



The Engineering Geologist's Critical Role in FERC Part 12D Comprehensive Assessments: Lessons Learned from Diverse Physiographic Provinces

Todd G. Bown, P.G., GZA GeoEnvironmental

The Federal Energy Regulatory Commission (FERC) Part 12D Comprehensive Assessment (CA) mandates a rigorous, independent evaluation of dam safety, a requirement significantly amplified by lessons learned from the Oroville Dam incident. Within the Independent Consultant (IC) team, the engineering geologist serves a critical function by identifying and assessing geological hazards—including foundation instability, internal erosion, landslides, and seismic risks—that threaten the structural integrity and long-term performance of dam infrastructure. The geologist's expertise is central to the CA process. They conduct a detailed review of site geology, construction records, and historical performance data to assess foundation conditions and surrounding terrain. Particular attention is given to identifying potential failure modes (PFMs) linked to geological hazards such as differential settlement, seepage, karst activity, seismicity, faulting, weathered rock zones, and mass movement of soil and rock. These findings directly inform the Potential Failure Modes Analysis (PFMA) and the subsequent Level 2 Risk Analysis (L2RA), ensuring that subsurface conditions and geohazards are accurately characterized and prioritized within the dam safety framework. This presentation focuses on the experience of an engineering geologist Subject Matter Expert (SME) who participated in four CAs across diverse physiographic provinces: the Adirondacks in New York, the Appalachian Plateau in Pennsylvania, and the Blue Ridge Mountains of Virginia and Tennessee. By highlighting these varied case studies, the presentation will distill key lessons learned and establish best practices for evaluating dam-related geological hazards. Ultimately, integrating this specialized geological analysis enhances the resilience of dam infrastructure and allows the IC team to assist the dam owner in developing targeted mitigation strategies and prioritizing risk.