We distinguish ourselves through continued development of innovative technology applications that result in significant long-term savings and reliability for our clients.

Offices in Principal Cities of the United States and Select International Locations
geosyntec.com

Geosyntec produces practical and reliable structural condition evaluations to effectively meet inspection requirements under FERC Part 12D or client-specific protocol, including field conditions assessment and stability evaluation of concrete gravity and arch dams, and non-overflow, spillways, aprons, intake, and gate structures. Our engineers design structures and retrofit schemes to enhance dam performance. We base our designs on the findings of comprehensive inspection studies, practical evaluation assessments, and technically feasible reconstruction alternatives. Our recommended solutions consider risks of failure, cost-benefits, limitations in construction schedule and site access, and environmental constraints.

Our suite of advanced computational tools allows us to evaluate the response of existing and proposed structures to diverse operating and extreme static, impact, seismic, and thermal load conditions. Consequently, we are able to develop cost-effective performance-based designs that reliably capture the stability, stress-strain, and crack/fatigue demands on the structures.

Structural Services
Geosyntec is a pioneer in using Risk-Informed Decision Making to assess the safety of dams. We help our clients through the process of identifying potential failure modes, evaluating the likelihood of failure, potential consequences, and the adequacy of in-place control measures; developing reasonable risk-reduction methods, and providing input to prioritize action plans. We routinely perform hazard potential classification assessments based on both national and local guidance documents; and prepare tailored Emergency Action Plans (EAP) to mitigate potential risks. Our professionals are versed in national guidelines established by agencies such as the Federal Emergency Management Agency (FEMA) and FERC, as well as state dam safety programs to meet regulatory requirements. Our engineers and scientists execute the full scope of risk analysis, assessment, and management to produce rational and convincing risk-informed dam safety decisions to mitigate risks to public health and safety, physical property, and the environment. Our experts identify cost-effective options for reducing risk and conveying dam safety risks to owners, stakeholders, operators, regulators, and the public.

Risk Evaluation and Mitigation
Geosyntec evaluated the seismic stability of a semi-hydraulic fill dam constructed in the 1920s in an area of low-to-moderate seismicity. Geosyntec demonstrated through advanced numerical deformation analyses that recent modifications to the dam improved its seismic performance. Geosyntec performed a semi-quantitative risk analysis, helping the client understand the risks associated with ground motions and how these risks compared to published guidelines.

Representative Project
We were retained to perform a stress-strain and stability analysis of a concrete gravity structure. The results of our engineering analyses helped our client identify critical structural components, potential remediation alternatives, and modifications to the safety monitoring program.

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Statement of Qualifications
Dams and Reservoirs
Geosyntec provides extensive experience developing site-specific solutions for dams using our expertise in civil, geotechnical, structural, and environmental engineering, water resources, information management, and construction management.

Inspection
Geosyntec provides prompt, practical solutions to support dam safety decision-making. Our engineers perform physical inspections, review design and as-built documents, and evaluate monitoring data to identify potential underperforming areas that could affect a dam’s operation and integrity. Our expertise allows us to identify realistic potential failure modes and develop Dam Safety Surveillance Monitoring Plans and Reports (DSSMP/DSSMR), risk management monitoring programs, and action plans to remediate deficiencies.

Hydrology, Hydraulics, and Water Quality
Our water resource engineers and regulatory experts provide:
- Site reconnaissance & field sampling
- Probable maximum precipitation and probable maximum flood analyses
- Watershed hydrologic modeling
- Flood inundation modeling & dam breach studies
- Complex hydrodynamic, sediment transport and water quality modeling
- Incremental damage assessment and dam breach modeling
- Real-time operational assistance tools
- Sophisticated computational fluid dynamic modeling
- Regulatory agency liaison and compliance support

Our engineers have performed numerous hydraulic studies in evaluation of safety and hydraulic adequacy of structures. We have also determined hazard potential classifications for dams and produced inundation mapping in compliance with state regulations and Federal Emergency Management Agency (FEMA) guidelines. We used results of these hazard analyses to support dam owners in emergency action plan (EAP) development, maintenance, exercise, and implementation to promote emergency preparedness, assist in the training of personnel, and demonstrate operational capability.

Our solutions help our clients who own and operate dams and hydropower facilities to assess flood inundation hazards, obtain water quality certifications and permits, evaluate water use and quality impacts on the environment, develop power generation optimization alternatives, and deliver conservation and restoration projects.

Hydropower Licensing and Compliance
We have developed positive relationships with Federal Energy Regulatory Commission (FERC) staff through collaborative project efforts. Our technical leadership and understanding of FERC requirements enhance our ability to assist clients in managing relicensing costs and obtaining reasonable license terms and conditions for continued project operation. As a member of the National Hydropower Association, Geosyntec stays abreast of regulatory developments affecting our clients.

Our scientists and engineers:
- Develop resource study plans
- Support agency and stakeholder consultation
- Implement studies for fisheries; water quality and quantity; wetland and terrestrial resources; protected species; recreation and land use
- Lead complex water quality monitoring programs
- Develop hydrodynamic and water quality models
- Conduct reservoir dredging feasibility evaluations

Geotechnology Services
Geosyntec’s expertise in geotechnical, geological and geophysical investigation, our analytical and numerical modeling capabilities, and our team of engineers, geologists, and seismologists, allow us to accomplish complex and ambitious projects with difficult ground conditions and in sensitive environments. Our dam-related services include:
- Stability, seepage, and piping analysis
- Instrumentation and monitoring
- Failure mode analysis and risk assessment
- Safety review and inspection
- Engineering design
- Construction management and inspection

Representative Project
Geosyntec assisted a hydropower utility develop flood inundation models as part of their emergency action plan update for their major reservoirs. Geosyntec then updated a subset of these models to serve as operational models to support hydropower operations under normal flow conditions. Additionally, Geosyntec updated hydrothermal models for multiple reservoirs in their hydropower system to enhance their operations while maintaining regulatory compliance.

Representative Project
Geosyntec assisted an energy company develop and update an emergency action plan (EAP) for their major reservoir. Geosyntec performed the necessary analyses to support the EAP update and helped the dam owner to implement the updated EAP.

Representative Project
Geosyntec conducted a state-of-the-art investigation and sophisticated numerical analyses for a 172-foot tall embankment dam to evaluate the need for construction improvements to satisfy the embankment stability under prescribed seismic loads. Our evaluations concluded that the dam response under the expected loads would be acceptable and helped the client save tens of millions of dollars in unnecessary seismic retrofits.

Construction Information Management Systems
Geosyntec has deep understanding of construction services and quality control requirements. This understanding, combined with our geotechnical, environmental, and water resources expertise inherent to ground improvement implementation techniques, enables us to develop robust tools that are user-friendly and facilitate interactive data visualization. We specialize in the development of tools for barrier wall construction projects that collect, compile, analyze, and present data in real-time.

We develop customized tools that enable dam owners and contractors to:
- Track project details
- Promptly analyze trends
- Achieve construction quality assurance (CQA) targets
- Automatically generate geospatially accurate as-built drawings
- Measure project progress

Representative Project
Geosyntec completed the information management system for the construction of multiple barrier wall dam retrofit projects using web-based applications that allowed real-time access to construction and instrumentation monitoring data.

Representative Project
Geosyntec prepared the environmental exhibit for a successful relicensing application for a 173-megawatt (MW) project involving diverse interstate stakeholder interests using FERC’s Integrated Licensing Process. We are currently managing comprehensive environmental services for relicensing of a 321-MW pumped storage project involving complex water quality, fisheries, and recreation access issues.

Representative Project
Geosyntec prepared the environmental exhibit for a successful relicensing application for a 173-megawatt (MW) project involving diverse interstate stakeholder interests using FERC’s Integrated Licensing Process. We are currently managing comprehensive environmental services for relicensing of a 321-MW pumped storage project involving complex water quality, fisheries, and recreation access issues.

Geosyntec’s information management system allows for real-time monitoring and analysis of construction data, providing valuable insights for project managers and stakeholders.

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