



Mark P. Molinari, LG, LEG, LHG

Senior Project Geologist

Overview

Mr. Molinari provides senior level technical services and project management for geologic and seismic hazard investigations, engineering geology and hydrogeologic studies, and geology/hydrogeology evaluations for environmental impact studies/reports and permit applications. His expertise includes performing geologic and seismic hazard field studies and data evaluation; development of seismic source models for probabilistic and deterministic seismic hazards analyses for onshore and offshore engineered structures; and evaluation of landslides, subsidence and surface fault displacement potential. He joined URS (formerly Dames & Moore) in 1983. His experience includes the following projects:

Areas of Expertise

Engineering Geology
Geologic and Seismic Hazards
Hydrogeology/Environmental
Geology

Years of Experience

With URS: 22 Years
With Other Firms: 1 Year

Education

M.S., Geology, University of
Nevada, Reno, 1984
B.A., Geology, University of
California, Santa Barbara, 1980

Registration/Certification

Professional Geologist, California
#4483, Nebraska #G-0274
Certified Engineering Geologist,
California #1412
Licensed Geologist,
Hydrogeologist, Engineering
Geologist, Washington #351

Project Specific Experience

Liquefied Natural Gas Projects

- Field manager and co-principal investigator for an extensive geoseismic investigation for a proposed Liquefied Natural Gas marine terminal facility in south-central Alaska. Conducted site specific and regional field studies to: (1) determine the structural geology of the site, (2) evaluate active and potentially active faults and the Aleutian subduction zone in the site region, and (3) assess the potential for surface faulting at the site. Detailed Quaternary mapping and stratigraphic evaluation, trenching, tephrochronologic and radiocarbon dating methods, and geomorphologic correlation were used to confirm the presence/absence of Quaternary faults and constrain the age of most recent surface faulting and paleoseismic events on the subduction zone. Developed a source model for the seismic hazard analysis in accordance with Federal siting criteria, and principal co-author of the report reviewed and approved by FERC.
- Developed a seismic source model for a probabilistic seismic hazard analysis of a proposed LNG terminal site in Long Beach, California for submittal to FERC. Assessment was based on existing seismologic and geologic data, as well as site-specific geotechnical data. Project also included assessment of tsunami hazard.
- Provided independent technical review of a PSHA for a potential LNG site offshore Southern California.
- Developed a seismic source model for a probabilistic seismic hazard analysis of two proposed LNG terminal sites in northern Baja California, Mexico. Performed field investigation of active faults on and near the sites and assessed other potential geologic hazards. Also assessed geologic and seismic hazards for a



proposed, 70-km long natural gas pipeline associated with the LNG sites. Prepared portions of the reports related to site geology, geoseismic hazards, and the seismic source model.

- Project manager for a geotechnical, and geologic and seismic hazard assessment of five potential LNG terminal sites in Alaska: three on Cook Inlet and two in Port Valdez. Assessment was based on existing seismologic and geologic data. Project included assessment of tsunami and volcanic hazards and identification of data gaps and studies that would be needed to meet FERC siting criteria. Performed a preliminary fault rupture hazard assessment for a potential pipeline route to the Cook Inlet sites.
- Performed preliminary seismic hazard assessments of a potential LNG terminal site and onshore oil and gas processing facility site on Sakhalin Island, Russia based on existing seismologic and geologic data. Identified data gaps and studies that would be needed to meet U.S.-equivalent siting criteria. Reviewed scope and preliminary reports prepared by Russian geologists for site-specific investigations.
- Developed a seismic source model for a probabilistic seismic hazard analysis of a proposed LNG terminal site in southern Luzon Island, Philippines. Performed field investigations of active faults near the site and in the region, and assessed potential geologic and volcanic hazards at the site. Prepared portions of the report related to site geology, geoseismic hazards, and the seismic source model.
- Performed a seismic hazard assessment of a potential LNG terminal site in southeastern China based on existing seismologic and geologic data, including review of site specific geologic, geophysical, and geotechnical reports.
- Performed preliminary geologic and seismic hazard assessments of a potential LNG terminal site in northern California to assess whether there are potential fatal flaws.
- Performed geologic logging of extensive trenches to evaluate faults at the Pt. Conception proposed LNG terminal site in Santa Barbara County, California. Assisted with preparation of report submitted to and approved by FERC. Provided technical support to senior personnel during FERC testimony.

Oil and Gas Projects

- Performed geologic and active fault hazards investigation for the Front End Engineering and Design (FEED) of an approximately 370km long proposed gas pipeline route in Papua New Guinea. Performed a preliminary geologic and seismic hazard assessment



of the onshore route, as well as a potential offshore route and export platform, for pre-FEED decision making on the project.

- Assessed geologic and seismic hazards and prepared report text for the EFSEC application for the proposed Cross Cascade pipeline route in western and central Washington. Performed field and aerial reconnaissance of the route. Provided expert testimony regarding geologic and seismic hazards for state licensing hearings.
- Developed a seismic source model for an updated probabilistic seismic hazard analysis of the Trans-Alaska Pipeline System.
- Performed preliminary fault rupture hazard and liquefaction susceptibility assessment of two potential gas pipeline routes in Alaska.
- Developed a seismic source model for a probabilistic seismic hazard analysis of a proposed offshore platform and associated 800-km onshore/offshore pipeline in the Philippines. Assessed geologic, volcanic, and seismic hazards for the onshore portion of the route and the tsunami hazard at the marine terminal.
- Developed a seismic source model for a probabilistic seismic hazard analysis of a proposed offshore platform in eastern Canada.
- Evaluated geologic and seismic hazards for a proposed oil and gas pipeline route and developed a seismic source model for two offshore oil/gas platforms near Trinidad and one offshore northern Colombia.
- Evaluated geologic and seismic hazards for a proposed oil/gas platform offshore of Borneo
- Developed a seismic source model for a probabilistic seismic hazard analysis of: (1) a refinery and associated onshore pipeline crossing most of South Korea and (2) a planned pulp mill in Chile, (3) a petroleum refinery in Turkmenistan, and (4) a proposed polyethylene plant in the Philippines.
- Preliminary geologic and/or seismic hazards assessment for an 800+ km long oil pipeline and associated offshore loading facility in Cameroon, West Africa, a gas pipeline in Thailand, and an offshore gas pipeline in the S. China Sea.



Southern California Projects

- Seismic source characterization and development of seismic source models for deterministic seismic hazard analysis of two existing earthfill dams and a planned new dam in Owens Valley, California. Conducted field investigations to evaluate the potential for surface faulting on the Owen Valley fault zone at one dam site, and the potential for surface fault rupture and other geologic hazards at the other dam sites. Reviewed and updated seismic source models for two existing dams and the new dam.
- Geologic and/or seismic hazards investigations in southern and central California for 12 hospitals and schools, numerous commercial and industrial buildings, a refinery, a hazardous materials storage tank, a pier at the Port of Los Angeles, and a water treatment facility.
- Seismic hazard analysis for hazardous waste surface impoundments at six southern California power plants located in Long Beach, Seal Beach, Redondo Beach, El Segundo, and Oxnard (2).
- Developed and refined an integrated seismic source model for southern California for probabilistic seismic hazard analyses of various projects throughout the region.
- Developed seismic source models for probabilistic seismic hazard analyses of several offshore oil platforms in the Santa Barbara Channel, California.
- Geologic, seismic hazards, and hydrogeologic investigation of a proposed Class III, 500-acre landfill site in Ventura County, California, including an extensive trenching investigation and biostratigraphic analysis to assess inferred splays of a nearby active fault.
- Geologic hazards and fault investigations for an EIR for a proposed 6,700 acre mixed use development in Riverside County, California including identification and evaluation of previously unidentified Quaternary reverse faults.
- Trenching investigation of San Jacinto fault zone to resolve differences in interpretation by two prior consultants on the presence/location of the fault at a development site.
- Evaluated surface fault displacement potential at several aqueduct and pipeline crossings of the San Andreas Fault.
- Field investigation of a possible splay of the Simi fault at a landfill in Ventura County, California



- Seismic hazards assessment for slope stability evaluations of all the pump stations and siphon structures on the Colorado River Aqueduct and the main diversion facility structure which is underlain by the San Jacinto fault.
- Trenching investigation of the Santa Ynez fault in Santa Barbara County, California.
- Engineering geology investigation for an oil and gas processing facility, and geologic hazards study of proposed oil pipeline in Santa Barbara County, California.

Other Projects

- Assessed geologic and seismic hazards and prepared report text for an EFSEC application for a proposed gas-fired power plant in northwest Washington. Provided expert testimony regarding surface fault rupture and other seismic hazards for state licensing hearings.
- Provided seismic source parameters for seismic hazard assessments of a county courthouse, a hospital, and several commercial/industrial facilities in the Puget Sound area of western Washington, a federal hospital in Spokane, and a statewide power transmission system.
- Identified potential seismic sources and estimated maximum magnitudes and source depths for deterministic seismic hazard analysis of a proposed Low Level Radioactive Waste (LLRW) facility in southwest Texas and provided expert testimony for state licensing hearings.
- Developed seismic source models for a nuclear power plant and a dam in Arizona. The power plant source model area included most of Arizona, southern Utah, southern Nevada, southeastern California, and northern Mexico.
- Volunteer assistant on USGS trenching investigation of Seattle fault, Washington.
- Geologic hazard and hydrogeologic evaluation for EIS of proposed research drilling in Katmai National Park, Alaska.
- Evaluated landslide and erosion potential in Cedar River watershed in Washington and developed relative hazard ranking criteria for the City of Seattle.



- Prepared geologic, hydrologic, and seismic sections of EIS for proposed low level radioactive waste (LLRW) disposal facility in Mojave Desert, California.

Senior technical manager of geologic and seismic hazard and/or, hydrogeologic studies for environmental reports (EA, EIR or EIS) and permit applications for:

- Proposed intrastate gasoline pipeline, Washington
- Several gas-fired power plants in Washington
- Commercial redevelopment of a former steel mill, Washington
- Colorado River corridor and Mojave River gas pipeline routes, Arizona and California
- Sand and gravel mining operations in Ventura County, California
- 50-year flood control plan for Las Vegas-Boulder City area, Nevada
- Alternative sand and gravel mining policies for Cache Creek, Yolo County, California
- Expansion of Disneyland, California
- Industrial facility in Clark County, Nevada
- Several cogeneration and power plants in California
- Conducted geologic, seismic, and hydrogeologic studies for numerous environmental reports (EIS, EA, and EIR) for petroleum exploration and processing facilities, petroleum pipelines, a cogeneration plant, and various linear utility systems in California.

Professional Societies/Affiliates

Geological Society of America
Seismological Society of America
Association of Engineering Geologists

Publications

“The Everett Fault: A newly discovered late Quaternary fault in north-central Puget Sound, Washington”, 2003, Molinari, M.P. and Burk, R.L., Geological Society of American Abstracts with Programs, v. 35, #6, p. 479.

“Quaternary geology of the Lower Elwha Valley, Clallam County, Washington”, 2003, Atkins, V.D., Molinari, M.P. and Burk, R.L., Geological Society of American Abstracts with Programs, v. 35, #6, p. 80.

“Random earthquake limiting magnitude and depth for the Basin and Range Province, 2000, Geological Society of American Abstracts with Programs, v.3 2, #7, p. A367.

"Evidence for early Holocene emergence and net Holocene uplift/submergence of Prince William Sound (PWS), Alaska". Molinari,



M.P., Hengesh, J.V., and Patterson, R.H., 1994, Geological Society of American Abstracts with Programs, v. 26, #7, p. A139.

"Opposing senses of Holocene vertical crustal deformation on Montague, Hinchinbrook and Hawkins Islands due to isostatic rebound, subduction zone elastic deformation, and reverse faulting". Hengesh, J.V., Molinari, M.P., and Patterson, R.H., 1994, Geological Society of American Abstracts with Programs, v. 26, #7, p. A139.

"Earth fissures in Lancaster, California: site geologic and geotechnical evaluation and recommendations for future studies in fissure areas". Molinari, M.P., Grivetti, M.C., and Roth, W.P., 1992, Association of Engineering Geologists, Proceedings of the 35th Annual Meeting, pp. 151-164.

"Tectonic geomorphology and paleoseismicity of the Montague Island-Rude River fault zone and Johnstone Bay and Ragged Mountain faults, south central Alaska". Molinari, M.P., Hengesh, J.V., and Patterson, R.H., 1991, Geological Society of American Abstracts with Programs, v. 23, #5, p. A435.

"Four Holocene tephra from the Prince William Sound area, Alaska": Wilbur, S.C., Molinari, M.P., Beget, J.E. and Hengesh, J.V., 1991, Geological Society of America, Abstracts with Program, v. 23, #5, p. A398.

"Large Wisconsin and Holocene glacial history of Port Valdez, Alaska": Wilbur, S.C., Molinari, M.P., and Burke, R.M., 1991. Geological Society of America, Abstracts with Programs, v. 23, #5, p. A62.

"Variable styles of deformation on the San Geronio Pass fault zone, southern California": Molinari, M.P., Donaldson, S.C., Fates, D.G., and Marcus, D.L., 1988, Geological Society of America, Abstracts with Programs, v. 20, #3, p. 217.

"Late Cenozoic structural geology of Stewart and Monte Cristo Valley, Walker Lane of west central Nevada": Molinari, M.P., 1984, in Western Geological Excursions, J. Lintz, Jr. (ed.), Field Guidebook for the 1984 Annual Meeting of the Geological Society of America, Reno, Nevada, p. 219-231.

"Late Cenozoic geology and tectonics of Stewart and Monte Cristo Valleys, west-central Nevada": Molinari, M.P., 1984, M.S. thesis, Univ. Nevada Reno, 124 p.

"Wrench fault tectonics of the southeast margin of the central Walker Lane, west central Nevada", Molinari, M.P., 1983, Geological Society of America, Abstracts with Programs, v. 15, #5, p. 384.