Geosyntec is highly experienced in the use of both standards-based deterministic and risk-based probabilistic evaluations of earthen dams and levees, concrete dams, spillways, outlet works, and other ancillary structures using state of the practice modeling and analytical methodologies.

**Dam Safety Compliance**
- Dam safety inspections
- FERC Part 12D inspections and potential failure modes analyses (PFMA)
- Design and as-built document reviews
- Regulatory compliance reviews
- Dam safety surveillance monitoring plans and reports (DSMMP/DSMMR)

**Geotechnical**
- Geotechnical, geologic, and geophysical investigations
- Seepage and internal erosion analyses and control
- Static and dynamic stability and liquefaction analyses
- Instrumentation and monitoring

**Seismic Evaluations**
- Deterministic and probabilistic seismic hazard analyses
- Evaluation of earthquake ground motions
- Site response analyses

**Hydrologic and Hydraulic Analyses**
- Spillway design flood and spillway capacity evaluations
- Hydraulic, hydrodynamic, and CFD modeling of spillways, channels, and outlet works
- Dam break analyses and inundation mapping

**Risk Assessment and Reduction**
- Risk-informed-decision making (RIDM)
- Facilitation of PFMA workshops
- Quantitative risk assessments (QRA) and semi-quantitative risk assessments (SQRA)
- Development and implementation of risk reduction measures (filters/drains, seepage barriers, stability berms, etc.)
- Consequence and hazard potential evaluations, emergency action planning and exercises

**Engineering, Design, and Permitting**
- Rehabilitation alternatives evaluations
- Preparation of design packages and bidding assistance
- Environmental and permitting services

**Construction Phase Services**
- Construction Quality Control (CQC) and Construction Quality Assurance (CQA) Programs
- Instrumentation data acquisition and interpretation
- Information Management Systems for project planning, data tracking, and analysis
- Data visualization and reporting using dashboards, geospatial tools, and automated drawings

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embankment soils, including the use of program was used to characterize the Seismic Zone. An extensive site investigation between non-plastic, coarse-grained and transitional soils that straddle the boundary of the data being collected in order to assess the performance of the dam through all phases of construction and changes in reservoir levels.

Blue Ridge Dam
Geosyntec led the evaluation of seismic deformations at this 965-ft long and 172-ft high semi-hydraulic fill embankment dam. The dam was constructed by placing uncompacted “dumped” fill from local, residual soil sources to construct the upstream and downstream shells. The dumped fill was subsequently “washed” using water cannons to mobilize the fines, creating a “sliced fill” zone and a central “puddled core” of fine-grained material. The resulting embankment materials are transitional soils that straddle the boundary between non-plastic, coarse-grained and moderate plasticity, fine-grained soils. The dam is located in a low-to-moderate seismic hazard area near the Eastern Tennessee Seismic Zone. An extensive site investigation program was used to characterize the embankment soils, including the use of normalized monotonic and cyclic strength parameters and stress history profiles. The PM4SAND advanced constitutive model was calibrated using the monotonic and cyclic laboratory results and used for numerical analyses. A suite of earthquake time histories representing high- and low-frequency ground motions and two return periods (3,000 and 10,000 years) was employed in the analyses.

Oroville Dam
Geosyntec’s Lelio Mejia was the co-Independent Consultant and Geosyntec staff were an integral part of the team pioneering the process for incorporating FERC Level 2 Risk Assessment results in a Part 12D Safety Report. The Tenth Part 12D Safety Inspection Report for the Oroville Complex was the first for any hydroelectric project in the United States to incorporate results from a FERC Level 2 Risk Assessment. The Complex, owned and operated by the California Department of Water Resources, consists of three dams (Oroville, Bidwell Bar Canyon Saddle, and Parish Camp Saddle) that create the Oroville Reservoir. In addition to the dams, the complex includes the Edward Hyatt Powerhouse, the service and emergency spillways, and a low-level outlet.

Utility Agencies-Owned Dams
Geosyntec has conducted FERC Part 12D Safety Inspections for multiple dams owned by power and water utility agencies. Our work included document review, field inspection, facilitating PFMA workshops, preparation of FERC Part 12D Safety Inspection reports, and updating PFMA and STI reports. For a large power utility, Geosyntec conducted inspections for eight dams (seven classified as High Hazard) in their inventory with heights ranging from 22 feet to 315 feet. For a water utility, Geosyntec managed the last three Part 12D Safety Inspections of a 240 ft high, 1400 ft long zoned earth-rock embankment dam currently undergoing an extensive seismic retrofit design. Geosyntec implemented significant updates to the STIs for several dams owned by another power utility. Geosyntec served as a subject matter expert on geotechnical engineering during the SQRA and QRA and related PFMA of a concrete faced rock fill dam subject to potential overtopping under the newly promulgated FERC Risk-Informed Decision-Making Guidelines.

USACE Dam and Levee Construction/Rehabilitation Information Management
Geosyntec is a pioneer in the field of foundation construction information and data management and has developed systems used for the construction of deep seepage barriers, grout curtains, rock anchors, and other features for constructing and rehabilitating multiple USACE dam and levee projects including Wolf Creek, Center Hill, Rough River, Bolivar, Bluestone, Folsom, and Chickamauga Dams; Herbert Hoover Dike, and the East St. Louis and Sabine Pass Levee Projects. Work has included maintaining a geospatial database to compile all project data, visualization and analysis of verticality and overlap of excavations from positional data, and a large variety of data sources for cutoff walls, foundation grouting data, real-time automated quality control process, and generation of drawings and models. The data management tools provide USACE with a long-term living document of the projects with a historical accounting of the original project construction and dam modification for use by both design engineers and operations staff for years to come.

About Us
Founded in 1983, Geosyntec combines the expertise and experience of over 1400 scientists and engineers to address complex environmental and infrastructure problems all over the world.

For More Information
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