

N. Dean Marachi P.E., Ph.D.

Biographical Data

Dr. Marachi has 34 years of broad professional and academic experience including research and development, professional engineering, project management, teaching, and expert witness testimony.

EDUCATION

Ph.D., Engineering; 1969
University of California, Berkeley

M.S., Geotechnical Engineering; 1966
University of California, Berkeley

B.S., Civil Engineering; 1965
Oregon State University, Corvallis

REGISTRATIONS

Civil Engineer. *Arizona, California, Oregon, Washington*

Geotechnical Engineer, *California*

Registered Environmental Assessor,
California

PROFESSIONAL ORGANIZATIONS

U.S. Society of Dams (USSD)

International Society of Dams (Life Member)

Association of State Dam Safety Officials (ASDSO)

American Public Works Association (APWA)

American Society of Civil Engineers (ASCE)

Bay Area Water Works Association (BAWWA)

International Society of Soil Mechanics and Foundation Engineers (ISSMFE)

Society of American Military Engineers

EMPLOYMENT HISTORY

Consultant

4/2001 – Present

Harza Engineering Company

2/1999 – 4/2001
Senior Partner

The MARK Group, Inc.

6/1984 – 1/1999
Co-founder/President

Converse Consultants

9/1983 – 6/1984
Member of Board of Directors

2/1982 – 6/1984
V.P. and Manager of S.F. Office

3/1979 – 2/1982
V.P. and Manager of Engineering of San Francisco Office

Tehran-Berkeley Consulting Engineers

3/1974 – 12/1978
Co-founder, Managing Director and Chairman of the Board for the firm and subsidiaries, consisting of Nedeco Iran, Ltd., Wimpy Laboratories Iran, Ltd., Tehran-Berkeley/Sounding, Ltd., and Enertec-Energy Technology Consultant, Ltd.

Aryamehr University

1/1973 – 6/1974
Assoc. Professor of Engineering

Converse Davis & Associates

6/1971 – 12/1972
Assistant Chief Engineer

6/1970 – 6/1971
Senior Engineer

5/1969 – 6/1970
Project Engineer

UC – Berkeley

5/1966 – 5/1969
Research Assistant

Dean Marachi Engineers and Planners

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Martinez, CA 94553

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PERSONAL

D.O.B.: 12/27/1941

CITIZENSHIP

U.S.A.

LANGUAGES

English and Parsi

TEACHING EXPERIENCE

Dam Engineering

Earthquake Engineering

Geotechnical Engineering

Groundwater/Seepage

Special seminars on:

- Contaminant Transport
- Environmental Aspects of Soils Engineering

Projects List: Water Market

Biographical Sketch

Educational Background

Dr. Marachi graduated from the most prominent high school in Tehran, Iran, ranking 7th highest amongst 310 students of the graduating class in 1960.

One week after graduation he came to the US. He received B.S. in civil engineering from Oregon State University in 1965. He was granted a tuition scholarship for much of the time he was at OSU. He took all of the geotechnical engineering courses that were offered at OSU as well as courses in geology. He also worked in the soil mechanics laboratory on a research project for USSC to classify all soils in Oregon, and ran complete sets of soil classification tests on nearly 50 different soil types. He also worked/researched for Professor Peterson on the behavior of dis-similar materials, e.g. reinforced wood, and developed a fundamental interest in learning interactive behavior of two dis-similar materials, the effects of boundary conditions, and what happens at the contact. This is a major topic in science and technology, e.g. paint industry, reinforced concrete, lined tunnels, concrete or steel pipelines through earth dams, etc.

He attended UC Berkeley in September of 1965 and received Masters of Science Degree nine months later, and continued his graduate studies and received his

Arch Dams

Big Tujunga	LA County DPW, CA
Combie	Nevada Irrigation District, CA
Concow	Thermolito Irrigation District, CA
Goodwin	Oakdale–S. San Joaquin Irrigation, CA
Hosler	City of Ashland, OR
Hume Lake	US Forest Service, CA
Karun II	IMWP/Acres International, Iran
Los Verjeles	Thousand Trails Corporation, CA
Matilija	Ventura County FCD
Milliken	City of Napa, CA
Salmon Creek	Juno Water & Power, AL
Santa Anita	LA County DPW, CA
Vail	Rancho California Water District
Webber	El Dorado Irrigation District, CA

Embankment Dams

Atochocha	Wahler/Peru
Chacras Decoria	Wahler/Peru
Chincau	Wahler/Peru
Culmback	UD 1 of S.C., WA
Elderberry	LA County DWP, CA
Forest Lake	California American WD, CA
Lake Herman	City of Benicia, CA
Oroville	DWR, CA
Pishin	IMWP, Iran
Pyramid	DWR, CA
Santa Felicia	UWCD, CA
Saw Mill	Pebble Beach PUD, CA
Summit	EBMUD, CA
Warm Springs	USACE, CA
Whale Rock	Whale Rock Commission, CA



Milliken Dam



Pyramid Rockfill Dam

Projects List: Water Market

Biographical Sketch (cont'd)

Ph.D. in May of 1969 (that's only 2 years and 8 months later). In this period he took all courses offered in geotechnical engineering, including:

- Soil mechanics
- Foundation Engineering
- Earth dams
- Seepage and groundwater
- Physico-chemical properties of clays
- Theoretical soil mechanics
- Soil dynamics
- Pavement design
- Field investigations and laboratory testing

For his two minors, as required for the Doctorate degree, he selected geological engineering and physics of the earth/seismology. For the geological engineering minor he took all courses that were offered. Course contents included:

- Air photo interpretation
- Geological mapping and structural analysis
- Geophysical investigations
- Rock mechanics (theoretical, applied, and field and laboratory testing)
- Soil and rock tunneling
- Rock block stability

For the seismology/physics of the earth minor, the courses he took covered the following:

- Plate tectonics
- Mountain building/Isostasy

Concrete/Rollcrete Dams

Folsom	USBR
Los Padres	MPWMD, CA
New San Clemente	MPWMD, CA

Intake/Outlet Structures

Forest Lake Intake/Outlet Tower	California-American Water Company, CA
Lake Herman Reservoir Intake/Outlet Tower	City of Benicia DPW, CA
Miliken Reservoir Tower	City of Napa DPW, CA

Aqueducts

Ahwaz-Sarbandar	IMWP, Iran
Mokelumne	EBMUD, CA
Wiskey Pete	Nipon, CA

Levees

Colusa Basin	USACE, CA
Feather River	USACE, CA
Jones Tract	EBMUD, CA
Old River	CCWD, CA
Sacramento River	USACE, CA
San Francisco/San Pablo/Suisun Bay Levees	USACE, CA
San Joaquin Delta	Calfed Program, CA
San Joaquin Delta Crossing	EBMUD, CA
West Levee	USACE, NV
Woodward Island	EBMUD, CA
Yuba River	USACE, CA



Colusa Basin Levee

Projects List: Power Market

Biographical Sketch (cont'd)

Heat transfer/convection, conduction

Physiography / geomorphology

Wave propagation in solids, liquids, gases

Faulting

Seismicity

Additionally, he audited courses in structural dynamics, computer methods/finite element method of analysis, and statistical thermal physics.

To support himself and his family he also worked as Research Assistant during his graduate studies. Some of the research work he undertook are as follows.

Research for Professor J. M. Duncan was mostly on properties of unsaturated soils, suction pressure in unsaturated soils and its effect on measured permeability, velocity of saturated front as a function of water content. He also worked on the effect of intermediate principal strain (not the stress) on strength of sandy soils. Later he and Prof. Duncan published this work as it had important practical implications in geotechnical engineering.

He also did research for Prof. R. E. Goodman, which included development and stability analysis of a 3-D model of rock block and seepage pressures in the abutments of Malpasset Dam to explain the mechanism of the 1960 failure causing loss of 3,000 lives. He

Hydroelectric

Camino Penstock	Sacramento MUD, CA
Castaic Power Project	Los Angeles DWP, CA
Forks of Butte Penstock and Power Plant	Hypower, Inc., CA
Sand Bar Hydroelectric Project	Sverdrup, CA
Terror Lake Penstock	Morison Knudson, AL

Fossil Fuel

Alameda Cable Crossing	Alameda, CA
Ellwood Generating Station	Southern California Edison
Goleta Generating Station	Southern California Edison
Haynes Power Plant	Los Angeles DWP, CA
Hyperion Power Plant	Los Angeles DWP, CA
Manjil Generating	Kraftwerk Union, Iran
Ray Generating Station	Kraftwerk Union, Iran

Nuclear

Aseismic Design Review of Base Isolation Systems	Int. AEO, Austria
Holister Ranch	Southern California Edison, CA
Inland Nuclear Plant Siting & ESAR	AEOI, Iran
Karun NPP – PSAR	AEOI, Iran
San Onofre	Southern California Edison, CA
Saveh NPP - PSAR	AEOI, Iran
Shiu/Bandar Lengel Siting & ESAR	AEOI, Iran



Forks of Butte



Castaic Power Plant

Projects List: Infrastructure Market

Biographical Sketch (cont'd)

also performed a finite element analysis of stresses in the roof of the underground excavation of the Hyatt Power Plant at the Oroville Dam facility, then under construction, to assess rock bolt requirements for the cavity.

His doctoral research, then under the tutelage of the Late Professor H. Bolton Seed, involved a comprehensive study of strength and deformation properties of rockfill material. This research, estimated at \$20M, was financed through grants from California DWR, National Science Foundation, USBR and a number of other agencies. It included design of highly elaborate testing equipment, instrumentation, and laboratory testing of actual and modeled rockfill material. Results of his pioneering research have been used for confirmation of the design of Oroville and Pyramid dams in California, El Infernilo dam in Mexico, and Tarbella dam in Pakistan, which are all built and working satisfactorily. It is also published and/ or referred to by most text books in geotechnical engineering as well as the US Bureau of Reclamation design manual for dams.

Work Experience

Dr. Marachi started his professional career by working for Converse Davis & Associates in Pasadena, California in May of 1969 as a project engineer. He was



Richardson Bay Bridge

Transportation

Bolinas Road	Marin County DPW, CA
Bushigan Bridge	Pars Water Authority
Centennial Drive Overpass	UC Berkeley, CA
Central Viaduct-SF	CalTrans, CA
Elephant Butte Highway	Idaho DOT, ID
Foothill/I-580 Overpass	City of San Ramon, CA
Fruitvale Draw Bridge	USA COE, CA
Hacienda/I-580 Overpass	City of Dublin/HQE
Highway 12 Bridge	USACE
Minor Road	Contra Costa County DPW, CA
Overhill Road	Contra Costa County DPW, CA
Panoramic Highway	Marin County DPW, CA
Point Reyes Road	Marin County DPW, CA
Richardson Bay Bridge	CalTrans, CA
Rowland Blvd Overpass	CalTrans, CA
Zander Drive	Contra Costa County DPW, CA

Commercial Developments

AAF Properties	Walnut Creek, CA
Airport Plaza Inn	San Francisco, CA
Arbora Homes	Alamo, CA
Audifred Building	San Francisco, CA
Boeing Test Facilities	Seattle, CA
Concord Hilton	Concord, CA
Coyote Point Marina	San Mateo, CA
Fashion Island Shopping Center	San Mateo, CA
Freemont Sheraton Hotel	Freemont, CA
Grayson Development	Pleasant Hill, CA
Hunters Point Residential	San Francisco, CA
Isabel Cook Homes	San Anselmo, CA
Kappas Marina	San Mateo, CA
Lal-West Building	Long Beach, CA
La Mesa Redevelopment Structure	La Mesa, CA
Marriott Hotel	Burlingame, CA
Mission Profes. Plaza	San Francisco, CA
Meadowbrook Residentia	Freemont, CA
Newark Holiday Inn	Newark, CA
Newark Shopping Center	Newark, CA
Oak Knoll Shopping Center	Novato, CA
Park View Terraces	San Pablo, CA
Pilgrim Tower	Pasadena, CA
PT&T Building	Vermont, CA
Rowland Plaza	Novato, CA
San Francisco Holiday Inn	San Francisco, CA
Sebastiani Vineyard	Schellville, CA
Shoreline Center	Sausalito, CA
Supermex Tower	Los Angeles, CA
Village Shopping Center	Corte Madera, CA

Projects List: Infrastructure Market

Biographical Sketch (cont'd)

assigned to work on the Castaic Power Plant project. His work included:

- All rock and soil stability evaluations
- All instrumentation planning and installations
- Design of various sections of the project, e.g. penstocks, manifold structure
- Design (in cooperation with Mr. Chuck Stewart) of the 180 ft. high pump-storage afterbay dam (presently named Elderberry Dam), including:

Seepage analysis for normal operations

Seepage analysis and design of the upstream section configuration for rapid drawdown (52 ft in 65 hrs). This is an extremely high requirement for a dam.

Dynamic finite element analysis allowing for pore pressure generation and dissipation to assess liquefaction potential. This was one of the first such studies done in practice.

For another project, evaluation of seepage through the proposed soil embankment reservoir for City of Industry, Dr. Marachi was the first to utilize the first available version of the finite-element transient seepage computer program, then being developed by Professors Paul Witherspoon and Shlom Newman (then a Ph.D. candidate).

The 9 Feb. 1971 San Fernando earthquake gave him the impetus to perform a number of highly critical and challenging assignments, such as:

Institutional Facilities

All Hallows Community Church	San Francisco, CA
East Oakland Youth Development Center	Oakland, CA
El Monte Municipal Building	El Monte, CA
Glendale Community Hospital	Glendale, CA
Holy Cross Hospital	San Fernando, CA
Jet Propulsion Laboratory	Pasadena, CA
Jones Memorial Homes	Pasadena, CA
Lawrence Livermore National Laboratory	Livermore, CA
Levine General Hospital	San Leandro, CA
Naval Facilities Station	Rough & Ready Island, CA
Pasadena Presbyterian Church	Pasadena, CA
Sandia National Laboratory	Livermore, CA
St. Ann's Church	Union City, CA
UC-Berkeley Campus Slopes	Berkeley, CA
UC-Berkeley Botanical Garden	Berkeley, CA
UC-Irvine Extension Campus	Irvine, CA
Verdugo Community Hospital	Glendale, CA
Vespor Memorial Hospital	San Leandro, CA

Water & Wastewater Facilities

Hyperion Treatment Plant Expansion	Los Angeles, CA
Joseph Jensen Filtration Plant	San Fernando, CA
Proposed Sewer System	Bombay, India
Proposed Wastewater Treatment Site	Pebble Beach, CA
Reclaimed Water Reservoir	Industry, CA
Sewage Transport & Treatment Facilities	Bombay, India
Sewer System Assessment	Camp Pendleton, CA
Sludge Drying Beds	Pittsburg, CA
Sludge Drying Bed Facilities	San Jose, CA
Wastewater Plant Expansion & Cogeneration Facilities	Dublin, CA
Wastewater Treatment Plant	Pittsburg, CA

Projects List: Infrastructure Market

Biographical Sketch (cont'd)

- Detail investigation of liquefaction at Joseph Jensen Filtration Plant and Holt boys camp,
- Dynamic soil amplification study in San Fernando Valley/ portions of a contract for NSF through Professor H.B. Seed,
- Development of the methodology and performance of a large number of site amplification studies using Fourier analysis of the random site motions.

Dr. Marachi successfully applied this method to Holy Cross Hospital which was severely damaged. Subsequently, he applied this method to assess the site amplification at many critical installations, e.g. Goleta and Ellwood power plants, Hyperion treatment plant (expansion), Supermex LNG facility, and many of the critical buildings at the Jet Propulsion Laboratory. He has since used this method to measure the first few natural frequencies of arch dams and intake/ outlet towers to validate/calibrate the computer finite element models of such structures prior to performing exhaustive computational efforts.

In this period Dr. Marachi also developed a method for calculating the statistical probabilities associated with different levels of ground shaking at a given site based on past recorded seismic events within a specified distance from the site. He published it in the International Conference of Seismic Microzonation in 1971. He and some of his colleagues, e.g. David Leads of Dames & Moore, used

Landfills

Aqua Mansa	Riverside County
Balance Rock	Tulare County
Billy Wright	Merced County
Camp Pendleton	Riverside County
C & H	Contra Costa County
Earlinart	Tulare County
Exeter	Tulare County
Evans Road	Colusa County
GBF/Pittsburg	Contra Costa County
Highway 59	Merced County
Holiday Rock	Riverside County
Houston Avenue	Kings County
Kettlemen City	Kings County
Palo Alto	Santa Clara County
Pier 70	San Francisco County
Pier 94	San Francisco County
Pier 98	San Francisco County
San Marcus Landfill Expansion	San Diego County
San Onofre	Riverside County
Stonyford	Colusa County
Teapot Dome	Tulare County
UPI-Site LA	Contra Costa County
UPI-Site LB	Contra Costa County
UPI-Site LB/Class II	Contra Costa County
Woodville	Tulare County

Expert Forensic Services

Biographical Sketch (cont'd)

this method to assess seismic risk for many of the high rise buildings presently in Los Angeles downtown. He also used this method to develop seismic criteria for all buildings in the Jet Propulsion Laboratory in Pasadena, CA. This method was important as it was one of the first methods to use 'probability' to arrive at selecting seismic design criteria. (Later in, 1976, Professors Shah and Karami-djian of Stanford University developed a probability method based on fault activity, and this was later improved by Dr. Norman Abrahamson and is presently being used to develop planning criteria for most important projects, e.g. the new section of the San Francisco / Oakland Bay Bridge.

Dr. Marachi was also very active in various engineering professional societies. He became a member of the SEAOSC committee to rewrite the seismic design section of the Uniform Building Code. He also directed a 12-hr workshop for ASCE members and taught seismicity, faulting, ground motion, liquefaction, wave propagation, and dynamic response to the practicing engineers. He also chaired an ASCE committee for developing practice standards for verification and dissemination of computer programs. He also was one of the first few to become a member of EERI (Earthquake Engineering Research Institute) when such memberships were by invitation only.

General Engineering

Simon Development

Byron, California

Review, deposition, and expert testimony regarding geotechnical and seismological feasibility evaluations of the 840-acre water lot development south of Highway 4 in Byron tract, near Old River on behalf of the plaintiff for development who received \$17M verdict. The ruling was in favor of the plaintiff.

Pacifica Landslide

Pacifica, California



Assistance to defense council for the Homeowners Association to determine potential causes of mud flow which lead to three deaths; including evaluation of surface cover and airphoto interpretation.

University of California

c/o Otis Elevator
Irvine, California

Project Manager for the evaluation and expert "declaration" of causes of ground movement (stress relaxation of soft bedrock foundations) leading to damage to elevator shaft.

San Ramon Bypass

Walnut Creek, California

Expert testimony in the Federal Arbitration Court on behalf of the US Army Corps of Engineers regarding construction claims for the project. The ruling was in favor of the U.S. Army Corps of Engineers.

Linda Levee Break

Yuba County, California

Deposition and expert testimony on behalf of the State of California Department of Water Resources in Superior Court in jury trial of the \$1 billion class action suit regarding February 20, 1986 Linda Levee break.. Services also included investigations, review of documents, preparation of visual aids for presentation at trial, and consultation regarding opinions and conclusions of other experts in the case.

Later, during 2000 and 2001, Dr. Marachi provided additional investigations, expert deposition and testimony in the Inverse Condemnation Complaint. The ruling was, again, in favor of the DWR.



Expert Forensic Services

Biographical Sketch (cont'd)

On the side, he also taught a four unit undergraduate course in soil mechanics and foundation engineering at the Cal State Los Angeles in 1972.

Overseas Experience

Dr. Marachi moved to Iran in January of 1973. At the time the Shah was in power, the Country was pro west, and the local economy was enjoying a twelve percent annual growth in GNP. And there were a half-million American and nearly 1 million European engineers and technicians working on well paying and very interesting developmental projects in Iran.

He started by teaching at the Aryamehr Institute of Technology. This was a tenure track professorial position. He taught courses in:

- Soil mechanics and Foundation Engineering
- Seepage (in groundwater and through dams)
- Earthquake Engineering
- Dam Engineering
- Soil testing - also set up the soil testing laboratory.

In April of 1974 Dr. Marachi and one of his former colleagues from UC Berkeley founded the " Tehran Berkeley Consulting Engineers". By September the firm had added 2 more partners and 15 employees. By the end of 1977 Tehran Berkeley had 4 subsidiaries with employ-

Paradise Cut Levee Break

Tracy (near), California

Investigations and evaluation of potential cause(s) of January 3, 1997 levee break, and expert deposition on behalf of State of California – Department of Water Resources.

Humboldt Bay Ocean Outfall

Eureka, California

Deposition and expert witness testimony on behalf of the Humboldt Bay WMD regarding geological stability and seismic vulnerability of the Humboldt Bay sewer line within the bay and off-shore. The work included geological, geotechnical, seismological, and geophysical investigations, testimony in court hearings, and consultation with legal counsel. The ruling was in favor of Humboldt Bay WMD.

Aluminum Pipe Failure

Atlantic City, New Jersey

Deposition and expert witness testimony on behalf of the Kaiser Aluminum on the causes of collapse of a pipeline leading to the turnover of a concrete truck and death of the driver of the truck. Services also included evaluation of the pipe, testing of the trench backfill material, analyses, and assistance to defendant's legal counsel.

Force Main Pipe Failure

S. San Francisco, California

Deposition and expert witness testimony on the causes of failure of the large diameter fiberglass force main pipe, including review and evaluation of design analyses, construction procedures, and expert opinion on the standard of practice at the time of design.

Marriott Hotel

Burlingame, California

Discovery investigations to evaluate causes of failure of sheet pile - tieback system and the backfill of a large excavation for a major hotel complex. Services included review of design analyses and construction procedure and expert opinion on the causes of failure, shortcomings in design, and reasonable construction delay allowances.

Jones Track Levee Failure

San Joaquin Delta, California



Expert opinion and assistance to legal counsel on the causes of failure of Jones Track while being traversed by railroad leading to inundation of upper Jones Track and considerable loss of agricultural crops.

Panoramic Highway Slope Repair Failure

Marin County, California

Expert opinion and assistance to legal counsel on the causes of failure of repair construction, including review of investigations, design analysis, construction procedure, and opinion on the professional negligence.

Expert Forensic Services

Biographical Sketch (cont'd)

ees totaling close to 300. Subsidiaries were:

Tehran Berkeley Sounding Drilling, Ltd.

Wimpy Iran Laboratories, Ltd.

ENERTEC, Ltd. (energy technology consultants)

Nedeco Iran, Ltd. (harbors and transportation systems)

Highlights of this period for which Dr. Marachi was project manager or co-project manager included many planning investigations and designs such as:

Siting of inland and shoreline nuclear power plants:

Prepared ESAR for 160 miles of shorelines

Prepared ESAR for a 22,000 square mile section of west of the Country

PSAR for Saveh NPP (2,400 mgw)

PSAR for Karun NPP (1800 mgw); Co-project manager with Mr. Kim deRubertis

Permitting of the Karun NPP site through the International AEC

Siting and investigations of 85 miles of aqueduct and protective levees

Siting and feasibility studies of Iran's five major geothermal power resource regions

Siting and planning studies of 2 industrial towns

Siting, planning studies, and design investigations for two major dams

Design of widening and upgrading of some 400 miles of highway

Slope Failure Repair

Berkeley, California

Expert opinion and assistance to legal counsel on the construction change orders and evaluation of contractual obligations.

Village Shopping Center

Corte Madera, California

Expert opinion and assistance to developer's legal counsel to evaluate contractor's claim of alleged additional fill used in the construction of major shopping center.

One Lombard Street

San Francisco, California

Deposition and discovery assistance to legal counsel on the causes of severe settlement of floor slabs including assistance in geotechnical investigations and analysis.

North Point Street Investors

San Francisco, California

Planning and installation of monitoring system for buildings along the Cross-town Tunnel to alert for potential damages and provide a database for potential litigation.

Vesper Memorial Hospital

San Leandro, California

Deposition and discovery assistance to plaintiff's legal counsel (the hospital) on the failure of tie-back retaining wall and the slope causing the demolition of two residential houses and jeopardizing two other houses.

Willow Glen Gardens

San Jose, California

Discovery assistance to defense legal counsel, including evaluation of alleged cracks and failures, and review and evaluation of design documents.

Kings River Levee

Kings County, California

Technical assistance to defense legal counsel and expert deposition on behalf of the Kings River Conservation District and ACWA Joint Powers Insurance Authority as to the causes(s) of April 10, 1995 levee failure.

Environmental Engineering

US Steel/POSCO Industries

Pittsburg, California

Assisted corporate and outside counsel in establishing comprehensive EMS with ISO 14000 compliance for a large industrial facility.

Brownfields Strategic Planning

Pittsburg, California

Assistance to corporate and outside counsel of a large industrial facility owning a 112 acre closed class III landfill area. Strategic planning for city involved converting the property to an industrial park.

Expert Forensic Services

Biographical Sketch (cont'd)

Existing capacity evaluation and feasibility study of expansion alternatives of the 12 main harbors of the Country.

He also participated as a member of an international committee of experts to review the aseismic design of the nuclear power plants proposed by the French nuclear plant suppliers (Framatome and Spie Bottineau). Eighteen units of this plant were being sold to be installed in South Africa, Iran, and Brazil.

Dr. Marachi's total stay in Iran was just less than six years. He and his family left Iran in December of 1978 and came back to US, fortuitously only two days before the revolutionaries closed the Tehran airport. He fervently wished not to deal with or in any way be associated with the Khomayni regime, or any of the Islamic fundamentalist groups that have since defiled Iran's 5000 years of glorious civilization and have brought nothing but disgrace, shame, and infamy to all.

Back in the U.S.

From March of 1979 to June of 1984 Dr. Marachi worked for Converse Consultants (the same 1969 firm of Converse Davis and Associates). Initially he was the manager of engineering in the San Francisco office. In Feb. of 1982 he became the manager of the office, and in late 1983 he was also elected to serve on the Board of Directors.

Bioremediation of Sludges

US Steel/POSCO Industrie
Pittsburg, California

Investigation of bioremediation land-farms and development of strategies for regulatory compliance and preparation of reports for Corporate Counsel.

Rialto Airport

Rialto, California

Assistance to legal counsel in negotiations with RWQCB and the operator of the airport, and implementation of the agreed workplan.

Alleged Pesticide Fatality

Coachella Valley, California

Assistance to defense legal counsel and investigations of the concentrations of wind deposited pesticides allegedly causing one death.

Monroe Street Overpass

Indio, California

Assistance to legal counsel and expert deposition for the City in evaluation of reasonableness of remedial work to remove soil contaminations performed by the City.

Texaco Bulk Distribution Center

Hollywood, California

Assistance to Texaco's outside counsel in defense of a suit by Ceder Sinai Hospital as to the extent of the remedial work at the site.

O'Brien Paint

South San Francisco, California

Deposition and assistance to legal counsel as to the sources of drums in the breakwater and associated costs of investigations.

US Steel/POSCO Industries

Pittsburg, California

Assistance to legal counsel in:

- Preparation of Consent Agreement with DTSC;
- Property conveyance to the City;
- Evaluation of potential of contaminant migration from adjacent properties;
- Evaluation of storm runoff from adjacent properties and negotiations; and
- Preparation of Part A and B RCRA permit.

Techalloy Industries

Perris, California

Assistance to legal counsel and appearance before Administrative judge to dismiss the penalty levied by DTSC.

Central Contra Costa Sanitary District

Hookston Station, California

Assistance to legal counsel for the Contra Costa Sanitary District regarding potential source(s) of VOC contamination.

Motorola

Cupertino, California

Assistance to legal counsel in negotiations with RWQCB in establishing the scope of and implementation of the remedial work. The site was removed from NPL after remediation and closure, which were designed and implemented by Dr. Marachi.

Technical Publications

General Engineering

Biographical Sketch (cont'd)

During this period he investigated a large number of levees and developed a method to assess the probability of levee failure and the corresponding cost of exposure to such a potential event. He utilized this method to investigate the annualized exposure costs associated with East Bay MUD's aqueducts through the San Joaquin Delta region. He also developed alternative mitigation plans and calculated annualized cost of each. He later published this methodology in various international proceedings.

As part of levee stability studies, he performed a series of laboratory tests on peats and peaty clays of the San Joaquin delta region and over consolidated fissured clays of the Colusa Basin. His findings, utilized to elucidate the cause of repeated levee breaks at Colusa, earned him commendation letters from the Sacramento District and San Francisco Division of the US Army Corps of Engineers. He also became very interested in investigation and safety analysis of existing dams, especially concrete arch and multiple arch dams. He performed 3-D dynamic finite element analysis of Milliken, Vail, Hume Lake, and Salmon Creek arch dams, and Whale Rock, Lake Herman, and Summit embankment dams. For a five week period he served as a special consultant to Parsons/Engineering Science in Bombay, India on a project for the World Bank to develop geotechnical

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Marachi, N.D., Panahandeh, M., 1988: Three-dimensional seismic analysis of a multiple arch dam using microcomputers, International Commission on Large Dams, San Francisco, July, pp. 1255-1271.

Seed, R.B., and Marachi, N.D., 1987, Seismic risk assessment for a lifeline aqueduct system: Proceedings of the 3rd International Conference on Soil Dynamics and Earthquake Engineering, Princeton, N.J., Elsevier Press Series: "Advances in Geotechnical Engineering", v. 45, pp. 415-426.

Seed, R.B., and Marachi, N.D., 1986, Lifeline risk analysis: The Mokelumne Aqueduct Study: in Proceedings of the Specialty Session on Seismic Evaluation of Lifeline Systems, ASCE Fall Convention, Boston, pp. 28-43.

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Technical Publications

Earthquake Engineering / Risk Evaluation

Biographical Sketch (cont'd)

investigation requirements and plans and specifications for the proposed comprehensive sewer collection, conveyance and treatment facilities of Bombay. He also served on the Board of Consultants to review the seismic design criteria and dynamic analysis of the Karun II arch dam by Acres International.

He co-founded "The MARK Group, Inc." on Memorial Day of 1984. By 1991 the firm had 98 employees and 3 main offices. In this period Dr. Marachi managed a large number of environmental cleanup and restoration projects at various industrial facilities and landfills. He developed a vacuum extraction method to remove volatile organic compounds from the vadose zone, and designed the system for the cleanup of a site for Motorola, the first such site in California receiving EPA approval. He also taught a condensed course on the environmental aspects of soils engineering, and contaminant transport (by convection or diffusion) at Cal State Long Beach.

He also managed many projects in the water market, i.e. safety investigations of Webber, Los Verjeles, Goodwin, Combie, Concow, Matilija, and Santa Felicia dams, to name a few. He also served on a CalFed subcommittee assessing seismic fragility of the levees in the Sacramento/San Joaquin delta.

On February of 1999 The MARK Group sold its assets to Harza Engineering Co.

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Technical Publications

Environmental Engineering

Biographical Sketch (cont'd)

Dr. Marachi served as Senior Partner and manager of the Concord office at Harza from 2/99 to 4/01. During this period he spearheaded the acquisition of a number of large projects, e.g. Relicensing of Orville Dam Facilities, Safety Investigation of Santa Anita and Hosler arch dams, Design of Safety Mitigations for Big Tujunga arch dam, ID/IQ engineering services contract with the San Francisco PUC, ID/IQ engineering services contract with USBR /MW for the California water plan, to name a few.

As an avocation, he also developed a "quick" method to compute seismic stresses in an arch dam. The method abates the costly analyses.

In April of 2001, Dr. Marachi resigned from Harza, and presently works as a consultant. In addition to engagements on a number of projects and cases, he is in the process of developing a method to assess seismic stability of a "generic" arch dam.

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