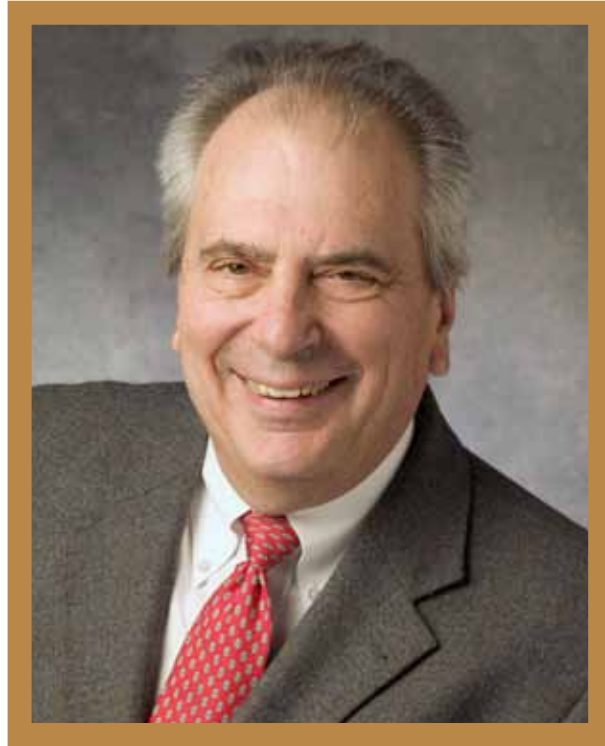


**Professional Profile
of
Paul C. Rizzo
Ph.D., P.E.**



Dr. Rizzo is an internationally recognized expert in geotechnical, civil, nuclear, and seismic engineering. He has more than 46 years of experience related to a wide range of projects including power plant structures, waterfront facilities, pumped storage facilities, and dams. As founder of Paul C. Rizzo Associates, Inc., Dr. Rizzo has built the firm into one of the leading consultants in seismic safety of nuclear power plants, dams, and other structures. He is a recognized expert in the field of safety evaluations and seismic issues. He has served on numerous panels, committees, and consulting boards charged with the deliberation of seismic hazard evaluation, seismic design basis, soil-structure interaction, and other seismic issues related to geotechnical engineering for various types of projects.

His wide variety of nuclear facilities experience includes commercial nuclear generation plants, nuclear fuel processing facilities, and nuclear weapons facilities. His experience encompasses the first generation commercial facilities of the 1960's, the second generation PWRs and BWRs, plus the Canadian and Russian reactors erected in the eastern block countries, and the latest generation EPR and passively safe reactors, such as the AP600 and AP1000. He has served as an Outside Expert in the areas of seismic hazards, foundations, geology, and geotechnical engineering for the Defense Nuclear Facilities Safety Board since 1989 for nuclear related projects at U.S. Department of Energy facilities.

Dr. Rizzo has been Principal-in-Charge for several Probabilistic Seismic Hazard Analyses (PSHA) efforts including Cernavoda NPP (Romania); Callaway (Missouri); Goesgen (Switzerland); Bell Bend (Pennsylvania); and PBMR (South Africa). Dr. Rizzo is a member of the NEI and participates in the "Seismic Issues" resolution initiative with the USNRC.

In addition, he has worked almost continuously in the Navy Nuclear Program since 1968 including projects at Idaho, Bettis, Kesselring Site, Yucca Mt., and the Naval Facilities at Charleston, SC. Dr. Rizzo has extensive experience with many types of sites, having worked at more than 100. These include deep soil sites, shallow soil sites, rock sites, and high seismic sites around the world. He has consulted to the USNRC, ACRS, and IAEA. He has lectured on seismic safety, geological hazards, and geotechnical engineering aspects of nuclear plants in the United States, Israel, and China. Dr. Rizzo's professional and academic experience is reflected in his more than 100 publications.

In addition to his particular experience with nuclear projects, Dr. Rizzo is well known for his expertise in dams and water resource projects, as well as mining and tunneling projects throughout the globe. His project experience ranges from geotechnical engineering matters for unusual structures to special foundations for power plants, and deep excavations.

- Dr. Rizzo has served as the Engineer of Record for numerous dams around the world during his **46+ year career**.
- Dr. Rizzo has served on numerous consulting boards and independent review panels for dams and other critical structures, including those in high seismic areas.
- Dr. Rizzo's broad experience includes his role as the ***Chairman of the Geotechnical Advisory Board for the new Second Avenue Subway Project*** in New York City - a \$16 billion, decade-long project. This senior position among a very distinguished Board demonstrates his stature within the industry as a geotechnical engineer.
- As a ***Seismic/Geotechnical Consultant to the Defense Nuclear Facilities Safety Board (DNFSB)***, Dr. Rizzo is involved in a review capacity at the Department of Energy's nuclear facilities including Hanford, Oak Ridge, Los Alamos, Pantex, and other sites. Dr. Rizzo has held this position for 20+ continuous years, proving his technical competence and ability in regard to a wide range of seismic and geotechnical problems including seismically induced liquefaction, soil-structure interaction, and deformation analyses.
- Dr. Rizzo is a recognized expert in the field of safety evaluations and the seismic rehabilitation of dams. He has served on numerous panels, committees, and consulting boards charged with the deliberation of seismic hazard evaluation, seismic design basis, soil-structure interaction, and other seismic issues related to geotechnical engineering for various types of projects. He is a ***Federal Energy Regulatory Commission (FERC) Part 12 Independent Consultant*** and has performed these inspections on dams throughout the United States.
- Dr. Rizzo was named the 2005 recipient of the ***Metcalf Award presented by the Engineers' Society of Western Pennsylvania (ESWP)***. Named for the ESWP's first president, William Metcalf, this award is presented annually to an outstanding engineer whose lifetime achievements have extended the engineering community's knowledge. This recognition from the oldest engineering society in the county is a result of a lifetime pursuit of professional excellence and proof positive of Dr. Rizzo's competence and ability within his chosen field - namely as a Geotechnical and Seismic Expert and a leader within the engineering community.

Employment Record:

March 1984 – Present:

Paul C. Rizzo Associates, Inc., 500 Penn Center Boulevard, Suite 100, Pittsburgh, PA, USA 15235

In early 1984, Dr. Rizzo formed Paul C. Rizzo Associates, Inc (RIZZO), where he serves as both the President and Chairman of the Board, reporting directly to the Corporation's Board of Directors. Dr. Rizzo is Principal-in-Charge of all of the firm's hydroelectric power and dam projects involving extensive geotechnical, seismic, and civil/structural engineering services both in the U.S. and overseas. He is highly recognized for his contributions in earthquake engineering and foundation design of major structures and is a recognized expert in the field of safety evaluations and seismic rehabilitation of dams. RIZZO's technical focus and majority of experience and expertise is primarily in the practice areas of geotechnical engineering, civil engineering, water resource engineering, structural engineering, hydrogeology, dam design, and seismology.

Dr. Rizzo has been Principal-in-Charge, or has served in the capacity as an expert consultant with numerous projects, including: earth, rock fill, and concrete dams; canals; groundwater investigations; conventional power plants; nuclear power plants; nuclear fuel facilities; chemical plants; rubber plants; steel mill facilities; and fabrication shops.

1966 – 1984:

D'Appolonia Consulting Engineers, 10 Duff Road Suite 300 Pittsburgh, PA, USA 15235

Upon receiving his Doctorate in Civil Engineering in 1966, Dr. Rizzo worked at D'Appolonia Consulting Engineers, Inc., serving in the following positions: Assistant Project Engineer; Project Engineer; Project Manager; Vice President,

Manager of Engineering; Vice President, Operations; and in August of 1977, he became President of the firm. During his tenure at D'Appolonia, his immediate supervisor was Mr. Elio D'Appolonia, until he became President and reported directly to the Board of Directors. His work at D'Appolonia had primarily been in the areas of structural dynamics, vibrations, foundations, soil mechanics, geology, seismology, and hydrology. Projects have included canals; earth, rock fill, and concrete dams; chemical plants; coal mines; steel mill facilities; fabrication shops; groundwater investigations; high-rise structures; conventional power plants; nuclear power plants; and nuclear fuel facilities.

A complete resume for Dr. Rizzo is attached for your review.



Paul C. Rizzo, Ph.D., P.E.

President and Chief Executive Officer

Years Experience

46

Education

Ph.D., Civil Engineering, Carnegie Mellon University – 1966

M.S., Civil Engineering, Carnegie Mellon University – 1964

B.S., Civil Engineering, Carnegie Mellon University – 1963

DOE Clearance

L Clearance: 72471

Professional Registrations:

Professional Engineer First Registered – 1968; Alabama, Alaska, Arizona, California, Delaware, Florida, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Massachusetts, Maryland, Michigan, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, Puerto Rico, Rhode Island, South Carolina, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, and Wisconsin

Affiliations

- American Society of Mechanical Engineers (ASME)
- Engineers' Society of Western Pennsylvania (ESWP)
- Association of State Dam Safety Officials (ASDSO)
- American Society of Civil Engineers (ASCE)
- Society of American Military Engineers (SAME)
- Society of Mining, Metallurgy and Exploration (SME)
- Seismological Society of America (SSA)
- United States Society on Dams (USSD)

Publications

A list of Dr. Rizzo's publications is available upon request.

Skill Areas:

Civil Engineering
Dams
Hydroelectric Plants
Nuclear Facilities
Seismic Engineering

Geotechnical Engineering
Structural Dynamics
Historic Structures
Expert Testimony
Liquefaction Analysis

Dr. Paul C. Rizzo, P.E., is President and CEO of Paul C. Rizzo Associates, Inc. (RIZZO). He has more than 46 years of experience on a wide variety of projects. He has lectured on a variety of civil and geotechnical topics, and served on consulting boards dealing with various issues in dams, seismic design, and geotechnical engineering. Dr. Rizzo has extensive experience related to civil engineering aspects of NPPs, thermal plants, mines, hydro plants, and earth and rockfill dams. He has actively participated in the industry, dealing with regulations, criteria, and professional practice in his areas of expertise. He is highly recognized for his contributions in earthquake engineering and foundation design of major structures. In addition, he has served as a Consultant to the utility, steel, petroleum, and mining industries. His professional and academic experience is reflected in his more than 100 publications.

Nuclear/Seismic

Dr. Rizzo is an international expert in seismic safety and foundation engineering for nuclear plants. He has experience on a wide variety of nuclear facilities, including commercial nuclear generation plants, nuclear fuel processing facilities, and nuclear weapons facilities. His experience encompasses the first generation commercial facilities of the 1960s, the second generation PWRs and BWRs, plus the Canadian and Russian reactors erected in the eastern block countries, and the latest generation, EPR and passively safe reactors. He has served as an Outside Expert in the areas of seismic hazards, foundations, geology, and geotechnical engineering for the Defense Nuclear Facilities Safety Board since 1989 for nuclear related projects at U.S. Department of Energy facilities.

Dr. Rizzo has been Principal-in-Charge (Principal-in-Charge) for several Probabilistic Seismic Hazard Analyses (PSHA) efforts, including: Cernavoda (Romania); Callaway (Missouri); Goesgen (Switzerland); Bell Bend (Pennsylvania); PBMR (South Africa); Borssele (Netherlands); Braka Site and Alternate Site (UAE); Akkuyu (Turkey); Krsko (Slovenia), and others. He is a member of the NEI and participates in the "seismic issues" resolution initiative with the USNRC. Dr. Rizzo has extensive experience with many types of sites, having worked at more than 100 sites in the US and internationally, including deep soil sites, shallow soil sites, rock sites and high seismic sites around the world. He has consulted to the USNRC, ACRS, and IAEA. He has lectured on seismic safety, geological hazards, and geotechnical engineering aspects of nuclear plants throughout the world.

Geotechnical, Civil, and Mining

Dr. Rizzo has experience related to a wide range of geotechnical and civil engineering projects, including power plant structures, mines, waterfront facilities, pumped storage facilities, and dams. He is an international leading consultant in seismic safety of hydro dams, tailings dams, and other heavy civil structures including mine crushers, material transport and tunnels. He has served on numerous panels, committees, and consulting boards charged with the deliberation of seismic hazard evaluation, seismic design basis, soil-structure interaction, and other seismic issues related to geotechnical engineering for various types of projects. Dr. Rizzo has extensive experience related to civil engineering structures; hydroelectric, mines, thermal, and NPPs; earth and rockfill dams; harbors and docks; and industrial facilities. His fields of interest include earthquake engineering, foundation engineering, geology, seismology, hydrogeology and groundwater control, stress analysis, vibrations, and structural dynamics.

Environmental

Dr. Rizzo has more than 46 years of professional consulting experience related to the civil engineering aspects of hazardous and solid waste management facilities, mines, nuclear, thermal, and hydroelectric power plants, and earth and rockfill dams.. He has lectured in the United States and Europe on environmental engineering, Phase II environmental assessments; facility and landfill siting; mine development and design and construction of landfill components. Dr. Rizzo has extensive experience in providing expert testimony, representing clients at public and regulatory meetings, and providing support for community relations programs.

NUCLEAR ACTIVITIES

March 2011 – Present

Visaginas Nuclear Power Plant – VAE, Vilnius, Lithuania:

Dr. Rizzo as Principal-in-Charge, was responsible for evaluating the over consolidation ratio (OCR) for the Visaginas site. He was also responsible for the supervision of the preliminary settlement and construction dewatering for the proposed NPP using existing data set. A field investigation program to support the engineering soil design and siting of GE Hitachi ABWRs will commence in the summer of 2012.

November 2008 – Present

KRSKO NPP Site Characterization – GEN energija, Slovenia:

Dr. Rizzo serves as Technical Expert for the site characterization for siting Nuclear Power Plants. The Scope of Work includes hydrology, geohydrology, geology, seismic and geotechnical investigation, and related field investigation programs appropriate to siting power plants per International Atomic Energy Commission requirements. The results are captured in a Safety Analysis Report, Chapter 2 format and content; proof that siting next generation NPPs is feasible at the KRSKO site.

RIZZO is performing a Probabilistic Fault Displacement Hazard Analysis (PFDHA) for the East Site and the West Site for the proposed Krško2 NPP. Seismic sources are characterized in terms of their locations, geometries, rates of activity, and magnitude distributions. Future fault displacements can be inferred from the magnitudes of earthquakes expected to occur, or directly from the evidence of past fault displacements. The magnitude of

secondary faulting that occurs away from the primary rupture must be characterized as a function of magnitude and distance. Knowledge uncertainties are addressed by assessing alternate interpretations through a Logic Tree Approach. The analysis addresses potential fault displacement associated with fault movement on the Libna, Artice, and Orlica faults.

The Scope of Work for the PFDHA will be carried out as a Level 1 study, according to the study levels defined by the Senior Seismic Hazard Analysis Committee (SSHAC) (NRC 1998). A Level 1 study depends primarily on information available in the literature or existing project documents.

RIZZO is also providing a preliminary safety analysis reporting that is required to advance the Slovenian decision making process. This report is a predecessor to the in-country approval process towards a next generation NPP application. A surrogate Reference Plant "Plant Parameter Envelop (PPE)" was developed by RIZZO to cover key siting parameters and to envelop four select PWRs e.g. EPR (Areva), APWR (MHI), AP1000 (WEC) and ATMEA1 (Areva & MHI cooperation).

June 2011 – Present

Akkuyu Nuclear Power Project (Turkey) – Worley Parsons, Sofia, Bulgaria:

Dr. Rizzo is Principal-in-Charge for all RIZZO geotechnical, geologic, seismic, hydrological, and meteorological efforts relating to the Akkuyu NPP application for nuclear operation licensure. An extensive field program was performed by RIZZO, including geologic mapping, geotechnical coring, and hydrologic well installation. Both probabilistic and deterministic seismic hazard analyses were also performed. This ongoing project included the delivery of several reports to support the license application.

October 2008 – Present

UAE Braka NPP Site Selection/Site Characterization/PSAR and EIA – ENEC/KEPCO E&C, United Arab Emirates:

RIZZO is preparing the site investigation and submittal of a PSAR and EIA to the Regulatory Authority for siting a APR1400 NPP. As Principal-in-Charge, Dr. Rizzo is responsible for the technical direction of the Project and for reviewing the technical documentation associated with the Project. RIZZO is performing the field investigations, PSAR Chapter 2, and the ER.

In second quarter of 2012, RIZZO initiated the field investigation to support additional units #3 & #4 at the Braka site.

March 2011 – December 2011

KCB2 Borssele NPP – ISAR 2.1-2.5 – DELTA Energy, The Netherlands:

Dr. Rizzo serves as Principle in Charge for a site characterization for siting NPPs. The SOW includes: hydrology and hydraulics, geo-hydrology, geology, seismic and geotechnical investigation and related field investigation areas appropriate to siting NPPs per USNRC, European Regulations and IAEA requirements.

The objective of the site characterization effort is to define the parameters for the Invitation to Bid, to be provided to the Nuclear Technology Vendors for their proposals.

October 2008 – December 2011

UAE Site A (Alternate) NPP Site Selection/Site

Characterization/PSAR and EIA – ENEC/KEPCO E&C, United Arab Emirates:

RIZZO is preparing the site investigation and submittal of a PSAR and EIA to the Regulatory Authority for the siting of a NPP. As Principal-in-Charge, Dr. Rizzo is responsible for the technical direction of the Project and for reviewing the technical documentation associated with the Project. RIZZO is performing the field investigations, PSAR Chapter 2, and the EIA.

November 2007 – Present

Levy County AP1000 COLA – Progress Energy/Sargent & Lundy, Crystal River, Florida:

Dr. Rizzo is Principal-in-Charge for RIZZO's support to the COL Application (FSAR 2.5.4) to the USNRC for siting the AP1000 NPP.

RIZZO's Scope of Work is Chapter 2.5.4 of the COLA, including interpretation of geotechnical conditions. The scope also included design of the dewatering, grouting and foundation design. The FSAR was prepared to USNRC codes and regulations.

The RIZZO scope of work includes: conceptual design of the construction dewatering program; excavation planning; design of a Roller Compacted Concrete (RCC) Bridging Mat beneath the Nuclear Island; performance of a RCC Test Program prior to mat construction; and specification of backfill and select FSAR sections. Due to high groundwater at the site and porous zones and fractures in the subsurface materials, RIZZO is designing a grouting program in concert with installation of a diaphragm around the Nuclear Island structures to make an impervious zone and prevent the flow of groundwater into the excavation.

August 2006 – September 2006

US EPR Foundation Interface Conditions Report (FICR) –

AREVA, Various Sites:

Dr. Rizzo provides structural design, geotechnical including Plant Parameter Envelope (PPE) and seismic consultation to AREVA for its EPR NPP standard design and Design Control Document (DCD) certification licensing effort with the USNRC. He also served as a member of its Structural Review Board. Dr. Rizzo authored the Foundation Interface Conditions Report for AREVA, which defines the plant – site interface requirements for the EPR.

2005 – Present

Westinghouse Site Characterizations – USA:

Westinghouse – Dr. Rizzo has been the Principal-in-Charge for RIZZO's review, comment, and recommendations for detailing field investigations for site characterization (e.g., seismic, geotechnical, determination of foundation conditions) for several sites to support construction of a Design Certified Standard Plant in a COLA approach.

- Southern Services – Vogtle
- Duke – William States Lee
- Progress:

- Shearon Harris
- Levy County
- SCE&G – Summer
- TVA – Bellafonte

April 1994 – Present

Savannah River Plant – US Department of Energy, Aiken, South Carolina:

Dr. Rizzo is currently providing consulting services as the DNFSB's Outside Expert for seismic hazards, geologic hazards, foundation engineering, and site selection. His earliest work at Savannah River involved site characterization and seismic hazard analysis for the Defense Waste Processing Facility (DWPF) in the 1970s and he has been involved in new construction/major modification projects continuously since that early project.

1993 – 1994

Expended Core Facility, Idaho National Engineering Laboratory – Bettis Atomic Power Laboratory, Idaho:

As Principal-in-Charge, Dr. Rizzo supervised the seismic reassessment of the Expended Core Facility (ECF) located within the Naval Reactors Facility Complex. He performed a seismic reassessment in order to evaluate the components of the ECF, whose failure could have potential radiological consequences. Dr. Rizzo reviewed the seismic criteria used in the design analysis, the current site geologic and seismological information, and established spectrum to be used as the Evaluation Basis Seismic Criteria.

1989 – Present

Defense Nuclear Facilities Safety Board (DNFSB) – Washington, D.C.:

The DNFSB is chartered by the National Defense Authorization Act to provide independent safety oversight of the Defense nuclear facilities. Dr. Rizzo serves as an Outside Expert to the Board for review and evaluation of DOE standards and for resolution of geotechnical, structural, and seismic issues at DOE sites, including seismic hazard and ground motion analysis. Dr. Rizzo provides independent reviews of designs for new construction Safety Class facilities – Hanford (WA), Savannah River (SC), Los Alamos National Lab (NM), Oak Ridge (TN), Pantex (TX), Rocky Flats (CO), and others.

Dr. Rizzo reviewed geotechnical and structural design work performed by other engineering firms; performed independent review of geologic and other hazards; provided geotechnical consultation; defined seismic design bases; performed independent stability/settlement analyses; proposed remedial solutions; reviewed and prepared engineering reports; and performed in-the-field evaluations of geotechnical conditions.

September 2007 – December 2008

Koeberg Pebble Bed Modular Reactor (PBMR) Demonstration Project – PBMR/ESKOM, South Africa:

RIZZO has performed several tasks supporting the final design and plan for construction of the PBDR. Dr. Rizzo was Principal-in-Charge for a Probabilistic Seismic Hazard Study (PSHA), including review of geology and catalogs of earthquakes; determining seismic zonations; determining upper magnitude and recurrence parameters; specification of ground motion models/attenuation models, etc.; aggregation and de-aggregation to determine ground motion at hard rock; development of time histories; addressing of randomization/uncertainties; and sensitivity analyses. The effort was completed per RIZZO's QA Program in accordance with ASME NQA-1 (1994), 10CFR 50 Appendix B, and ISO 9001.

December 2006 – December 2008

Callaway Unit 2 EPR Design and COLA Application – UniStar, Callaway, Missouri:

Dr. Rizzo was the Principal-in-Charge for the COLA (FSAR Chapter 2) and EIA applications, to the USNRC for siting the US-EPR NPP at the Callaway Site.

RIZZO's Scope of Work included meteorology, hazards, hydrology, geohydrology, geology, seismic and PSHA, and geotechnical along with all appropriate field investigations. The FSAR was prepared to USNRC codes and regulations and has been docketed for USNRC review.

December 2006 – December 2011

Bell Bend EPR Design and COLA (Chapter 2.4 and 2.5) – UniStar, Berwick, PA:

Dr. Rizzo was Principal-in-Charge for performance of the field investigation (Work Plan, QA, Boring Program, Geophysical Testing, Lab Testing) and preparation of SAR Chapter 2, Site Characterization for the Bell Bend COLA. Inclusive of this effort were:

- 2.4 Hydrologic Engineering describing the local surface water and groundwater hydrology, including normal and extreme conditions.
- 2.5 Geology, Seismology and Geotechnical work describing the site geological setting and detailed evaluation of the seismic conditions potentially affecting the design of foundations and structures, inclusive of the PSHA.

All work was completed in accordance with RIZZO's QA Program in compliance with 10 CFR 50, Appendix B and ASME NQA-1-1994. The FSAR was prepared to USNRC codes and regulations for USNRC review.

December 2006 – December 2008

Pelindaba Fuels Facility PSHA – ESKOM, South Africa:

Dr. Rizzo served as Principal-in-Charge for the PSHA that supported the design for the Pelindaba Fuels Facility Project in South Africa.

August 2006 – September 2006

**AP1000 Foundation Interface Conditions Report (FICR) –
Westinghouse Electric Company, Various Sites:**

Dr. Rizzo authored the Foundation Interface Conditions Report for Westinghouse Electric which defines the plant/site interface requirements for the AP1000 NPP design. Further, Dr. Rizzo has confirmed that the interface conditions are satisfied for the Progress Energy Levy County and Shearon Harris Sites, the Southern Services Vogtle Site, the Duke William States Lee Site, and the South Carolina Electric and Gas Summer Site.

November 2005 – 2006

Arkansas Nuclear One, Entergy – Entergy, Arkansas:

Dr. Rizzo is the firm's Principal-in-Charge for work at this site. RIZZO is specifically working with Entergy's on-site engineers to (1) confirm the adequacy of the Service Water Pond and impounding dike and (2) develop a new Service Water Pond that will assure long term viability of the plant's service water. This work has involved close interaction with the USNRC Staff, as this work is in direct response to challenges raised by the Staff.

June 2003 – October 2004

**Nuclear Facility Siting Projects – Westinghouse Electric
Company, China AP1000 at SanMen and Haiyang Sites,
China:**

Dr. Rizzo has been the Principal-in-Charge for RIZZO's role in the Westinghouse initiative to sell AP1000 units in China. He has been responsible for adapting the AP1000 to the SanMen, Yangjiang, and Haiyang sites, including site layout and compliance with the AP1000 Plant Parameter Envelope (PPE). He has worked with the Owner's engineers in China and has advised of deficiencies and additional field work to be performed. RIZZO reviewed each site per the PPE (meteorology, geology, seismic, foundation conditions, flood, and levee protection). RIZZO supported the concepts and costing for cooling water intake, discharge cooling, tunneling options, and tie-in of the plant site to local infrastructure.

November 1985 – April 1987

**Krško and Prevlaka NPP – Westinghouse Electric
Corporation, Yugoslavia:**

Dr. Rizzo was Principal-in-Charge for site characterization and seismic hazard analysis, including capable fault investigations for these two nuclear plants in Yugoslavia. Krško is still operating, but Prevlaka was stopped in the 1980s. The services included both site selection and site characterization using U.S. Nuclear Regulatory Commission criteria. Both sites, located along the Sava River, are deep soil sites influenced by capable faults within 100 km.

For Krško, Dr. Rizzo participated at the outset of design and in construction of the project. Initially, RIZZO advised Westinghouse during the contract negotiations and on all matters related to siting, capability of faults, seismic design parameters, cooling water alternatives, foundation design, dewatering, settlement and bearing capacity, and liquefaction analysis.

During construction, RIZZO provided on-site inspection and consulting services related to the deep excavation, dewatering, and foundation construction.

For Prevlaka, Dr. Rizzo supervised the study of foundation concepts for the site. He evaluated foundation problems associated with potential liquefaction on the top layers of sand under seismic excitation and consolidation of underlying clay layers.

June 1984 – April 1987

Nuclear Facility Siting Projects – Westinghouse Electric Corporation, China:

Dr. Rizzo was Principal-in-Charge for technical consulting services for the site characterization of several proposed nuclear facilities. These services included both site selections and site characterizations using USNRC criteria. Aspects considered included geotechnical engineering, seismology, surface water and groundwater issues, geology, and meteorology.

December 1985 – November 1986

River Bend Nuclear Station – Louisiana:

Dr. Rizzo performed an assessment of the seismic margin for the structures and components of the Category I building structures, piping systems and equipment, and components of the plant. The assessment comprised a review of FSAR and other design documents, a plant walkdown, review of the seismic design basis, review of the design of reinforced concrete and steel structures, reevaluation of soil-structure interaction parameters, dynamic seismic reanalysis, reassessment of floor response spectra, and review of the design of piping systems and equipment supports with emphasis on up-to-date methodologies for seismic analysis.

June 1985 – July 1985

EI Dabaa NPP – Westinghouse Electric Company, Egypt:

Dr. Rizzo served as Principal-in-Charge for this project, which established appropriate rock-structure-interaction (RSI) parameters to be used by Westinghouse in the computation of the seismic response of EI Dabaa NPP structures. RIZZO developed stiffness and energy dissipation coefficients for the Reactor Containment Building, the Auxiliary/Control Building, the Fuel Handling Building, and all Safety Category I structures. RIZZO reviewed the subsurface investigation reports to establish the site profile and the properties of the rock layers. Our staff conducted the calculation of the RSI coefficients using a frequency-domain technique that accounts for the layered nature of the site.

CIVIL AND GEOTECHNICAL ACTIVITIES

August 2010 – Present

Dry Comal County Creek Flood Retarding Structure – Comal County, Texas:

Dr. Rizzo provided design review services for the proposed Dry Comal Creek Flood Retarding Structure (DCCFS) located in Comal County Texas. The DCCFRS is a 70-foot high Roller Compacted Concrete (RCC) dam currently under construction. The dam will be used for flood protection and was designed by CH2MHILL. The excavation for the foundation of the dam revealed that the subsurface conditions were not consistent with the design assumptions utilized by CH2MHILL. Therefore, the construction was stopped pending a substantial re-design of the dam to address the actual subsurface conditions at the site. Comal County has subsequently

terminated their agreement with CH2MHILL and has hired Freese and Nichols to complete the redesign of the dam. Dr. Rizzo was responsible for performing an independent design review of both the original dam design performed by CH2MHILL and the revised design developed by Freese and Nichols.

January 2009 – April 2011

Wyaralong Dam – QWI, Brisbane, Australia:

Dr. Rizzo was a member of the Board of Consultants for the design and construction of the new Wyaralong Dam, in Queensland, Australia, south of Brisbane, completed in early 2010 and served as Principal-in-Charge for the conceptual design for this new RCC dam. RIZZO's responsibilities included: stability analyses and optimization of the cross section of the proposed dam, RCC design details, and interpretation of geotechnical data. During the Dam Design Phase, RIZZO was responsible for the sliding stability analysis of the dam and preparation of portions of the design including design of the drainage gallery, dam instrumentation, and foundation preparation details. RIZZO also performed thermal analysis, finite element analysis, and the preparation of specifications.

Wyaralong Dam is an RCC structure with an overflow spillway and a spillway chute on the left abutment. Dr. Rizzo advised on the RCC mix, RCC Design, seismic analysis and seismic design, and the interpretation and accommodation of the jointed and bedded rock in the Dam foundation. He was engaged from the early stages of design throughout construction and then through the startup period.

2009 – Present

Rio Dam Part 12D Inspection – Alliance Energy NY GEN-LLC, Orange and Sullivan Counties, New York:

Dr. Rizzo is the Principal-in-Charge for this Part 12D Safety Inspection. The Rio dam is approximately 1,500-foot long and impounds approximately 3,650 acre-feet of water. The dam was constructed to generate electrical power, producing approximately 31,000 MWh of power annually, and normally operates in times of peak demand when sufficient flow is available. RIZZO's Scope includes: inspecting the dam and associated structures; reviewing and evaluating piezometer and weir data for the project to determine if instrumentation is monitoring potential failure modes of the dam adequately, including preparing time histories and correlation curves for each instrument; and preparing a stability analysis for the concrete spillway; and writing the Part 12D Report submitted to the Federal Energy Regulatory Committee (FERC).

2006 – Present

Osage Hydroelectric Project Part 12D Inspection and Follow-up – Ameren Missouri, Missouri

Dr. Rizzo was the Independent Consultant for the FERC Part 12D Inspection for the Osage Project including conducting a Potential Failure Modes Analysis (PFMA). The Osage Project consists of Bagnell Dam, a 2,540 foot long, 150 foot high concrete gravity dam. The total watershed area is 14,000 square miles and includes five major US Army Corps flood storage reservoirs. Instrumentation at Bagnell Dam includes piezometers, crack movement gages, alignment surveys, and foundation drains.

The Part 12 inspection was a comprehensive evaluation of the project and included a review of the stability analyses, hydrologic and hydraulic

information, instrumentation, and operation and maintenance. An inspection report was prepared for submittal to the FERC. The Supporting Technical Information Document (STID) and PFMA report were prepared concurrently with the Part 12 Inspection Report. RIZZO also has performed or is performing work recommended in the Part 12 Report. The major projects include installation of additional piezometers, a re-evaluation of the Probable Maximum Flood (PMF), and an updated stability analysis.

June 2004 – Present

Blue Ridge Dam and Appurtenances – Tennessee Valley

Authority, Blue Ridge, Georgia:

The Tennessee Valley Authority retained RIZZO to remediate the intake tower, dam, and penstock of this dam. As Principal-in-Charge, Dr. Rizzo supervised the detailed inspection and geotechnical investigation during the 2003 Outage and Lake Drawdown. In order to obtain all necessary information, RIZZO is considering several remediation schemes for the tower, and is proceeding with design and implementation for a re-lining of the penstock.

October 2010 – December 2010

Margarita Export Line Tunnel – Repsol, Bolivia:

Dr. Rizzo served as Principal-in-Charge for a 3-m diameter tunnel through the sub-Andes Mountains in southern Bolivia. The Final Design has been completed by RIZZO, and a bid package has been delivered to the Client. When constructed, the tunnel would be nearly 2-km long and will carry a liquefied natural gas pipeline. Dr. Rizzo developed the conceptual tunnel design, conceptual geotechnical investigation program and provided technical guidance throughout the detailed design phase.

January 2006 – April 2010

Taum Sauk Upper Reservoir – Ameren Missouri, Lesterville, Missouri:

Dr. Rizzo served as Principal-in-Charge of the conceptual design of the re-build. RIZZO has analyzed and developed various options to re-build the project. The rebuild of the dam consisted of the construction of an RCC dam approximately 100-foot high and 6,600 feet long, consisting of 2,838,215 cubic yards of RCC. The following tasks were successfully completed:

- Developed the design basis for a complete re-build of the Upper Reservoir Dam;
- Developed Construction Drawings and Technical Specifications for the re-build;
- Supervised a site-specific Roller Compacted Concrete Mix Design Program;
- Developed a formal Environmental Report;
- Assisted in the design of the Level Protection and Control System for dam safety and plant operation;
- Developed a Dam Safety Surveillance and Monitoring Program;
- Prepared the Reservoir Refill Plan;
- Developed remedial designs for the water conveyance system at the plant included the vertical shaft, unlined tunnel, and unlined tunnel;
- Developed the grouting program for the new dam; and

- Provided continuous engineering support throughout construction.

Dr. Rizzo served as Principal-in-Charge of the detailed forensic engineering investigation to determine the causes of the failure of this kidney shaped rockfill rim dike. RIZZO's analysis included stability and seepage, dam breach (to determine time of failure), complete review of instrument control systems, sediment transport, detailed mapping of breach zone, and drilling and sampling of remaining portions of the dike.

Dr. Rizzo served as Principal-in-Charge as RIZZO was also the Construction Manager for this \$300 million project.

2007 – May 2009

Bear Creek Dam Rehabilitation – Tennessee Valley Authority, Hodges, Alabama:

RIZZO was selected to investigate, design, and provide oversight for the construction of this project. Dr. Rizzo was the Principal-in-Charge for the engineering and design for the rehabilitation of Bear Creek Dam. RIZZO's responsibilities include; preparing reports, work plans, cost estimates, and technical specifications; performing stability analyses for the dam; developing design drawings; and managing the overall preparation of all design documents.

March 2003 – 2009

Upstream Volobe Hydroelectric Power Project – U.S. Trade & Development Agency, Ivondro River, Toamasina, Madagascar:

Dr. Rizzo was Principal-in-Charge to perform a Feasibility Study for a proposed hydroelectric power project to be located on the Ivondro River near Toamasina, Madagascar. Upstream Volobe will generate approximately 418 gigawatt hours of energy each year. The project configuration impounds a reserve of water with a new dam/dike system with transport of water via an intake structure at the dam, an underground tunnel, and an above ground penstock to a powerhouse. The project will deliver power to the Toamasina Grid. The project Scope of Work consisted of environmental review, conceptual design of the project features, civil works; mechanical and electrical equipment; transmission line and interconnection equipment; project schedule; capital costs; electricity market conditions in Madagascar; project risks; and financial model.

January 2005 – December 2006

Lotru-Ciunget Hydropower Plant Refurbishment Project – Bucharest, Romania:

Dr. Rizzo served as the Independent Foreign Consultant for this project. He assisted the owner on this IBRD project with preparation of bidding documents, procurement, tender evaluation, contract negotiation, and provided construction Management Training to the Utility Owner.

2005 - 2006

FERC Operation Inspections – FERC New York Regional Office:

Dr. Rizzo was the Principal-in-Charge for the triennial operation inspections for over 30 low-hazard hydroelectric facilities under the jurisdiction of the New York Regional Office of the Federal Energy

Regulatory Commission (FERC). The work was performed as part of a nation-wide pilot project for the FERC. The inspections consisted of a visual inspection of the projects and a review of all available documentation at the facilities and in the FERC New York Regional Office files. RIZZO prepared draft FERC Operation Inspection reports for the projects which addressed dam safety, public safety, security, environmental, and license compliance issues. Final reports were prepared addressing comments provided by FERC. The project also included a project kickoff and project closeout meetings held at the FERC New York Regional Office.

July 1990 – September 2005

Saluda Dam Remediation – South Carolina Electric and Gas, Columbia, South Carolina:

Dr. Rizzo served as the Principal-in-Charge for the site investigation and remedial design for a backup to a “puddle” type hydraulic fill dam constructed in the 1930s. His responsibilities included supervision of the static slope stability analyses, dynamic slope stability analyses, and liquefaction and deformation analyses. He worked with the FERC to define the seismic hazard and seismic design criteria. Based on the results, Dr. Rizzo led the development of alternate remediation schemes. This \$275 million remediation project focused on the construction of a backup berm at the toe of the dam. It is approximately the same length, 7,800 feet, and height, 211 feet, as the existing dam. The project was the largest dam during construction in the country, with the placement of 1.3 million cubic yards of RCC and 3.5 million cubic yards of rockfill. RIZZO also served as Construction Manager for the project. This project was awarded the 2006 OPAL Award for Engineering Excellence, as presented by the ASCE (international competition).

February 2002 – October 2004

Hidrosuroeste/Hidroven Dam – USTDA, Tachira State, Venezuela:

As Principal-in-Charge, Dr. Rizzo directed a review of the watersheds for water availability, current and projected demand, and storage requirements. He developed the conceptual design of the dams, channels, water treatment facility, and pipeline and pumping stations, which will deliver into an existing distribution infrastructure. This Feasibility Study was funded by the USTDA for a Water Supply System for cities in the west of Tachira State. RIZZO evaluated several watersheds for a series of dams and water storage with integration into the existing Hidrosuroeste facilities. The project area is subject to seismic activity, severe storms, and landslides. The Scope of Work also included site study, review of geology, fieldwork, conceptual design of key structures, specifications, costing, project financials, and environmental review.

July 2001 – October 2004

Beirut Central District Waterfront Reclamation Area – Solidere, Beirut, Lebanon:

As Principal-in-Charge of the Feasibility Study, Dr. Rizzo supervised the conceptual land use plan, interpretation of hydraulic model test results, assessment of the environmental risks of constructing on the former landfill areas, assessment of the seismic risk in Beirut, assessment of the behavior of road and buried piping constructed on, or within, the reclaimed land, and established the methods of support for buried piping, cable, conduit, and fiber optic cable in the reclaimed land.

July 1999 – October 2004

Egypt Valley Recreational Lake and Dam – Ohio Department of Natural Resources, Belmont County, Ohio:

Dr. Rizzo was Principal-in-Charge of the Feasibility Study, design, permitting, and detailed design (including construction documents) for a dam to impound a recreational and fishing lake at a watershed that occupies 1,500 acres of prior strip-mined land in the Egypt Valley Wildlife Area. The project included field investigation and design of a dam, outtake, emergency spillway, and recreational features.

April 1988 – October 2004

Santee Cooper Project, East Dam and East Dam

Extension – Santee Cooper, Moncks Corner, South Carolina:

Dr. Rizzo served as Principal-in-Charge of the investigation for this rolled earth dam on a loose sand foundation. He supervised the static and dynamic slope stability, liquefaction and deformation analyses. He worked with the FERC to define the seismic hazard and the associated seismic design criteria. Based on the results, he led the development of alternate remediation schemes and performance of a stone column pilot test program.

May 2004 – July 2004

Blenheim-Gilboa Pumped Storage Project – New York Power Authority, Gilboa, New York:

Dr. Rizzo was the Principal-in-Charge for the duration of this \$700,000 design effort and 1,000 MW pumped storage plant. He focused on correcting slope movement that threatened interruption of the main transmission line and failure of a plant access road. Dr. Rizzo's thorough evaluation of the local geology and existing aerial infrared photography revealed the presence of an ancient landslide. Under his direction, subsurface investigations were conducted to confirm the presence of the ancient slide and fully define the subsurface conditions. Remedial efforts were focused on stabilizing the toe of the slope that could catastrophically fail and threaten the transmission line. The "fix" included both surface drainage improvements and a toe berm of about 400,000 cubic yards. The project results concluded that slope movements previously recorded, at about 2-inches per year over the last 20 years, were virtually eliminated. Total construction costs were about \$5 million.

2002 – 2004

Second Avenue Subway – DMJM + Harris, New York City, New York:

RIZZO served on a team of consultants for the Second Avenue Subway Project in New York City. Dr. Rizzo acted as the Chairman of the Geotechnical Advisory Board, which provided an independent review of the overall design and construction philosophy.

June 2002 – November 2003

Mine Subsidence Investigation – Confidential Client:

In an ongoing civil suit, RIZZO was hired to determine whether the operations of a mining company caused significant subsidence and are responsible for damage done to a nearby residence. Duties have included site investigations, the development of an extensive ground monitoring system to establish any continuing movement, and the development of a

core boring plan to assess geologic conditions beneath the structure in question. Future duties include the use of specialized software to assess the predicted subsidence due to the proximity of mining operations, as well as preparing a final report to be entered as expert testimony.

September 2000 – September 2003

Boskov Most Hydropower Plant – USTDA, Macedonia:

Boskov Most collects water from the mountains of the Mala Reka watershed via a system of intakes, channels, and siphons with transport to a headrace tunnel. The elevation head is such that water will flow back up or down through a 9 km headrace tunnel and fill a dam during non-generating hours; during generation hours, it will help the dam feed the powerhouse Pelton Wheel turbines. As Principal-in-Charge, Dr. Rizzo optimized and detailed the design concept from a run-of-the-river design to a 70 MWe design, operating during peak generation hours. The Final Feasibility Study also included review of field investigation, seismic criteria, cost estimates, financial analyses, major component qualification, and an environmental and regulatory framework reviews.

January 2003 – March 2003

Charleston County Courthouse – County of Charleston, Charleston, South Carolina:

As part of the renovation and restoration of this historical building, RIZZO provided structural, geotechnical, and civil engineering services for the exterior stabilization and seismic rehabilitation. Dr. Rizzo served as the geotechnical lead and overall lead reviewer for the project. The County of Charleston retained RIZZO to coordinate and monitor the work related to the stabilization, serving as the construction administrator.

November 2002 – February 2003

Mapocho and Molina Hydroelectric Plants – Chile:

Dr. Rizzo has served as Principal-in-Charge for the geologic investigations and seismic design review. His responsibilities included completing the general layout and design of the daily storage pond; civil works such as intake structures, canals, forebays, penstocks, and powerhouse; and specifications of hydro machinery, electrical equipment, and switch yard. Specifications have been prepared to support cost estimates. The Environmental Assessment has been completed per World Bank and per Chilean EIS requirements. Permitting is proceeding.

July 1988 – January 2003

Stevens Creek Hydroelectric Project – South Carolina Electric and Gas, Georgia:

As Principal-in-Charge, Dr. Rizzo led the investigation of this overflow type gravity concrete dam. He performed sliding and overturning stability analysis, including PMF and seismic conditions, definition of the seismic hazard and seismic design criteria, development of alternate remediation schemes, and design of a rock anchor system.

September 1988 – September 2002

Carpenter Dam – Entergy, Inc., Hot Springs, Arkansas:

Dr. Rizzo served as Principal-in-Charge for the site investigation and remedial design of this arched gravity concrete dam. His responsibilities included sliding and overturning stability analyses, including PMF and

seismic conditions, definition of the seismic hazard and seismic design criteria development.

February 2000 – December 2000

Alcona, Loud, Five Channels, Cooke, and Foote

Hydroelectric Part 12D Safety Inspections– Consumers Energy, Various Locations, Michigan:

Dr. Rizzo was the lead Independent Consultant for the completion of the FERC Part 12D Safety Inspections of the Alcona, Loud, Five Channels, Cooke, and Foote Dams owned by Consumers Energy. RIZZO performed the Part 12 Safety Inspections for all five dams. The inspections included an assessment of the structural integrity, evaluation of the Spillway adequacy and stability analyses, and recommendations to improve operations at each Project; and working with a diver to inspect the draft tubes of the Powerhouses and a sounding survey team for the downstream aprons. The inspections revealed that the embankment at Five Channels Dam contained voids and RIZZO was retained to locate, evaluate, and oversee the repair of the voids. RIZZO also performed a detailed evaluation of the adequacy of the primary and emergency Spillways at Loud Dam.

November 1999 – November 2000

Kayuta Lake and Ogdensburg Hydroelectric Plants FERC Part 12 Inspections – Algonquin Power, Ontario:

As Civil Engineer, Dr. Rizzo performed the 2000 FERC Part 12 Independent Consultant's Dam Safety Inspection Reports at the Kayuta Lake and Ogdensburg Hydroelectric Projects. He inspected the project works and assessed the structural integrity, evaluated the spillway capacity, and reviewed the stability analysis at each project. As part of the inspection, he performed a dye test to determine the possibility of structural leaks. Dr. Rizzo managed the preparation of the Inspection Reports and the "Appendix D" for each project.

December 1988 – December 1995

Carbon Limestone Sanitary Landfill – Browning Ferris Industries of Ohio, Ohio:

RIZZO permitted a 600-acre expansion at the Browning-Ferris Industries of Ohio facility. The Permit Application included excavation and final grading plans, development sequencing, design details, operation plans, and Quality Assurance Plans. RIZZO has provided QA services for every phase of construction since the landfill began operation. In 1996 and 1997, RIZZO designed and provided construction QA for the initial capping and supervised the installation of a new landfill gas recovery system.

May 1993 – September 1995

Solid Waste Management Plant – Sedesol, Mexico:

Utilizing the proceeds of a World Bank loan, Mexico began a nationwide diagnostic analysis and master planning effort for solid waste management as part of the 100 Cities Program. RIZZO conducted the program for Mexico under the overall direction of the World Bank and addressed the needs and issues for 50 cities. Dr. Rizzo oversaw the conceptual plan, including landfill design, for the 25 cities requiring the most immediate attention.

January 1994 – May 1994

Swinging Bridge Dam – Orange & Rockland Utilities, Sullivan County, New York:

Dr. Rizzo was a member of the Board of Consultants for the repair and remediation of Swinging Bridge Dam, a part of the Mongaup Falls Hydroelectric Project in the northeastern USA. He served as Principal-in-Charge of the investigation of this “puddle-type” hydraulic fill dam to assess the potential for settlement-induced buckling of the penstock through the dam. Dr. Rizzo performed the slope stability analysis, settlement and deformation analysis, and development of alternate remediation schemes.

The Project is regulated by the United States Federal Energy Regulatory Commission and the New York Department of Environmental Protection. The upstream slope of the hydraulic fill Dam was damaged due to a sinkhole which developed as a consequence of a major leak in a tunnel/penstock that runs through the Dam. The overall stability of the Dam was threatened and piping was already in progress when the reservoir was lowered.

December 1991 – February 1994

Buckeye Lake Dam – Ohio Department of Natural Resources, Ohio:

Dr. Rizzo served as Principal-in-Charge for this geotechnical and slope stability investigation. RIZZO conducted an independent analysis of the pre/post remediation stability of the dam during normal surcharge pool loading conditions. He characterized the soil strength parameters and phreatic surface at cross section locations along the 4.1-mile long earth dam. RIZZO staff used the parameters to develop slope stability models, perform seepage evaluation, and conduct stability analyses.

October 1989 – February 1994

Capels Rail Haul Transfer Station – Berwind Natural Resources, Pennsylvania:

The transfer station for the Capels Landfill involved the design of a facility to transfer 10,000 tons per day from dedicated hopper cars, box cars, and gondolas to off-road, custom-designed articulated haulers. The facility involved a railroad yard to accommodate 180 cars, 2 rotary car dumpers, a bailing operation, and a reloading facility. RIZZO completed all of the conceptual design and permit applications for the facility, the rail yard and access roads, and specified the design of the dedicated rail cars and off-road haulers.

July 1990 – December 1992

Remmel Dam – Entergy, Inc., Hot Springs, Arkansas:

Dr. Rizzo served as Principal-in-Charge for this site investigation and remedial design of this buttress Ambursen dam. He conducted sliding and overturning stability analyses, including PMF and seismic conditions, definition of the seismic criteria, and the development of alternate remediation schemes. Through negotiations with the FERC, Dr. Rizzo conducted the design of a conversion of the buttress dam to a concrete gravity dam with supplemental anchors.

June 1984 – December 1992

Youghiogheny Hydroelectric Plant – D/R Hydro, Confluence, Pennsylvania:

RIZZO performed the design, finance, and construction management of the complete two-unit 12 MW Plant with vertical Francis units. Dr. Rizzo served as both Owner and Principal-in-Charge of this project. His work included major pump-over diversion, lining and grouting an 18-foot diameter rock tunnel, a penstock bifurcation, gate structure, river cofferdam, road construction and seven miles of transmission line. In addition, Dr. Rizzo prepared all project financial analysis, licensing with the Federal Energy Regulatory Commission, and permitting with all state agencies and the Corps of Engineers.

October 1990 – November 1990

Discovery Mountain/Magic Kingdom, Disneyland Paris – Walt Disney Imagineering, Villa-De-Marne, France:

RIZZO was retained by Walt Disney Imagineering to perform settlement analyses in association with the construction of the Casey Jr. Ride at the Magic Kingdom site, and to investigate the geotechnical considerations associated with the design of the Discovery Mountain attraction at Disneyland Paris in Marne-La-Ville, France. Dr. Rizzo served as Principal-in-Charge on this project.

April 1990

Buckeye Pipeline Failure – U.S. Department of Justice, Pennsylvania:

The Buckeye Pipeline failure involved the failure of a petroleum products pipeline discharging into a tributary in the Allegheny River, north of Pittsburgh. This failure caused the shutdown of several water supply treatment plants. Dr. Rizzo supervised the post-failure slope stability investigation where the pipeline failed. RIZZO resolved whether the pipeline caused the slope failure or the slope failure caused the pipeline to fail.

February 1986 – January 1990

Imperial Landfill – Browning Ferris Industries, Pennsylvania:

RIZZO developed the concept of expansion for this operational landfill during a time period when the Pennsylvania solid waste regulations were being re-written in accordance with Sub-Title D Regulations. Several options, including the preparation of financial pro formas for expansion, were considered during the course of the work. Ultimately, we permitted the landfill for a 140 acre expansion, which is currently in operation.

July 1987 – August 1988

Fairfield Pump Storage Project – South Carolina Electric & Gas, Columbia, South Carolina:

Dr. Rizzo has served in multiple roles for this project since its inception in the early 1970s to the present. His efforts began as a member of the Federal Energy Regulatory Commission (FERC) Board of Consultants, which reviewed and analyzed the original concept and layout, through all of the engineering, construction, start-up, and operation. Later, Dr. Rizzo served as Principal-in-Charge of FERC Part V inspections and follow-up investigations of dam stability, concrete deterioration, and powerhouse leakage. He continues to stay apprised of reservoir-induced seismicity at the project.

March 1988

Paris Metro – Grand Palais Segment, France:

Dr. Rizzo served as Principal-in-Charge of the investigation and analysis/design of a segment of the Paris Metro that runs adjacent to the Grande Palais, Petite Palais, and Le Pont Alexandre III in downtown Paris, France. Dr. Rizzo took special design considerations because of settlement of historical structures, vibrations in the two art museums, and the impact on the imposing Horsemen Sculptures at the ends of Le Pont Alexandre III. RIZZO constructed this segment with soft ground tunneling techniques with injection grouting being required adjacent the River Seine near Le Pont Alexandre III.

December 1984 – November 1987

Columbia Dam – South Carolina Electric and Gas, Columbia, South Carolina:

RIZZO converted this timber crib dam to a gravity dam. As Principal-in-Charge, Dr. Rizzo conceived the "fix" for the dam and supervised the design. He conducted negotiations with Federal and State Dam Safety Officials, environmental regulators, and historical preservation groups.

March 1985

Rio Dam – Orange & Rockland Utilities, Sullivan County, New York:

RIZZO stabilized an arch gravity dam with anchors and a hydraulic fill dam subject to liquefaction. As the Principal-in-Charge, Dr. Rizzo conceived the "fix," led all communication and negotiation with regulators, supervised the design, and negotiated with contractors. RIZZO resolved all FERC comments associated with previous stability analyses and developed remedial measures to ensure that all sections of the dam meet current FERC criteria. Twenty-one 2,600 kips, post-tensioned rock anchors, were installed to stabilize the spillway section of the dam.