



Matthew L. Fuller, L.E.G., P.Geo., QP
Engineering Geologist

Education

BS, Geology, Colorado State University, 1982
University of Hawaii, Manoa 1980
Western Connecticut State College, 1978-1979

Registrations/Certifications

Professional Geoscientist (P.Geo); British Columbia (2018)
Certified Professional Geologist (CPG): American Institute of Professional Geologists (#8757, 1992)
Licensed Engineering Geologist (LEG): Washington (#2135, 2003)
Registered Geologist: Kansas (R.G.) (#550, 2004)
Registered Environmental Professional (REP): Ministerio del Medio Ambiente y Recursos Naturales, El Salvador (#0155, 1995)
Society of Mining & Metallurgical Engineers (SME) – Registered Member (# 04116803, 2002)
Towards Sustainable Mining – Qualified Verifier (March 2023)
N.I. 43-101 Qualified Person (QP) – Tailings, Water, and Geotechnics

Experience Summary

Mr. Fuller, LEG, P.Geo. is an Engineering Geologist and Founding Principal of Tierra Group International, Ltd. Matt's professional experience spans more than 35 years of applying geological, geotechnical, geo-environmental, and geological hazards consulting services to the mining industry. Matt is Tierra Group's Chief Tailings Steward specializing in designing, constructing, operating, decommissioning, closing, and reclaiming more than 50 individual tailings storage facilities (TSFs) worldwide. Matt serves on Independent Tailings Review Boards (per the Canadian Ministry of Energy and Mines). He performs due diligence, GISTM implementation and conformance audits, forensic studies, Independent Engineer's audits, and expert witness testimony for mining companies, private equity firms, financial institutions, and insurance companies. In addition to development and operations, Mr. Fuller is well-versed in the Equator Principles (per the International Finance Corporation) and has collaborated with international regulatory agencies to ensure environmental, social, and governance (ESG) sustainability throughout their organizations.

Project Experience

Tailings Storage Facilities

CONFIDENTIAL PROJECT | BULGARIA

Performed a pre-investment technical due diligence review, including a detailed analysis and risk assessment for a 150-meter (m) high co-disposal (tailings and waste rock) storage facility. (Tierra Group, 2021)

CONFIDENTIAL PROJECT | ARMENIA

Performed a tailings technical due diligence review for a private equity investment firm. (Tierra Group, 2019)

CONFIDENTIAL PROJECT | ARIZONA

Performed a technical review/due diligence on the TSF1, TSF2, TSF3, and TSF4 tailings dams. The active TSF4 required an in-depth review due to raising the upstream tailings dam from 650 feet to 1015 feet. Reviewed previous stability analyses and performed independent studies to validate the earlier findings. (Tierra Group, 2021)

STILLWATER MINE INDEPENDENT TAILINGS REVIEW BOARD (ITRB) AND INDEPENDENT REVIEW PANEL (IRP) | MONTANA

Served on an independent, three-expert tailings review board adding assurances to tailings dam design and operations safety in accordance with Montana Code Annotated (MCA) 2015 Title 82 (Minerals, Oil, and Gas Chapter 4. Reclamation Part 3. Metal Mine Reclamation (specifically 82-4-377 IRP)). The project included annual inspections, performing design and operations reviews, and reporting to the State of Montana. (Tierra Group, 2017 to Present)

CORPORATE TAILINGS STEWARDSHIP STRATEGY | AUSTRALIA AND CANADA

Served as Chief Tailings Steward for the TSFs and qualified water dams at Cadia (Australia), Telfer (Australia), and Red Chris (Canada) mines. Tailings Stewardship required independently evaluating the design, operations, and safety of all tailings and water dams, including hazards classifications, facilitated risk assessments, systems and processes reviews, operations team training, Dam Safety Inspections, and evaluating TSF conformance with GISTM requirements. This multi-year role requires annual updates. (Tierra Group, 2022 to 2023)

ÇÖPLER MINE INDEPENDENT ENGINEERING AUDIT | TURKEY

Completed tailings and heap leach facility (HLF) annual Independent Engineer Audits providing an independent, qualified opinion on the state of the facilities, risks associated with the facilities; whether facilities are being managed consistently with sound engineering practices; and whether concepts and design criteria are consistent with industry standards, good practice, current theory, methodologies, and experience. (Tierra Group, 2020 to 2022)

EAGLE MINE TECHNICAL DUE DILIGENCE | YUKON TERRITORY, CANADA

Led an independent due diligence technical review for a private equity investment firm. The technical review included geology and resources, mining, metallurgy and process, infrastructure, cost estimating, and execution plan for a new mine's construction, commissioning, and operations. The technical review supported an economic analysis and investment risk analysis. (Tierra Group, 2018)

INDEPENDENT TECHNICAL DUE DILIGENCE | PHILIPPINES

Performed a pre-investment independent technical due diligence investigation into the cause of a reported cyanide-tailings storage leak. Determined the cause to be operational modifications that exposed a fractured abutment. Provided recommendations to mitigate the leak, leading to a successful investment and multi-year continued use of the TSF. (Tierra Group, 2018)

PIRQUITAS MINE INDEPENDENT TAILINGS OPERATIONS REVIEW | JUJUY PROVINCE, ARGENTINA

Reviewed tailings deposition and operations plan for maximizing tailings storage in the final stages (pre-closure) of operations. A site visit and TSF inspection resulted in multiple recommendations for optimizing tailings deposition and water management practices to extend the TSF operational life. (Tierra Group, 2018)

EQUITY MINE ITRB | BRITISH COLUMBIA, CANADA

Serve on a four-person ITRB for the Equity Mine in British Columbia. Equity Mine is in closure; care and maintenance status. Activities include treating water to mitigate acid rock drainage and water/tailings management. Annual condition-opinion reports are authored and submitted to the B.C. Ministry of Energy and Mines. (Tierra Group, 2017 to 2020)

CORPORATE TAILINGS STEWARDSHIP STRATEGY | LATIN AMERICA

Chief Tailings Steward for all TSF's located in Latin America, which include Peñasquito and Los Filos (Mexico), Marlin (Guatemala), and Cerro Negro (Argentina) mines. Tailings Stewardship required independently evaluating the design, operations, and safety of all tailings and water dams, which included performing hazards classifications, facilitated risk assessments, systems and processes reviews, operations Team training, Dam Safety Inspections, and preparing a 5-year Dam Safety Review Report consistent with Canadian Dam Association (CDA) guidelines. This multi-year role requires that updates be prepared annually. (Tierra Group, 2015 to 2019)

CORPORATE TAILINGS STEWARDSHIP STRATEGY | U.S., CANADA, MEXICO

Chief Tailings Steward responsible for overseeing the independent review and preparation of a 5-year Dam Safety Review Report for the Myra Falls (Canada), Tennessee Mines (U.S.), and Campo Morado (Mexico)

TSFs in accordance with CDA guidelines. The Dam Safety Reviews were performed as part of an internal corporate due diligence effort. (Tierra Group, 2016)

TAILINGS INDEPENDENT ENGINEER DAM LIQUEFACTION AND WATER MANAGEMENT STUDY | MINAS GERAIS, BRAZIL

Principal in Charge of investigating the liquefaction potential and water management practices for tailings disposal at two mine sites in Minas Gerais following the Fundão tailings dam failure. Tierra Group performed a tailings geotechnical investigation, a liquefaction analyses, and developed detailed site-wide water management plans to optimize water usage and reduce liquefaction potential at Jaguar's Caeté and Turmalina mines. (Tierra Group, 2016)

DON MARIO TSF DAM RAISE | SANTA CRUZ, BOLIVIA

Principal in Charge of overseeing the design and construction of an innovative means to reduce tailings dam construction costs without compromising dam integrity that included developing a unique and innovative dam raise design incorporating a mechanically stabilized earth (MSE) dam-crest raise combined with sterile waste rock to increase tailings storage capacity while reducing construction volumes, time, and costs. (Tierra Group, 2014 to 2017)

DOUGLAS TSF DESIGN | SANTA BARBARA, HONDURAS

Principal in Charge of field investigations, feasibility, and final design for an earthfill tailings dam at Mina El Mochito. The Douglas Dam represents the fourth TSF Tierra Group is responsible for over 28 years of continuous service at El Mochito. (Tierra Group, 2014 to Present)

BRUSHY CREEK TSF RAISE DESIGN | VIBURNUM, MISSOURI

Principal in Charge responsible for a 17-foot dam raise design for an existing TSF at the Brushy Creek Mine. The dam was built in stages starting in 1973 using tailings cyclone underflow (coarse tailings) and the upstream construction method. The raise design required CPT, a liquefaction triggering analysis, seepage modeling, and slope stability modeling. In addition to the dam raise, a spillway raise was designed requiring hydrology and hydraulic modeling, and riprap design. The design was approved by the Missouri Department of Natural Resources (MDNR) Dam and Reservoir Safety Council in February 2015. (Tierra Group, 2014 to Present)

BRUSHY CREEK 2 TSF | VIBURNUM, MISSOURI

Principal in Charge responsible for a new TSF design at the Brushy Creek Mine capable of storing 36 million tons (Mt) of tailings solids. The new TSF requires a 185-foot tall dam planned for construction in four stages, including a clay starter dam and three raises using tailings cyclone underflow. Hydrology and Hydraulic modeling was performed to design four spillways, and a water balance was completed providing a planning tool for use throughout facility life. A geotechnical investigation was carried out, which utilized both hollow stem auger and diamond coring techniques. The Brushy Creek 2 TSF design is currently under review by MDNR. (Tierra Group, 2014 to Present)

PITARILLA FEASIBILITY STUDY | DURANGO, MÉXICO

Principal in Charge of designing a 112-Mt TSF, developing a mine-wide water management plan (MWWMP), and writing contributing sections for the Manifestación de Impacto Ambiental (MIA). Both the TSF and the MWWMP were included in an N.I. 43-101 report. (Tierra Group, 2012 to 2013)

MINA EL TOQUI TAILINGS DAM | PATAGONIA, CHILE

Principal in Charge of the geotechnical investigations, alternatives site selection, engineering design, and permitting for a 1,500-tonne-per-day (tpd) zinc mine in the Patagonia region. Historically, El Toqui has operated centerline tailings dam construction. This alternative and others were considered for expanding an existing facility versus constructing a new one. (Vector Colorado, 2005 to 2007)

SOLEDAD TAILINGS DAM, MINA EL MOCHITO | LAS VEGAS, HONDURAS

Principal in Charge of the geotechnical investigation, engineering design, and construction of a 60-m high-zoned earthfill tailings dam for a 2,000-tpd zinc mine. The project included an alternative site(s) geotechnical risk assessment and siting study, a 7-kilometer (km) tailings delivery and water reclaim pipeline design, low-density polyethylene liner installation in steep terrain, and dam construction utilizing sapolite and laterite soils over karstic bedrock in a tropical region that receives approximately 3 m of rainfall

annually. (Olsson Associates, 2003; Vector Colorado, 2003 to 2007; Tetra Tech, 2007 to 2011; Tierra Group, 2012 to Present)

PUCARRAJO AND CONTONGA TSFs | HUARES, PERÚ

Principal in Charge of directing a team of engineers in the expansion design and recommissioning of two conventional TSFs in northern Perú. (Tetra Tech, 2010 to 2011)

CHINCHÁN TSF DESIGN | SAN MATEO, PERÚ

Principal in Charge of the siting, investigation, design, and construction of a dry-stack TSF located at 3,800-m elevation in the Peruvian Andes. (Tetra Tech, 2009 to 2011)

CERRO QUEMA TSF DESIGN | LA PITALOZA, PANAMÁ

Principal in Charge of the siting, investigation, and design of a co-mingled gold tailings and waste rock storage facility in a high rainfall region in the tropics. (Tetra Tech, 2007)

MOLEJÓN GOLD TSF DESIGN | COLÓN PROVINCE, PANAMÁ

Principal in Charge of the siting, investigation, design, and construction of conventional gold TSF located in the tropics and receiving 5-m of rainfall per year. (Vector Colorado, 2005 to 2007)

EL DORADO TAILINGS DAM DESIGN | SENSUTEPEQUE, EL SALVADOR

Principal in Charge of a geotechnical investigation and engineering design of a 35-m high rockfill tailings dam for a 1,500-tpd underground gold mine. A challenging aspect of this project was construction sequencing that would allow the rock used to construct the dam to be excavated from the impoundment basin while also permitting a high-density polyethylene liner system to be installed across the 27-hectare impoundment area. The liner system included leak detection and a recirculating underdrain system to ensure that cyanide-laden water would not impact the environment. (Vector Colorado, 2005 to 2007; Tetra Tech, 2007)

EL DORADO MINE ANIMATION | SENSUTEPEQUE, EL SALVADOR

Produced and Directed a Mine-Life-Cycle video animation of the proposed development of this underground gold mine, which was used as a public communications media. (Vector Colorado, 2006)

SANTA ROSA TAILINGS DAM EXPANSION, EL LIMÓN MINE | LEÓN, NICARAGUA

Principal in Charge of the geotechnical investigation, engineering design, and construction of two 3-m tailings dam crest rises. A unique design utilizing geogrid reinforced earth allowed the crest to be raised at a near vertical upstream slope, which reduced the downstream rockfill volume by 40% over a conventional downstream raise, significantly reducing the time and cost for construction. Co-authored and presented a professional paper on the unique project design at Tailings and Mine Waste 2004. (Vector Colorado, 2003 to 2006)

POZO AZUL TAILINGS DAM UPSTREAM RAISE DESIGN, MINA EL MOCHITO | LAS VEGAS, HONDURAS

Project Manager/Principal Designer to maximize storage capacity in the Pozo Azul tailings impoundment by raising the 165-foot high earthfill tailings embankment crest utilizing cycloned tailings. Engineering activities performed to complete the upstream raise design included determining design storm events and impounded tailings densities, liquefaction analyses, a seismic risk analysis, static and pseudo-static slope stability, seepage analyses, slurry distribution management, embankment construction phasing, and expanding the decant system. The innovative design concept raised the embankment crest by 45 feet and saved the client more than \$3M in construction costs (over a downstream earthfill option) while increasing the impoundment life by 6 plus years. (Hydro-Triad, Ltd., 1995 to 1999)

GORO NICKEL MINE BANKABLE FEASIBILITY STUDY | NEW CALEDONIA

Technical Design/Field Investigation Team Leader for determining the technical and economic feasibility of developing tailings and mine waste disposal facilities and water supply system for a 120 M-pound per year nickel mine. Project included geotechnical and geophysical field investigations, soil sampling and laboratory testing and analyses, and compilation. Integrated data into an engineering feasibility design for a rockfill tailings dam and impoundment, a water supply dam and reservoir, a mine waste disposal buttress and storage area, and water diversion, control and management facilities. Developed a design report and engineering drawings to support the bankable document prepared for the project. (Hydro-Triad, Ltd., 1999; SRK Consulting, 1999 to 2000)

MINA COBRIZA TAILINGS THICKENER REHABILITATION STUDY | CHURCAMPÁ, PERÚ

Project Manager investigating the failure mode for a 100-m diameter conventional tailings thickener and determining the feasibility of its rehabilitation. Activities included on-site forensic investigations and site surveying. A failure mode analysis determined unsuitable foundation preparation led to the thickener settling. Ground modification alternatives such as deep dynamic compaction, vibratory compaction, and pre-consolidation were determined to be economically infeasible. Provided recommendations for replacing the conventional thickener with a high-capacity cone thickener. (Hydro-Triad, Ltd., 1998)

REY DE PLATA TAILINGS DAM DESIGN | TELOLOAPÁN, MÉXICO

Project Manager/Design Team Leader for the final design of a 60-m high rockfill tailings embankment in a high seismic area of México. The project included geological and geotechnical investigations, sampling, and laboratory testing for characterizing the foundation and identifying borrow materials for embankment construction. Engineering analyses included a seismic risk analysis, static and pseudo-static slope stability, hydrological site characterization, and determining design storm events and other related design criteria. Supervised the preparation of a design report and construction drawings (prepared in Spanish). (Hydro-Triad, Ltd., 1998)

SWEETWATER MINE PERMITTING | VIBURNUM, MISSOURI

Project Manager responsible for managing the mine permitting process and developing tailings impoundment management strategies for the mine. Successfully designed and installed an innovative internal seal to repair the mine's damaged decant discharge conduit. (Hydro-Triad, Ltd., 1993 to 1997)

WEST FORK UNIT TAILINGS EMBANKMENT DESIGN AND PERMITTING | MISSOURI

Design Team Leader/Project Manager for designing a 20-foot downstream cyclone tailings embankment raise, and an earthen-cut emergency spillway. Prepared and submitted design and operating reports to the State of Missouri Department of Dam Safety and acted as the Lead Technical Advisor during state dam inspections. Developed a long-term tailings impoundment management plan, which led to obtaining a State of Missouri 5-year operating permit. Renewed National Pollution Discharge Elimination System permits for the impoundment. Provided recommendations for tailings spigot patterns and schedules, impoundment water discharges, embankment design, slope stability, and construction schedule. (Hydro-Triad, Ltd., 1993 to 1997)

MINA EL DORADO PRE-FEASIBILITY STUDY | SENSUNTAPEQUE, EL SALVADOR

Project Manager responsible for determining pre-feasibility of water and mine tailings management possibilities for a 1,000-tpd gold mine and milling operation. Performed geotechnical field investigations, laboratory testing, and analyses for siting and designing a tailings embankment and impoundment, slurry delivery system, and mine waste rock dumps. Acid mine drainage potential of the waste rock, water supply, water quality, and water management systems for reclamation were addressed in the study. (Hydro-Triad, Ltd., 1995)

RIO CHIQUITO MINE TAILINGS IMPOUNDMENT FEASIBILITY STUDY | TILARÁN, COSTA RICA

As Project Geologist, participated in a thorough geological, geotechnical, and environmental evaluation to determine the feasibility of constructing a tailings impoundment within a reasonable distance of the Rio Chiquito Mine. Required reconnaissance level through detailed investigations of the surrounding area. Implemented a baseline water quality monitoring program and performed a thorough geological, hydrological, and geotechnical evaluation before recommending siting of an impoundment in an environmentally sensitive area. (Hydro-Triad, Ltd., 1994)

VILLA SANTA CRUZ TAILINGS EMBANKMENT GEOTECHNICAL INVESTIGATION | COLQUIRI, BOLIVIA

As Geologist, performed geotechnical field investigations for a 260-foot high rockfill tailings embankment. Work included surficial geological mapping, exploratory drilling, core logging, dam siting analysis, and reporting. (Hydro-Triad, Ltd., 1993)

QUIRUVILCA MINE TAILINGS IMPOUNDMENT SLOPE STABILITY ANALYSIS | LA LIBERTAD, PERÚ

As Project Geologist, performed computer-aided slope stability modeling to determine the feasibility of embankment slope stabilization by constructing a rock toe berm at the downstream embankment. Stabilization of the embankment was a pre-requisite to raising the embankment crest. (Hydro-Triad, Ltd., 1992)

POZO AZUL TAILINGS EMBANKMENT, EL MOCHITO MINE | LAS VEGAS, HONDURAS

Project Geologist responsible for installing approximately 45,000 square feet of impoundment liner and grouting cracks in the decant system. Managed a crew of 40 indigenous Hondurans installing the liner, which alleviated seepage through karst terrain. Sealed cracks in a decant system with chemical grout. (Hydro-Triad, Ltd., 1991)

Environmental / Mine Closure and Reclamation

EL DORADO MINE ENVIRONMENTAL IMPACT ASSESSMENT | SENSUTEPEQUE, EL SALVADOR

Project Director/Principal in Charge responsible for producing an environmental impact assessment for El Dorado Gold Mine. Utilized a multi-national team of expert consultants and organizations to assess the impacts of a 1,500-tpd underground gold mine. Developed environmental management plans to ensure impacts on the environment are minimized. Developed a detailed cyanide management plan and post-cyanide destruction passive water balance and dilution model to ensure the community water supplies were not adversely affected. Presented an educational seminar to the Ministerio del Medio Ambiente y Recursos Naturales, non-governmental agencies, and the public. Scheduled over 11 public meetings to solicit comment and community awareness and address the social concerns of the region. (Vector Colorado, 2004 to 2007)

PAREDONES MINE ANIMATION | BAJA SUR CALIFORNIA, MÉXICO

Produced and Directed a Mine-Life-Cycle video animation of the proposed development of this open-pit gold mine. (Tetra Tech, 2008)

AKYEM MINE ANIMATION | GHANA, AFRICA

Produced and Directed a Mine-Life-Cycle video animation of the proposed development of this open-pit gold mine. The project included building two-scale dioramas of the project for public education. (Vector Colorado, 2006)

MINA EL MOCHITO CLOSURE AND RECLAMATION PLAN | LAS VEGAS, HONDURAS

Project Director responsible for developing a closure and reclamation plan and engineering cost estimate for an underground mine in operation for over 50 years. The closure plan included reclamation designs for the underground mine and portals, mill and site infrastructure, three TSFs, and a tailings delivery system. The closure plan and cost estimate were used for corporate planning and budgeting. Based on the study's results, a progressive reclamation plan was implemented, and an accrual budget was developed to finance the ultimate mine closure. (Vector Colorado, 2004)

MINA EL LIMÓN CLOSURE AND RECLAMATION PLAN | LEÓN, NICARAGUA

Project Director responsible for developing a closure plan and engineering cost estimate for an underground gold mine in operation for over 50 years. The closure plan and estimate were used for corporate planning and budgeting. Based on the study's results, a progressive reclamation plan was implemented, and an accrual budget was developed to finance the ultimate closure. (Vector Colorado, 2004)

EL BOSQUE TAILINGS IMPOUNDMENT CLOSURE PLAN DESIGN, MINA EL MOCHITO | LAS VEGAS, HONDURAS

Principal Designer/Design Team Leader for developing a closure plan for the decommissioned El Bosque tailings impoundment. Design components included impoundment surface grading, a permanent emergency spillway, embankment erosion control, and decommissioning of over-flow type vertical decant and emergency spillway intake and discharge conduits. (SRK Consulting, 2001)

Water Dams/Resources

MASBATE WATER TREATMENT PLANT (WTP) DESIGN AND CONSTRUCTION | MASBATE, PHILIPPINES

As Project Principal, oversaw the design and provided construction and commissioning support to a 15,000 cubic meters (m³) per day WTP and over 7 km of pipelines. The WTP incorporates INCO and microfiltration processes to treat TSF supernatant water to Philippine discharge standards. The design team completed a geotechnical investigation, foundation design, pipeline design, and full WTP design, including structural, chemical, and process engineering. (Tierra Group, 2013 to 2015)

MONYWA COPPER PROJECT / SABETAUNG-KYISINTAUNG AND LETPADAUNG ORE BODIES FEASIBILITY AND PRE-FEASIBILITY STUDIES | MONYWA, MYANMAR (BURMA)

As Project Manager, analyzed historical, regional, and site-specific climatology data and established design criteria for constructing two open pit mines within 7 km of the Chindwin River, a major tributary to the Ayeyarwady. River flow regimes and flood stages were analyzed with respect to pit flooding and pit dewatering. Analyzed hydrogeology data and performed hydrologic modeling for designing the 160-m deep, open pit dewatering system. Designed a water supply system to supply a 15,000-tpd heap leach pad operation. Developed an overall water balance model satisfying the facility's demands, including quantifying excess water, water treatment rates, and methods for achieving World Bank discharge limits. Installed a surface and groundwater quality monitoring program and established baseline or pre-mining environmental conditions. Designed the overall water management system, including a river intake gallery, water distribution and treatment systems, surface runoff diversion, sedimentation control ponds, process and potable water supply, and discharging effluent. Determined the acid-generating potential for waste rock and designed an acid drainage treatment facility to treat water that seeped through the waste dumps. Designed a reclamation phase water resource management plan, including a passive, low-maintenance acid drainage treatment facility. Prepared two bankable feasibility study reports, which led to project funding and construction of an open pit mine producing 25,000 tonnes per year of cathode copper. (Hydro-Triad, Ltd., 1995 to 1996)

STANDLEY LAKE DAM MONITORING | COLORADO

Project Geologist responsible for collecting and analyzing strain gauge, inclinometer and piezometer data, vertical and underwater monitoring surveys, and site inspections. Prepared an annual monitoring report and budget. (Hydro-Triad, Ltd., 1990 to 1998)

DA LORD DAM MAINTENANCE REHABILITATION | COLORADO

Project Manager responsible for engineering design, construction management, quality control/assurance, and reporting for replacing the outlet conduit of this earthfill dam. A 24-inch steel conduit was replaced with 30-inch reinforced concrete pipe to accommodate the potential enlargement of the irrigation reservoir dam. (Hydro-Triad, Ltd., 1993)

STANDLEY LAKE DAM SLOPE STABILITY ANALYSIS | COLORADO

Project Geologist responsible for performing a subsurface geologic investigation, sampling and laboratory testing for soil properties, and modeling slope stability utilizing a computer model to determine factors of safety under differing piezometric surfaces. Performed in conjunction with ongoing safety monitoring for this high-hazard dam. (Hydro-Triad, Ltd., 1993)

STANDLEY LAKE DAM GEOTECHNICAL MONITORING PROGRAM | COLORADO

Project Geologist responsible for fieldwork coordination of support services for drilling and installing inclinometers, valve house anchor tendons, and strain gauges. Performed continued monitoring and data reporting for compiling an annual monitoring report to the State Engineer's Office. (Hydro-Triad, Ltd., 1992)

CONTINENTAL DAM REHABILITATION | COLORADO

Resident Geologist responsible for supervising the general contractor rehabilitating a 200-foot high earthfill dam, concrete outlet conduit, and gatehouse access shaft. The project involved reconstructing portions of the dam, installing a synthetic liner to minimize seepage, and chemical grouting to seal cracks and conduit joints. Prepared a project completion report for the State Engineer's Office. (Hydro-Triad, Ltd. 1990)

SANTA MARIA DAM REHABILITATION | MINERAL COUNTY, COLORADO

As Resident Geologist, supervised rehabilitation work of a 102-foot high hydraulic fill dam. The work included geological investigations to identify probable seepage mechanisms, installing a polyethylene geomembrane, and a chemical grouting program to control seepage through the embankment. (Hydro-Triad, Ltd., 1990)

RIDGEWAY DAM ABUTMENT GROUTING | COLORADO

As Assistant Project Manager, directly accountable for coordinating grout quantities and billing schedule with the U.S. Bureau of Reclamation for this two-season, 24-hour-a-day project. The BOR directed a large, extensive abutment void-grouting program to prevent foundation seepage in karst terrain. Over 1,600 holes were pressure grouted with slurry cement in two stages on a primary and secondary tertiary grid pattern. (Hayward Baker, Co., 1985)

Due Diligence / Audits / Expert Testimony

EL DORADO MINE ARBITRATION | WORLD BANK COURT, NEW YORK

Provided expert witness statement for arbitration hearings between Pacific Rim Mining and the country of El Salvador in a dispute over the Ministerio de Ambiente y Recursos Naturales failure to issue an Environmental Permit for an underground gold mine. (Tierra Group, 2014 to 2015)

MASBATE MINE GEOTECHNICAL DUE DILIGENCE AUDIT | MASBATE, PHILIPPINES

Principal in Charge of geotechnical due diligence audit of an 18-Mt TSF. The project entailed reviewing design reports, field investigations, and preparing a Technical Audit Report for a potential buyer. (Tierra Group, 2013)

MINA EL CUBO TSF GEOTECHNICAL AUDIT AND MITIGATION DESIGN | GUANAJUATO, MÉXICO

Principal in Charge of a TSF stability analysis and stabilization design. The project included structural analysis of a subterranean decant conduit gallery underlying the facility. (Tetra Tech, 2009)

SAN VICENTE TSF PEER REVIEW | SAN VICENTE, BOLIVIA

Performed an expert peer review of a conventional silver TSF in southern Bolivia. (Tetra Tech, 2009)

NUESTRA SEÑORA TSF EXPERT PEER REVIEW | SINALOA, MÉXICO

Performed expert peer review of a poly-metallic TSF design constructed in a karstic environment. Recommendations led to the designer ultimately selecting, designing, and implementing a thickened/paste tailings disposal system for the facility. (Tetra Tech, 2008)

CONFIDENTIAL MINE DUE DILIGENCE | AREQUIPA, PERÚ

Performed an early-stage environmental/geotechnical due diligence review for a potential acquisition for a copper project development plan in this highly socially-sensitive region of Perú. (Tetra Tech, 2011)

MINAS AGUAS TEÑIDAS TSF AUDIT | HUELVA PROVINCE, SPAIN

Performed a geotechnical and construction peer review of a paste tailings/rockfill tailings dam design in Spain's historical "Pyrite Belt". The design was being hyper-scrutinized due to a contemporary tailings dam failure (not at or by the owner of this property) in the region that caused nearly catastrophic environmental damages. (Tetra Tech, 2010)

TROY MINE DUE DILIGENCE | MONTANA

Geotechnical lead on a project team performing a due diligence review for a potential acquisition of this underground silver mine in western Montana. (Tetra Tech, 2009)

YARBICOYA MINE DUE DILIGENCE | YARBICOYA, BOLIVIA

Performed an early-stage due diligence review for a copper project development plan located at 4,300-m elevation in the Bolivian Andes for a potential acquisition. (Tetra Tech, 2009)

MINA BELLAVISTA ENVIRONMENTAL AUDIT | MIRAMAR, COSTA RICA

Principal in Charge of a team of experts performing an environmental audit and assessment of impacts caused by a mega-landslide resulting in the suspension of mining at this surface gold mine located adjacent to a national preserve in Costa Rica. The study was commissioned by and performed for SETENA (Secretaría Técnica Nacional Ambiental). (Tetra Tech, 2008)

CERRO MAIMÓN TSF PEER REVIEW | MAIMÓN, DOMINICAN REPUBLIC

Performed a peer review of a waste rock/tailings co-disposal facility and mine development plan in a high rainfall region of the Caribbean. (Vector Colorado, LLC, 2006)

MINA SAN ANDRÉS EXPERT GEOTECHNICAL PEER REVIEW | COPÁN, HONDURAS

Performed a geotechnical forensics assessment, which determined that spent ore from an on-off leach pad operation had liquefied, causing a debris flow threatening to inundate a major river basin. Subsequently, a preventative detention buttress was designed, which obviated continued mass movement. (SRK Consulting, 2000 to 2001)

Geological Hazards

MINA EL MOCHITO GEOLOGIC HAZARDS ABATEMENT | LAS VEGAS, HONDURAS

Served as Mina El Mochito's Principal Geotechnical Project director since 1990. In this capacity, he has identified, investigated, and led engineering teams in the design and mitigation of a multitude of landslides, debris flows, karstic features, flooding, and seismic events responses ranging in size from 24-hour operational upsets to multi-month, multi-million-dollar construction delays. Despite the geologic hazards threatening El Mochito's tropical operations over the past two decades, the engineering design team and El Mochito's operations personnel have allowed Mina El Mochito to maintain continuous operations without significant downtime. (Hydro-Triad, Ltd., 1990 to 1999; SRK Consulting, 1999 to 2001; Olsson Associates, 2001 to 2003; Vector Colorado, 2003 to 2007; Tetra Tech, 2007 to 2011; Tierra Group, 2012 to Present)

TAMBORAQUE LANDSLIDE PEER REVIEW | SAN MATEO, PERÚ

Performed industry peer review of a Peruvian consulting firm's work, investigation, engineering analyses, and mitigation recommendations for a large landslide that threatened the stability of a dry-stack TSF. (Vector Colorado, 2006 to 2007; Tetra Tech, 2007 to 2008)

BELLAVISTA MINE LANDSLIDE CHARACTERIZATION | MIRAMAR, COSTA RICA

Led a team of international experts to investigate the probable cause of ground disturbances experienced at the Bellavista Mine property. Matt's team hypothesized that the ground disturbances were likely caused by a deep-seated failure mechanism requiring immediate investigative action. Subsequent investigations proved the existence of a large-scale (35,000,000 cm) landslide underlying the project site. (Tetra Tech, 2007)

FALCONBRIDGE NICKEL MINE GEOTECHNICAL RISK EVALUATION | BONAÑO, DOMINICAN REPUBLIC

Principal in Charge of a site-wide geotechnical risk assessment for a 40-year-old operating nickel mine. The risk assessment encompassed 10 massive waste rock dumps and six sediment control dams located across a 40-km long mine property. Performed slope stability and dam breach flood inundation analyses to prioritize these structures in terms of geohazard risk and liability. Recommendations for remedial action were taken for the priority structures. Developed engineering designs for mitigating potential risks. (Olsson Associates, 2003; Vector Colorado, 2003 to 2006)

CERRO MOJÓN LANDSLIDE CHARACTERIZATION | LA LIBERTAD, NICARAGUA

Project Geologist responsible for identifying the cause for cracks in the slopes of recently excavated HLF solution ponds. Geologic mapping and interpretation of aerial photographs revealed that excavating the toe of a paleo-landslide caused the landslide to remobilize and reinitiated downslope creep. Accurate site characterizations led to a successful mitigation design for the solution ponds and ancillary facilities. (Hydro-Triad, Ltd., 1998)

TRAPPERS RUN ROCKFALL / DEBRIS FLOW EVALUATION | COLORADO

Project Geologist responsible for geological analysis of potential hazards associated with rockfalls and debris flow impacting specific designs of the proposed Trappers Run residential development. Determined the hazards classification and zoning of the proposed development, as defined by the town of Vail; assessed the potential impact of geological hazards associated with constructing the proposed development; and recommended three mitigation alternatives for alleviating the debris flow. (Hydro-Triad, Ltd., 1996)

STANDLEY LAKE DAM BEDROCK GEOLOGY STUDY | COLORADO

Project Geologist responsible for research data analysis, reduction, interpretation, and preparation of a report interpreting the bedrock geology underlying Standley Lake Dam. (Hydro-Triad, Ltd., 1994)

EL BOSQUE WEST ABUTMENT SLIDE STABILIZATION, TAILINGS EMBANKMENT, EL MOCHITO MINE | LAS VEGAS, HONDURAS

Project Geologist responsible for design and construction management of the stabilization of a large landslide undermining the west abutment of the El Bosque tailings embankment. The project design included constructing vertical drawdown drains, installing erosion control matting, surface runoff control, geomembrane liner installation, and extensive revegetation. (Hydro-Triad, Ltd., 1990)

Geotechnics

ANGOSTURA DIRECTIONAL STUDY | ANTIOQUIA, COLOMBIA

Principal in Charge of a senior discipline-led team tasked with identifying a critical path-forward plan to developing a Feasibility Study and permitting a combination underground/open-pit mine located in northern Colombia. This project resulted in drafting Terms of Reference for a detailed proposal to advance the project. (Tetra Tech, 2007)

KORI KOLLO PLANT EXPANSION | ORURO, BOLIVIA

As Project Manager, performed geotechnical investigations and directed a laboratory soils testing program to facilitate making foundation design recommendations for a carbon-in-pulp mill expansion. The expansion required constructing 12 additional 7-m diameter holding tanks over an area overlain by silt. Removing the silt and constructing concrete rings over imported, compacted sand and gravel were recommended and constructed for the foundations. Supervised the quality assurance/quality control (QA/QC) program during construction. (Hydro-Triad, Ltd., 1994)

HETCH HETCHY RESERVOIR PENSTOCK SLOPE STABILIZATION | CALIFORNIA

Field Superintendent responsible for project implementation, construction, and completion. Pressure-injected a cement grout through the concrete penstock foundation walls to depths of 60 feet. Utilized void intrusion of the slurry mixture to increase the strength and stability of the 50° slope at depth. (Hayward Baker, Co., 1985)

VALENCIA WATER TREATMENT PLANT | CALIFORNIA

Assistant Project Manager responsible for project implementation, coordination, contractor supervision, and contract administration. The foundation for a water treatment facility required vibratory compaction to effectively reduce the liquefaction potential of sandy and cohesionless foundation soils. (Hayward Baker, Co., 1985)

WASHINGTON, DC SUBWAY EXPANSION | DISTRICT OF COLUMBIA

Field Technician responsible for monitoring grouting quantities through a 12-port terminal. Expanding subway tunnels required soil stabilization prior to tunneling. A silicate grout was injected to create a structurally sound subsurface medium before excavation. (Hayward Baker, Co., 1984)

AMTRAK TRAIN STATION REHABILITATION | NEW JERSEY

Assistant Project Manager responsible for daily project coordination. Injected low slump compaction grout bulbs beneath existing pedestrian loading and unloading platforms to compact the soils and function as mini piles for later rehabilitation of the platforms. (Hayward Baker, Co., 1984)

SOUTH TEXAS NUCLEAR PROJECT | TEXAS

Field Technician responsible for monitoring grout quantities, travel, and communication of a chemical grout around a water release box-culvert to control radioactive-contaminated water seepage. Work required daily Nuclear Energy Regulatory Commission security clearance and safety training. (Hayward Baker, Co., 1984)

Professional Affiliations

American Avalanche Association, Member

American Institute of Professional Geologists, Member

Canadian Dam Association, Member

Colorado Mining Association, Member

Geological Society of America, Member

International Association of Engineering Geologists, Member

Nevada Mining Association (NMA), Member

Society for Mining, Metallurgy and Exploration (SME), Registered Member (#4116803RM)

Prospectors & Developers Association of Canada, Member

Publications / Presentations

- Fuller ML**, 2019. *The Infamous Legacy of Upstream Tailings Dams*. Colorado SME-MPD Subsection 69th Annual Conference. Recipient of the Louis W. Cope Best Presentation Award.
- Fuller ML**, 2018. *In-Pit Tailings Storage – Converting Liabilities Into Assets*. The Mining Record, Vol. 129, No. 6, June 2018 Reprint.
- Fuller ML**, 2017. *Tailings Stewardship: Training from the Tailings Beach to the Board Room*. The Mining Record, Vol. 128, No. 6, June 2017 Reprint.
- Fuller ML**, Shultz, J, 2016. *Tailings Stewardship – Adding Value to Due Diligence*. The Mining Record publication, 2016.
- Fuller ML**, Jacobs M, 2015. *Tailings Stewardship – Genuine Corporate Responsibility*, Tailings and Mine Waste 2015 Conference, Vancouver, British Columbia, Canada, 2015.
- Fuller ML**, 2012. *Lining Steep Rock Slopes with a Geomembrane Liner to Facilitate Tailings Facility Expansion*, 16th Annual International Conference on Tailings and Mine Waste, Keystone, Colorado, 2012.
- Fuller ML**, 2004. *Cerro Santa Rosa tailings dam: storage capacity increased using a unique mechanically stabilized earth design*, 11th Annual International Conference on Tailings and Mine Waste, Vail, Colorado, 2004.
- Fuller ML**, 2005. *Virtual reality animation of the proposed El Dorado Mine in El Salvador assists regulators in reviewing an EIA*, Society of Mining Engineering Annual Meeting, Salt Lake City, Utah, 2005.
- Fuller ML**, 2002. *Pozo Azul tailings impoundment: design modifications made to utilize a difficult site*, 9th Annual International Conference on Tailings and Mine Waste, Fort Collins, Colorado, 2002.

Employment History

CURRENT EMPLOYER	TIERRA GROUP INTERNATIONAL, LTD.
POSITION	Founding Principal
YEARS	2012 to Present
EMPLOYER	TETRA TECH, INC.
POSITION	Vice President / International Mining, Latin America
YEARS	2007 to 2011
EMPLOYER	VECTOR COLORADO, LLC
POSITION	Founder / Principal Engineering Geologist
YEARS	2003 to 2007
EMPLOYER	OLSSON ASSOCIATES
POSITION	Mining Group Manager
YEARS	2001 to 2003
EMPLOYER	STEFFEN ROBERTSON AND KIRSTEN (U.S.), INC.
POSITION	Principal Engineering Geologist / Project Manager
YEARS	1999 to 2001

EMPLOYER	HYDRO-TRIAD, LTD.
POSITION	Senior Engineering Geologist / Project Manager
YEARS	1990 to 1999
EMPLOYER	HAYWARD BAKER, CO.
POSITION	Project Superintendent
YEARS	1984 to 1986
EMPLOYER	AMOCO MINERALS, INC.
POSITION	Exploration Geologist
YEARS	1980, 1983 to 1984

Language Proficiency

English: Native
Spanish: Conversational (spoken, written)