rock. Operated the first of its kind precision grouting SCADA system (Intelligrout), containing an array of video cameras and engineering instruments to measure and monitor multiple live drilling and grouting activities simultaneously. Mr. Irsch monitored real time depth, flow, and injection; effective and column pressures; and directed engineering, science and technical staff to make appropriate modifications to grouting procedures. Also monitored and inspected live slope movements, seepage, tailrace discharges, and hydrology with a network of instrumentation, as ongoing high-pressure grout injection could jeopardize the integrity of the dam. Compared prior studies to actual site hydrology, geotechnical data, and boring logs to identify anomalies and trends. Provided daily client interaction with modifications/change orders due to complex geology. Prepared daily cross sections, pressure trend plots, and pay items for client review. Provided ancillary services such as downhole camera confirmations, deviation plots, and water testing, as well as technical review and modification of the onsite water quality treatment system operations, making recommendations to save treatment costs. Performed QA/QC of grouting instruments and discharge water quality instruments.

USACE / Tennessee Valley Authority Chickamauga Lock Expansion, Chattanooga, TN

Engineering Geologist and Senior Dam Grouting Engineer. Provided geotechnical design and oversight for the construction of a new lock 60 feet below river level. This was a geologically challenging site with a syncline-anticline combo and bentonite layers providing highly fractured rock and multiple shear planes. Mr. Irsch directed the foundation preparation with various equipment and techniques for efficient excavation; designed and directed installation of rock stabilization systems with rock bolts and shotcrete; designed foundations for tower cranes, conveyer belt, and other concrete delivery

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systems in a challenging boulder field and folded rock with bentonite shear layers; and directed the installation of 44 drilled shafts in highly fractured rock. Concrete integrity was tested with cross-hole sonic logging and tomography. Mr. Irsch directed and provided technical oversight to field engineers, geologists, and the construction foreman. He also provided technical oversight and live monitoring of the instrumentation program with over 100 existing inclinometers, prisms, and piezometers, and the expansion and installation of new prisms and pressure cells for the new construction. Technical challenges included failing lock walls, construction 60 feet below river level, and a 500-year flood event flooding the project area, prompting diligent, ongoing analysis of the instrumentation system, as the flood effected the stability of the new construction and existing construction. Project included installation of a custom double row grout curtain in highly fractured rock, karst, solution features, and bentonite layers of varying thickness and consolidation using an instrumented packer to properly determine grout pressures. Mr. Irsch developed and directed the data management system to track, analyze, and visualize in 3D the new lock construction. The system used GIS technology to manage data associated with excavation, rock bolts, drilled shafts, grouting, and individual lifts during wall construction. The 3D model displayed all data and documents linked to any point in space. Authored numerous technical submittals for various construction tasks and researched and summarized technical issues for the client. Interacted daily with the client's geologists and engineers and hosted and attended technical meetings.

Mining Reservoir Asphalt Dam Construction / Morenci, AZ

Resident Engineer and Senior Dam Grouting Engineer. Directed and managed all construction of America's first asphalt core dam for Freeport MacMoran copper mining operations. The project included an emergency spillway, pump house, inlet structures, discharge structure, and erosion control. Mr. Irsch provided engineering oversight and construction management of the foundation and embankment, and directed and designed a custom consolidation and curtain grouting program for the new asphalt core dam. Direction of the grouting program included geotechnical interpretation, permeability testing and interpretation, and geologic sampling and interpretation. His responsibilities involved daily customization of the grouting program for the unique asphalt core dam by interpreting the responses to the various grout formulations injected at various pressures, as well as direction of the daily grouting program while simultaneously interpreting permeability testing, geologic boring samples, and grouting at multiple holes, using a state-of-the-art SCADA system to monitor flow, effective pressure, Lugeons, apparent Lugeons, and formation pressure. Interacted daily with the client and engineering team while managing staff and overseeing technical aspects of dam construction, new mine piping construction, inlet and outlet construction, and borrow pit/source rock crushing operations. Quality Assurance of the installation of a network of Vibrating Wire Piezometers and inclinometers.

Tennessee Valley Authority Boone Dam Remediation / Boone, TN

Senior Dam Grouting Engineer and forensic analysis at TVA's \$300 million, 160-foot high critical (failing) dam remediation that involved a composite seepage barrier in a complex epikarst, syncline/anticline, faulted geology. Provided technical review and oversight of the HMG and LMG remediation grouting program using packers at multiple depths for the embankment, alluvium, foundation soils, epikarst, solution features, faults, joints, and fine fractured rock. This included the compaction, compensation, and dilation grouting methods, as well as procedures, rheology, operations, documentation, computer monitoring, construction, and QA/QC of the grouting contractor and Grout IT system. Attended open technical panel discussions with the industry's top professionals. Developed a results based QA/QC forensics investigation of all grouting. Provided daily coordination with the client and client's engineering team, and technical review of the engineering team's reports on grouting trends, grouting anomalies, grout mixtures, dam instrumentation

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responses, site hydrogeology, exploratory drilling, permeability testing, geotechnical engineering, and dam safety. The instrumentation response analysis included correlating various grouting pressures of various mixes with threshold exceedances at various instruments. Performed regular inspections of onsite and off-site sinkholes, including post remediation sinkhole monitoring.