Steven Bond and Associates
Consulting Geologists, Groundwater and Water Quality Experts
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22 October 2012

Jeanie Townsend
Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814
VIA ELECTRONIC MAIL: commentletter@waterboards.ca.gov

Re: Comment Letter - July 2012 Draft Industrial Permit: Submitted on behalf of the California Sportfishing Protection Alliance

On behalf of the California Sportfishing Protection Alliance, I'm presenting two technical comments, one regarding the appropriate use of one of the options of design storm standards in Section X. of the July 2012 Draft Industrial Storm Water Permit. The other comment discusses monitoring parameters in Section XI of the Permit.

I am a professional geologist specializing in engineering geology, water chemistry and quality, and groundwater, hold professional licenses and certifications issued by the State of California for these practices. I've a private consulting business providing these services, and have more than twenty-five years experience evaluating natural and contaminant water chemistry issues and evaluating surface and groundwater flow. I have personally investigated and/or evaluated more than 200 industrial storm water cases in the State. A copy of my recent résumé is attached.

My comments are summarized as follows:

- The 0.2 inch/hour option for design storm standards for treatment control BMPs, should be removed because it is shown to be significantly less than 85th percentile in many areas and therefore provides inadequate treatment capacity of polluted storm water.

- Electrical Conductivity should be included as a required monitoring parameter. EC is the simplest and least costly parameter to measure. It can detect the presence of dissolved salts that would not otherwise be detected that may impair receiving waters.

My first comment is in regard to Section X. 'SWPPP Requirements, H. Best Management Practices (BMPs), 7. "Design Storm Standards for Treatment Control BMPs" b., Flow-based BMPs.

Under Section X., H., 7., Design Storm Standards for Treatment Control BMPs, one design standard option is offered to dischargers that will provide inadequate treatment capacity of polluted storm water. The design standard that requires that dischargers design their treatment system with the capacity to manage/treat runoff from no more than the runoff flow rate produced from a rainfall intensity of 0.2 inch/hr is not appropriate for all places in California. While 0.2 inches/hour may provide adequate protection in certain locations of the State, it is not appropriate in all places throughout the State. In some regions the value may be greater than required to protect water quality, however in many locations the 0.2 inches per hour provides inadequate protection.

Considering that the other option is the design standard of two times the 85th percentile 24-hour storm event determined from local historical rainfall records, the value of 0.2 inches is in many cases, less than one-half of that value. To illustrate this fact, attached are three cumulative frequency distribution curves for Redding, Sacramento, and Los Angeles (figure 1). This figure shows that a flow-based treatment system with a capacity based on 0.2 inches per hour rainfall is easily overwhelmed by recent historic rainfall.

Referring to figure 1: Rainfall depth to the left of the vertical lines is reasoned to be 'managed' by a flow-through system whose capacity is defined by the inches per hour value of the associated line. In the case of Los Angeles, 0.2 inches per hour manages 56% of the rain that fell between 1995 and 2012, and 44% of the rain overwhelmed such a system. In the case of Sacramento, 0.2 inches per hour manages 76% of the rain that fell between 1995 and 2008, and 24% of the rain overwhelmed such a system. In the case of Redding, 0.2 inches per hour manages 75% of the rain that fell between 2001 and 2012, and 25% of the rain overwhelmed such a system.

Another example of the lack of uniformity of the one-size-fits-all approach is the 85th percentile 24-hr Rainfall Isohyetal Map of Los Angeles County. This map is included in the report: "Analysis of 85th Percentile 24-hour Rainfall Depth Analysis Within the County of Los Angeles". It can be found at << http://ladpw.org/wrd/publication/engineering/Final_Report-Probability_Analysis_of_85th_Percentile_24-hr_Rainfall1.pdf >>

This map shows that the 85th percentile 24-hour rainfall depths vary from 0.30 to 1.50 inches within the County of Los Angeles. In many instances, using the 0.2 inch/hour

approach will provide less than 10% the water quality protection provided by the other option.

Given an option to spend less money on storm water treatment, most dischargers will choose the cheapest alternative regardless of the protection afforded by the selected standard. Therefore it is important that this deficient standard not be an option.

My second comment is with regard to Section XI. Monitoring Requirements.

Specific Electrical Conductivity (EC) is not included in the suite of test parameters and should be included as a required parameter. EC is the simplest and least costly parameter to measure. It can detect the presence of dissolved salts in storm water runoff from industries whose wastes tend to be non-hazardous brines such food processing (Sector U), as well oil and gas drilling (Sector I). The parameters included in tables 3 and 4 of the Draft Permit would not detect potentially water quality impairing discharges consisting of dissolved solids. Therefore EC needs to be included as a standard field or lab parameter.

Conclusions:

• The 0.2 inch/hour design option at best, offers uneven, partial treatment of polluted storm water. It provides inadequate water quality protection.

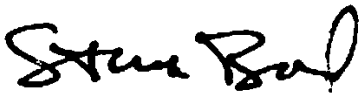
- Electrical conductivity provides very inexpensive and efficient measurement of dissolved salts that may not otherwise be detected.

Recommendations:

- Eliminate the 0.2 inch/hour design storm standard for treatment control BMPs.

• Add specific electrical conductivity (EC) to the suite of required monitoring parameters.

Sincerely,



Steven Bond PG, CEG, CHG
Principal, Steven Bond and Associates

figure 1: Hourly Rainfall Depth Distribution

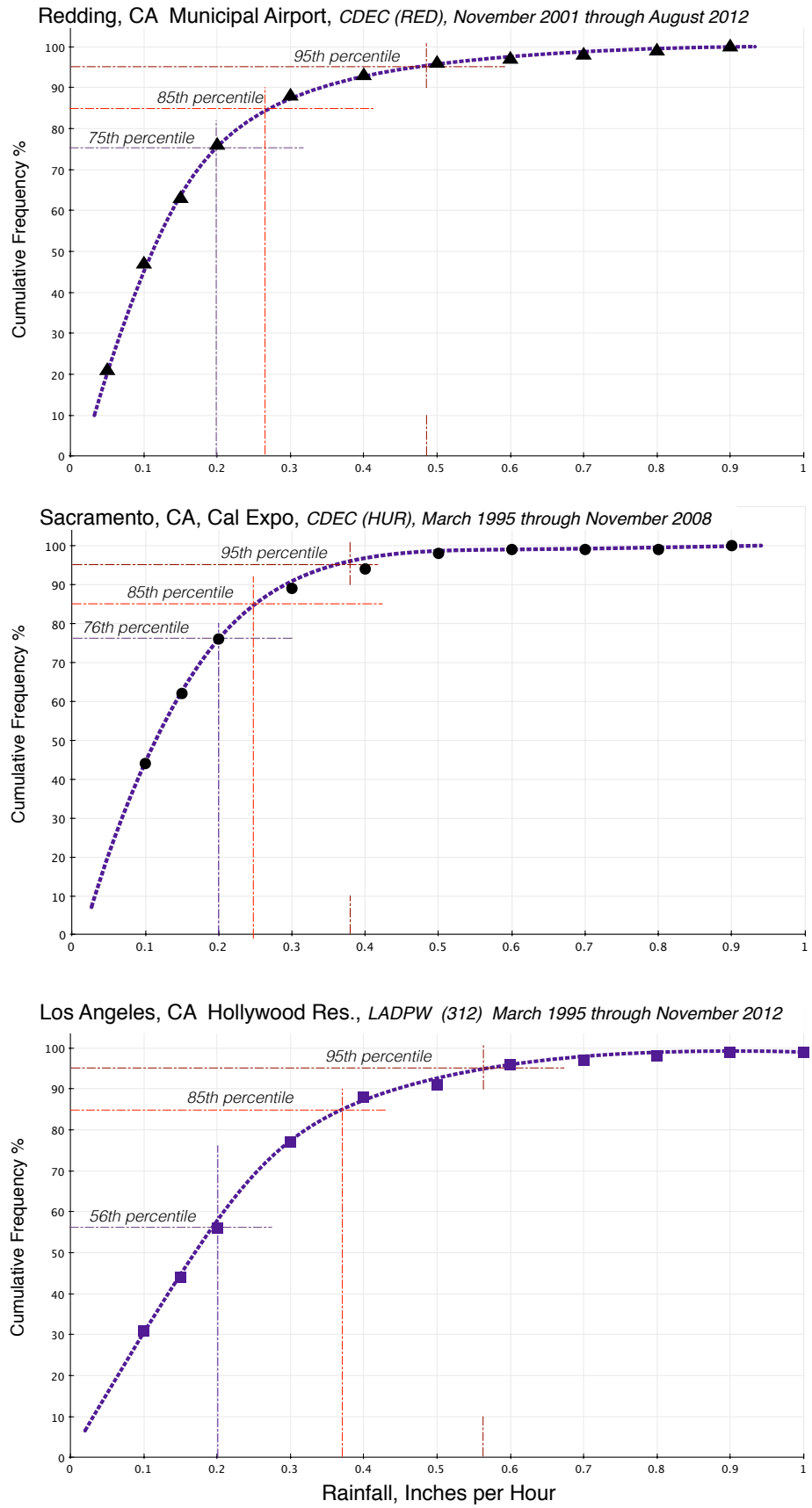


Figure 1 shows the cumulative rain depth (volume) curves for Redding, Sacramento, and Los Angeles. The weather station and the periods of record are listed on the figure. These data are based on hourly rain data reported as inches per hour. Data from days with less than 0.1 inches per day of rain are excluded.

Rainfall depth to the left of the vertical lines is reasoned to be 'managed' by a flow-through system whose capacity is defined by the inches per hour value of the associated line.

In the case of Redding, 0.2 inches per hour manages 75% of the rain that fell between 2001 and 2012, and 25% of the rain overwhelmed such a system.

In the case of Sacramento, 0.2 inches per hour manages 76% of the rain that fell between 1995 and 2008, and 24% of the rain overwhelmed such a system.

In the case of Los Angeles, 0.2 inches per hour manages 56% of the rain that fell between 1995 and 2012, and 44% of the rain overwhelmed such a system.

STEVEN R. BOND

Curriculum Vita

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Profile

Geologist / Engineering Geologist / Hydrogeologist / Aqueous-geochemist /

- More than twenty-five years applied experience in groundwater and engineering geology.
- Twenty years practical experience defining hydrogeologic flow systems in crystalline, fractured rock systems, and porous sedimentary aquifers.
- More than twenty years practical experience evaluating natural and contaminant water chemistry problems and issues.
- Twenty years practice of geochemical analysis of humid and semiarid hydrogeologic regimes, including water supply, and contaminant fate and transport.
- More than twenty years experience investigating and evaluating geologic and hydrogeologic hazards related to slope stability, seismic hazards, hazardous materials, mine wastes, and soil and groundwater contamination.
- More than ten years experience defining and modeling stream and river flow, flooding analyses, and sediment transport systems.
- More than twenty years experience evaluating industrial impacts to surface water quality
- Eleven years regulatory experience implementing California and U. S. water quality laws and regulations.

Professional Licenses		
	Professional Geologist, *California, USA*	# 5411
	Certified Engineering Geologist, *California, USA*	# 1841
	Certified Hydrogeologist, *California, USA*	# 0238

Professional Experience

January 1999 to Present

Steven Bond and Associates, Santa Cruz, CA, President, Principal Geologist

Conducted investigations and assessments of geologic hazards, threats to surface water and groundwater quality from various industrial and natural sources, and groundwater supply investigations. Performed litigation support in cases involving potential impacts of geologic hazards, groundwater supply and pollution, surface water pollution, and State water quality policy review. Examples of such activities and projects include the following:

- *Engineering Geology*: Conducted investigations of geologic hazards, foundation studies, liquefaction potential assessments, fault trace analyses, slope stability assessments and prepared the associated engineering geology investigation reports for development and industrial projects in Monterey, San Mateo, Mendocino, and Santa Cruz Counties. ◊ Conducted foundation suitability study, seismic evaluation, and fault trace study for resort development, Big Sur (Monterey Co.) ◊ Conducted analysis of debris-slide hazard potential of properties near Loma Mar (San Mateo Co.) ◊ Did technical analysis of slope stability and soil erosion potential of timber harvest operations, and evaluated surface-water monitoring practices (Humboldt Co.) for permitting dispute. ◊ Evaluated landslide activation hazard analysis of cliff side development in Brisbane (San Mateo Co.) ◊ Evaluated potential erosion hazards and drafted technical remedies from impacts of extrajudicial logging activities (Mendocino, Co.) ◊ Prepared engineering geologic reports for various residential development projects (Santa Cruz Co. , San Mateo Co.).
- *Groundwater Investigations, Modeling, and Remediation System Design:* Designed and implemented original subsurface investigation technics, and remediation systems for a complex hydrogeologic environment of

volcanic sediments, for Sierra Nevada Mt. community drinking water contamination (Volcano, CA). ◊ Did aquifer analysis and computer simulation (Modflow) of contaminant flow and remediation system design (groundwater extraction) for MTBE site in Turlock, CA. ◊ Did groundwater transport and pollutant fate analysis of landfill for litigation support. (Colma, CA)

- *Groundwater Supply:* Conducted groundwater use sustainability study for Sonoma Valley winery (Valley of the Moon). ◊ Did evaluation of sustainability potential and impacts from groundwater extraction in Sierra Valley (Sierra and Plumas Counties) for litigation support.
- *Policy Review and Regional Studies:* Conducted technical review and analysis of CA State water policy (State Implementation Plan, California Toxics Rule) for litigation support. ◊ Technical consultant and committee member for San Francisco Bay Copper-Nickel TMDL impairment studies (north and south).
- *Storm Water:* Conducted technical reviews, and did litigation support in cases of storm water pollution regarding the adequacy of monitoring programs, BMPs, and treatment technology application (Alameda, Humboldt, Placer, Sacramento, San Joaquin, San Mateo, San Francisco, Sonoma, Yuba counties) for the following types of industry: aggregate, cement, asphalt, metal fabrication, metal forging, steel casting, recycling, ship breaking, wood treatment, sawmills, CAFOs, vehicle maintenance, auto wrecking, POTW, precious and heavy metal mines, landfills, fueling facilities, and port loading facilities for ammonia, fertilizer and petroleum coke.
- *Mining Projects:* Evaluated drinking water quality hazards posed to confined prisoners at an operating copper mine (United Nations ICTY, Bosnia-Herzegovina). ◊ Evaluated geochemical potential to produce acid and release arsenic from re-activated gold mine (Sutter Ck. CA), acid mine drainage water quality impacts. ◊ Evaluated WQ pollution potential from abandoned mercury and gold mines (Coastal Mts, central & north CA, Sierra Nev. Mts) for litigation purposes.
- *Land Discharge Projects:* Evaluated compliance with CCR Title 23, Title 22, Chapter 15 (CA) regulations for Winery wastes (Amador County), dredging spoils disposal (Port of Stockton), Class III landfill (San Mateo Co., Shasta Co., Lake Co.). Designed monitoring programs and budgets.

March 1998 - January 1999

Fall Creek Engineering, Inc., Santa Cruz, CA, Principal Geologist

Evaluated the risk from surface and groundwater contamination to public groundwater supplies (Big Sur); performed computer simulations of flow and geochemistry of ground and surface water interaction using Modflow, Minteq. Did hydrologic studies to evaluate the flood stages, water surface profiles, and erosion potentials; constructed a computer -based hydraulic model of the river using HEC-RAS (Salinas River, Monterey Co.); prepared water quality and flood control management plans (Pajaro River). Designed and conducted soil and groundwater sampling analysis programs at various sites in Monterey and Santa Cruz Counties (leaky underground fuel tanks, wastewater disposal systems).

March 1997 - January 1998

Water For People, Denver Colorado, Consulting Hydrogeologist

Conducted a synoptic hydrogeological survey of the Bay Islands, Honduras, Central America for the Bay Island Environmental Project. Conducted a study of the islands' resources and made recommendations for a comprehensive water supply investigation of the three main islands comprised primarily of fractured metamorphic rock. Conducted local interviews, literature review and a reconnaissance level survey, field trued geology in selected areas. Evaluated island-available drilling technology, characterized water quality and supply issues for several of the island communities, prepared investigative criteria for future work, wrote report.

December 1986 - May 1998

California Regional Water Quality Control Board, Sacramento, CA. Associate Engineering Geologist

Conducted investigations of all aspects of pollutant transport in the vadose zone and groundwater and surface water. Reviewed and evaluated the geologic, hydrogeologic, geochemical, and geophysical content of professional reports. Evaluated thoroughness of surface and groundwater investigations, the completeness of remedial efforts, and validity of monitoring programs. Provided expert technical assistance to State and local agen-

cies on issues of geochemical fate and transport of pollutants, well-head protection strategies, abandoned mine investigation and remediation methods, and contaminated groundwater and soil cleanup technics. Examples of such projects include the following:

- Analysis of groundwater impacts from organic solvents and fuels in sedimentary and fractured rock terrain. Evaluated investigative methods including drilling techniques, soil, water, and vapor sampling methods, and in situ and ex-situ remedial technologies using vapor transport, groundwater capture, extraction and treatment. Did deterministic computer modeling. Technical advisor and regulator for hundreds of facilities under authority of Federal and State underground tank statutes in the counties of Alpine, Amador, El Dorado, Calaveras, Lake, Napa, Mariposa, Placer, Sierra, Solano, Stanislaus, and Tuolumne California, and in Yosemite National Park.
- Analysis of groundwater flow and pollutant transport characteristics of polluted, high density waste water (industrial acids and heavy-metals) at Davis, CA. Evaluated water quality impacts, effectiveness of groundwater extraction schemes using numerical modeling methodologies for flow, and chemical fate and transport. Co-developed in situ leaching methods of contaminated soils to accelerate cleanup rates.
- Analysis of the underlying, geochemical causes of acid mine drainage at the Penn Mine in Calaveras Co., CA. Identified and evaluated groundwater flow paths in a faulted crystalline-rock aquifer and the applicability of water quality and hazardous waste laws to the toxic discharges. Conducted a geologic and fracture mapping project and developed conceptual flow groundwater model. Evaluated acid-mine and acid-rock drainage remedial alternatives and made recommendations for their use. Developed and composed work plan for the investigation of fractured-rock hydrogeological transport, and aquatic geochemical fate of heavy metals from Penn Mine to the adjacent Camanche reservoir. Authored numerous reports and a series of successful grant proposals, prepared annual budget and obtained funding for detailed groundwater and remedial waste rock investigations.
- In companion project to the above mine waste project, developed a conceptual model for the transport mechanisms of heavy-metal laden sediment in the Camanche water-supply reservoir, developed the conceptual methodology of investigation, and managed the project. Assembled a team of limnologists from the University of California at Davis and fluid mechanical engineers specializing in sediment resuspension from University of California at Santa Barbara. Wrote a successful Federal Clean Lakes Grant proposal, and implemented the investigation at Camanche reservoir, California.

May 1986 - September 1986

U.S. Army Corps of Engineers, Sacramento, California, Engineering Geologist.

Conducted geologic and hydrogeologic investigations preparatory to the design of Deer Creek Water Supply Reservoir, Utah. Drafted groundwater investigation plan. Conducted geologic mapping. Designed monitoring wells, supervised drilling crews and well construction, conducted aquifer pumping tests.

October 1983 - September 1984

Dames and Moore, Los Angeles, California, Sedimentary Petrologist.

Conducted sedimentological investigation of near-shore sediments in western Arabian Gulf. Characterized sediment transport systems in the Arabian Gulf area of United Arab Emirates for Abu Dabi National Oil Company.

May 1982 - April 1983

U.S. Army Corps of Engineers, Portland, Oregon, Engineering Geologist.

Conducted geologic, geophysical and hydrogeologic investigations in the Columbia Gorge near Bonneville, Oregon. Conducted geophysical borehole investigation of Bonneville New Navigation Lock. Did detailed mapping of landslides, and drill core logging. Designed passive de-watering systems, and monitoring wells. Supervised drilling crews and the construction of water supply wells and monitoring wells; conducted and interpreted aquifer pumping tests.

June 1981 - December 1981

XCO, Denver Colorado, Petroleum Field Geologist

Did drill core logging, conducted field screening of chemical composition of drill cores, interpreted geologic strata, and prepared drilling reports in several depositional basins in North Dakota, Colorado, and Oklahoma.

September 1976 - September 1977

U. S. Geological Survey, Menlo Park, California. Geologic Field Assistant.

Conducted geologic mapping and did geochemical sampling for Continentally Unified Strategic Assessment Program. Evaluated economic potential of proposed Federal Wilderness areas and abandoned mines including the Kalmiopsis Wilderness of southwestern Oregon; an ophiolite suite and recent volcanic terrain.

Education & Training

Master of Science (ABT) in Hydrogeology, Special Studies Program, California State University, Chico, California, 1985-1986

Bachelor of Arts in Geology, Humboldt State University , California, 1979 - 1981

Annual NWWA courses in Aqueous Geochemistry, Fluid Flow through Fractured Rock, In situ Fluid Extraction Systems, Ground-Water Isotope Geochemistry. 1987-1991.

Computer Modeling. EPA CEAM: MINTEQ geochemical speciation, 1990, 1991; WASP surface water flow and transport, 1991. General Sciences Corp.: SESOIL vadose zone pollutant transport, 1994, 1996; AT 123D groundwater pollutant transport, 1994, 1996; NWWA: Visual Modflow, Flowtrans, groundwater flow and transport, 1996. WHI: Modflow 2000, MTD3, groundwater and contaminant transport, 2002.

Constructed Wetlands Workshop and Seminar Series, Humboldt State University, California, 2002.

Soil Slope Stabilization, Embankment Design, National Highway Institute, Vail, CO, 2007

40 hour OSHA Health and Safety for Hazardous Waste Operations and serial 8 hour refresher courses.

Professional Associations

Association of Engineering Geologists; Groundwater Resources Association of California
Northern California MTBE and Fuel Oxygenates Committee

Non-Profit Affiliations

Valley Air Trust, Central Valley, Stockton California, Board Member 1993 - 1997
BayKeeper San Francisco Bay -Sacramento Delta, Technical Advisory Committee Member 1996 - present.
California Sportfishing Protection Alliance, Technical Advisory Committee Member 2000 - present
The Abandoned Mine Alliance, Sierra City, California, Board Member 2005 - present

Expert Testimony

- Before the United States Northern District of California Court, on issues of storm water pollutants associated with industrial ammonia and urea fertilizer production and storage operations in the case of California Sport Fishing Protection Alliance vs California Ammonia Company, September 2006.

Expert Testimony cont.

- Before the United States Northern District of California Court, on issues of surface water pollution associated with logging practices in the case of EPIC vs Pacific Lumber Company, May 2006.
- Before the United States Northern District of California Court, on issues of groundwater and storm water pollution associated with lumber milling and wood treatment operations in the case of Ecological Rights Foundation vs Sierra Pacific Industries, April, October, 2002.
- Before the United States Eastern California District Court, on issues of storm water pollution, confined animal feeding operations and industrial activities in the case of WaterKeeper of Northern CA. vs L. Vandhoef, Chancellor, University of California, Davis, June, August 2001.
- Before the CA State Water Resources Control Board hearing on the Appeal of Regional Water Quality Board's Actions regarding Pacific Lumber and the Elk Creek Timber Harvest Monitoring, July 2001.
- Before the United States Northern District of California Court, on issues of storm water pollution and ship-breaking in the case of WaterKeepers of Northern CA. et al, vs U.S. Dept. of Navy and Astoria Metals Corporation, June, August 2000.
- Before the California Superior Court on issues of groundwater pollution and crude oil in the case of Thompson Chevrolet vs Chevron Corporation et al., January, July, and November 1996.
- Before the California Superior Court on issues of acid mine drainage, water pollution, and groundwater flow through fractured crystalline rock in the case of California Sportfishing Protection Alliance vs State Water Resources Control Board, June 1994.
- Before the California Senate Natural Resource and Wildlife Committee Investigative Hearing on Conflicts of Interest in the California Environmental Regulatory System, June 1992.
- Before the California Senate Natural Resource and Wildlife Committee Investigative Hearing on Acid Mine Drainage, Water Pollution, and the California Regulatory Environment, Jan. 1992.
- Before the California State Water Resources Control Board hearing on the Appeal of Regional Water Quality Boards Actions regarding the Penn Mine, October 1991.

Public Speaking and Presentations

Presentations before the State Water Resources and Regional Water Quality Control Boards.

- Presented testimony and briefs before the State and Regional Boards on specific cases of regulatory enforcement actions, (1990 - 2007)
- Mediator of formal discussions regarding disputed technical issues about groundwater quality between responsible parties, (1988 - 1998)

Workshop Presentations before professional societies, and local and State regulatory agencies:

- The application and interpretation of discreet groundwater sampling methods and data collection.
- The use and interpretation of computer modeling simulations for vadose transport and mineral equilibria
- The effects and determination of vertical gradients on pollutant transport in groundwater.
- Contaminated soil cleanup criteria based on California State Water Code, regulations and policies.
- Acid Mine Drainage issues: the geology, mineralogy, and chemistry, the environmental effects, remediation, policies, and politics.

Writings

Author of scores of reports for private organizations, NGO's, Federal, State and local Agencies, on the subjects of (a. organic and inorganic pollutant transport in surface and groundwaters, (b. polluted groundwater remediation, (c. the investigation and analysis of the potential transport of soil contamination (metals, fuels, solvents) through the vadose zone, (d. unsaturated zone characterization including vapor-phase transport and cleanup technologies, (e. acid mine drainage causes, fate, and mitigation, (f. the logical elements of water quality monitoring, (g. regulatory compliance of state and federal environmental laws by federal, state and private parties, (h. metal mobility and mineral equilibria, (i. net-vertical transport of groundwater pollutants, (j. general surface water and groundwater resource protection, (k. water budget accounting in mixed geologic environments with multiple density fluid interfaces, (l. groundwater supply evaluations, (m. reconciliation of threats to water resources and risks to human health, (n. engineering geology, geological hazard analysis.