Baldwin v. County of Tehama

(1994) 31 Cal. App. 4th 166 *by Judith Kammins Albietz, Esq.*

In Baldwin v. County of Tehama (1994) 31 Cal. App 4th 166, the California Supreme Court addressed the question of whether or not a county ordinance that regulates groundwater is preempted by state law regulation of groundwater. The court found that while state law regulates aspects of groundwater, state statutes do not wholly preclude county regulation.

On February 4, 1992, Tehama enacted an ordinance that required a permit to extract groundwater for the purpose of use on land other than where the extraction occurs. This permit would not be granted if the board of supervisors finds that the proposed extraction's will result in an overdraft, saltwater intrusion, adverse effects upon the rate of flow of water through the aquifer, adverse effects on the water table, or the overdraft of groundwater based upon the preexisting and reasonably foreseeable beneficial uses of the water on lands within Tehama overlying the aquifer. Further, the operation of any well in the county that causes a cone of depression in the water table beyond the boundaries of the parcel upon which the well is located is prohibited.

The plaintiffs alleged that they owned land in Tehama County and they desired to extract groundwater therefrom for the purpose of irrigating land in Colusa County or Glenn County. The trial found that the ordinance was preempted. Tehama County was enjoined from enforcing its ordinance.

The court first noted that there is no direct conflict between this county ordinance and any state statute. Therefore, the sole question would be whether the field of groundwater is outside the county's police power and for that reason the entire ordinance must fail.

The court held that the Constitution provides that a city or county "may make and enforce within its limits all local, police, sanitary, and other ordinances and regulations not in conflict with the general laws." Then, the court noted they had upheld a county ordinance that regulated groundwater in In re Maas 219 Cal. 422. In that case, the court found that an Orange County ordinance that limited the uses of water from pumping wells, prohibiting, among other things, the use of such water to flood land for hunting by duck clubs, was not preempted by state law. The court rejected an argument that this area of police power was reserved for the state. The court found that the conservation of groundwater was a legitimate area for the exercise of police power by Orange County, and that this power had not been reserved so that it could be exercised exclusively by the state legislators.

Thus, since the court found groundwater regulation is within the county police power, the ordinance may be enacted unless it conflicts with the general law (state legislation). To do this, it would have to be shown that the general law directly or impliedly "covers" the whole of the claimed field of regulation.

Again, since there was no direct conflict with state law, then one must look to see if there was an intent to preempt the field. The field would be preempted if :the subject matter has been so fully and completely covered by general law as to clearly indicate that it has become exclusively a matter of state concern, or the subject matter has been partially covered by general law couched in such terms as to indicate clearly that a paramount state concern will not tolerate further or additional local action. An amiss curiae brief in support of plaintiffs' position admits that the Tehama ordinance addresses a regulatory void left by the historical reluctance of the state legislators to address the general problem of groundwater resources management.

Plaintiffs pointed to California Water Code Section 104, which states: "It is hereby declared that the people of the state have a paramount interest in the use of all the water of the State and that the State shall determine what water of the State, surface and underground, can be converted to public use or controlled for public protection." The plaintiffs argued that it clearly states that the "state shall determine" how the water of the state should be utilized to achieve the greatest benefit for its citizens.

The court countered there is no indication local authority is preempted just because this is a state wide concern. The court also argued that any reference to "the State" may include the counties. Further, the court points out that the state legislature cannot preempt the counties police power negatively by merely forbidding its exercise. Thus, the state legislature cannot simply declare a field is preempted, they must actually enact legislation that preempts the field according to the court.

Plaintiffs then argued that California Water Code Sections 1215-1222, which address the export of groundwater, support their claim of implied preemption. They also argued these sections are in direct conflict with the Tehama ordinance. These sections deal with exports of water out of the Sacramento Basin. The court found that there is no conflict because the Tehama County ordinance does not authorize exports of water out of the Sacramento Basin. However, plaintiffs then claim the Tehama ordinance duplicates parts of the above sections because they impose additional requirements on the export of water. The court found that preemption by duplication is usually limited to penal ordinances.

Therefore, the court concluded the plaintiffs have failed to show that the subject matter of groundwater regulation has been so fully and completely covered by general law as to clearly indicate that it has become exclusively a matter of state concern. In fact, the court stated that the statutes suggest that the problems of groundwater management should be addressed at the local level. Finally, the court noted that the plaintiffs might have been able to attack the antimining provisions of the statute but since they did not address this issue the court declined to address this question.

Judith Kammins Albietz is Co-chair of the Natural Resources Subsection of the Real Propertv Section of the California State Bar. Ms. Albietz has been involved with Natural Resources, including water law and minerals law, Federal Indian law, federal and state public agency law, and real property and environmental matters in the private law firm setting and the public sector for over 25 years.

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Branch Activities

Southern California Branch

New Officers:
The results of our election for the 1996 GRA Southern Califomia Branch Officers was announced at our November 15, 1995 meeting. Susan Garcia, past President, informed the meeting attendees that there was a good response to the election and the following individuals will represent our Branch for 1996:

PRESIDENT - Jim Carter, SP Laboratories, 714/447-6868

VICE PESIDENT - Mark Cutler, Foster Wheeler Environmental, 714/444-5500

TREASURER-LOU Reimer, Reimer & Associates, 714/779-6743

SECRETARY - Carmen Guzman, Geraghty & Miller, 818/332-8010

MEMBERSHIP CHAIRMAN - O'Connor, Columbia Analytical Services, 714/505-4640

The new Officers are very excited about the results, and we are looking at ways to make this the best year ever for our Branch. The Southern California Branch has benefited from Susan's hard work and dedication and we all have the desire to build on her successes.

The new Officers met and had a planning session for 1996. Some of the issues that we are looking to accomplish for the year include: locating a common and central meeting place; ensure that we have presentations that will be valuable to our membership; and building our financial reserves to a sound level. In order to achieve these goals we need your input! Please give us a call with ideas for speakers, locations, etc. for the upcoming year.

Past Meetings:
Our July 19th, 1995 meeting was a noontime teleconference presented by Brian Anderson, Branch Chief with the Environmental Division at Rocky Mountain Arsenal (RMA). Brian's presentation was titled "Effectiveness of Boundary Systems at Rocky Mountain Arsenal, Commerce City Colorado." The teleconference was very well attended and proved to be an excellent format for the meeting. Brian discussed the groundwater treatment systems at RMA as well as the groundwater intercept and treatment system north of RMA. Brian provided the attendees with fact sheets, contacts at RMA, and contour maps of some of the contaminant plums at the site.

We sponsored a workshop titled "Certified Hydrogeologist Exam Preparation" which was very well attended. This workshop reviewed the basic concepts and important issues that are covered in the exam to become a Certified Hydrogeologist.

The September 20, 1995 meeting presented the thought provoking talk by Dr. Jay Lehr titled, "Environmental Cleanup ReEvaluated--Are We Compromising?" Dr. Lehr addressed the current status of environmental regulation including riskbased standards, public health issues and CERCLA reauthorization. Dr. Lehr assured the audience that environmental regulations will be relaxed to some degree, but he also stressed that there is still a luture for environmental professionals.

"Should TCE Be Considered a Probable Human Carcinogen" was the title of the presentation given by Dr. Lee Shull at our November 15, 1995 meeting. Dr. Shull is International Director of Toxicology for Foster Wheeler Environmental Corporation. Dr. Shull's talk presented the strong case that the current 5 ppb drinking water standard is too low and is not supported by current toxicological data. He presented the scientific issues related to the classification of TCE as a probable carcinogen, and discussed some of the flaws of the TCE risk assessment performed by USEPA in the early 1980's. Dr. Shull is a member of the

Trichloroethylene Issues Group, which is lobbying USEPA to revise the 5 ppb drinking water standard to a higher level.

Our January 17, 1996 meeting was presented by Dr. E. Essi Esmaili of Foster Wheeler Environmental Corporation. He provided us with an overview of ASTM Risk-Based Corrective Action (RBCA) and discussed how we could implement it within the state of California.

Future Meetings:
Our March 20, 1996 meeting will cover groundwater containment zones and will be presented by Donald Marcus of Emcon Associates. The location is tentatively scheduled to be held in Downtown Los Angeles.

We are actively looking for speakers and topics for future meetings. If you have any ideas, please call one of the new Officers.

Central Coast Branch

The Central Coast Branch of the GRA held its September 21, 1995 meeting at the El Ranchito Restaurant in Oxnard. The guest speaker was Mr. Bob Collar, Senior Engineer with CH2MHill in Santa Ana. The topic of Mr. Collar's discussion was "Using Water Supply Wells to Investigate Groundwater Quality." Using a technique developed jointly with Welenco, depth-specific samples were collected from water supply wells with large or multiple perforated intervals to determine water quality. This methodology was applied as an initial assessment tool for investigating potential groundwater contamination.

Our November meeting was held at the Elephant Bar in Goleta. The guest speakers were Mr. Morley Weitzman and Mr. Jeff Zukin of Dames and Moore. The topic of their discussion was "Groundwater Flow and Transport Modeling." Mr. Zukin gave an introduction to transport modeling, briefly describing the advantages and the disadvantages of three modeling methods: the analytical method, the semi-analytical method, and the numerical method. Mr. Weitzman gave a hypothetical site demonstration of four computer modeling programs: DREAM, TDAST, Visual MODFLOW, and RESSQ. There was a good turnout of the Branch membership at the meeting, as well as many nonmembers interested in transport modeling. The Central Coast Branch thanks Zymax for sponsoring this meeting.

The January 1996 guest speaker was Mr. Rick Iger of the Kern County, Water Agency, who discussed Groundwater Banking in Kern County.

Please watch for our next flyer announcing the time and place for our next meeting!

San Francisco

Executive Director of AIPG to speak in San Francisco Bay Area to AIPG/GRA.

The American Institute of Professional Geologists, Northern California Section and the Groundwater Resources Association, San Francisco Area Chapter will hold a joint meeting on Tuesday, February 20, 1996 at the Old Spaghetti Factory in Jack London Square in Oakland. William Knight, Executive Director of the National AIPG, will discuss domestic and international job opportunities fbr geoscientists, national trends in registration and university programs. The meeting will start at 6:00 p.m. with a social/dinner. The I hour talk will start at 8:00 p.m. Please reserve by faxing to Jim Jacobs at FAST@TEK Engineering Support Services at (415) 455-1890, or call at (415) 455-1899 by February 14, 1996. Dinner (Chicken/Lasagna/Fettuccine Alfredo/Meat Ravioli)is $15 for members of AIPG or GRA, $25 for nonmembers.

California Geology Board
The Geology Board is under sunset review. Members from the California Board of Geology will discuss the status of the Board at the AIPG/GRA meeting. For more information on the status of the review, please call Robert Tepel, (408) 997-3437

Engineering Board Review
The Engineering Board will have a sunset review in 1997. Engineers should take note of the process that geologists are performing to be better prepared for the sunset review next year.

Past Meetings:
The San Francisco Bay branch had three speakers for its January meeting in Oakland: Seena Hoose, representing the State Board of Registration of Geologists; Steve Morse, Chief of Toxics Cleanup Division of the Regional Water Quality Control Board; and Linda Spencer, Associate Engineer Geologist with the Regional Water Quality Control Board. Attendance for the meeting exceeded 165 people.

Seena Hoose provided a brief update on the status of the Sunset Review of the Board of Registration for Geologists and Geophysicists (Geology Board). What follows is based on Seena's presentation plus late-breaking news from Robert Tepel of the association of Engineering Geologists. On January 29, the Joint Legislative Sunset Review Committee recommended continuance of the Geology Board for four more years, subject to recommended changes. But this is not the end of the process. The Review Committee's recommendation needs to be approved by the Department of Consumer Affairs. Then the continuance of the Geology Board needs to be ftmded in the governor's budget bill and be approved by the governor. Finally, a bill to continue the present licensure act needs to pass the legislature and the governor's desk. There are still a lot of possibilities that could derail the continuance of the Geology Board. If you are affected by this legislation, you are encouraged to write your Assembly Member and State Senator in support of the continuation of the Geology Board.

Steve Morse spoke on expected changes in groundwater cleanup policy pertaining to Containment Zones and leaking underground fuel tanks (LUFFs). These changes in State policy were driven by the National Research Council report "Alternatives for Groundwater Cleanup" dated June 1994. Locally, the Lawrence Livermore National Laboratory report "Recommendations to Improve the Cleanup Process for California's Leaking Underground Fuel Tanks" dated October 1995 concluded that fuel hydrocarbon leaks have had limited impacts and risk to human health, the environment, or groundwater resources, can be effectively remidiated by passive biodegradation, and can be regulated less stringently.

Evolving regulatory responses include proposed Containment Zone and LUFF cleanup policies. The proposed Containment Zone policy would allow a finite area of groundwater (the containment zone) to be degraded. Groundwater is to be contained by hydraulic capture, if necessary. Containment is to be verified by monitoring. Containment zones may apply to low risk sites, fuel leak sites, sites where existing remediation has reached an asymptote of concentration versus time, and to sites where the source has been removed.

Walt Pettit, SWRCB Executive Director, issued a letter on December 8, 1995, providing interim guidance to the RWQCBs and Local Oversight Agencies regulating leaking underground fuel tank (LUFF) cleanups. This letter recommends aggressive closure of low-risk soil only cases, and for low-risk groundwater cases, that active remediation be placed with monitoring to determine plume stability and whether passive bioremediation alone would be adequate.

For more information, access the regional Board computer bulletin board at (510) 2863978 or 286-0404 and read the executive officer's summary report (bulletin EOREP) and download the files: LUFTLLNL.ZIP, LLNLPLUM.ZIP, LLNLGUID.ZIP, LLNLOCC.ZIP, and R2LLNLX.ZIP.

Linda Spencer spoke on 1) an evaluation of beneficial uses of water resources on the San Francisco peninsula and 2) a groundwater protection strategy for the Napa River watershed.

Under SWRCB Resolution 88-63 most groundwater could have a beneficial use as a potential source of drinking water. This strict interpretation of beneficial use requires groundwater remediations to reduce contaminant concentrations below drinking water standards. In reality, however, many groundwater aquifiers have a low probability of use as drinking water. The probability of use can be limited by

economics, yield, quality, risk of sea water intrusion, and other factors. Examples include aquifiers beneath the financial district in downtown San Francisco (limited by extensive contamination from leaking underground sewers) and shallow aquifers around the margins of San Francisco Bay (limited by low yields and potential for sea water intrusion). How the results of this study will affect regulations is not yet known. There are no plans to modify the Basin Plans at this time. It may be possible to modify Resolution 88-63 or interpret the PorterCologne Water Quality Act.

The Regional Board historically has been a "resource *restoration* agency." The Napa River watershed study is a first step toward becoming a "resource *protection* agency." This study used a Geographic Information System (GIS) as a tool to prioritize the value of groundwater resources and their sensitivity to contamination. By Overlaying contamination cases on a map of groundwater value and sensitivity, a regulatory enforcement agency can prioritize contamination cases by risk and focus on those with a high risk of damaging a valuable resource. Future Regional Boards may take a watershed approach to groundwater protection and restoration. Beneficial uses of water resources may be tailored to regional and local conditions. In the future, more information about groundwater resources may be provided to consultants and to the public.

For more information, access the Regional Board computer bulletin board and download file 9512#9.ZIP.

The next San Francisco Bay branch wiII be on Wednesday, March 20 and will feature Martin Reinhard, a professor at Stanford University. Dr. Reinhard will present the results of recent research in groundwater remediation, including passive bioremediation. For reservations, contact Mike MaIey at (510) 450-6159.

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Chemist's Corner

MTBE - WHERE IS IT, AND HOW DID IT GET THERE?

by Barton P. Simmons

Methyl *tert-butyl* ether (MTBE) is an oxygenated compound which has been increasingly used in gasoline in U.S. urban areas to improve combustion and reduce the levels of atmospheric carbon monoxide, hydrocarbons, and ozone. The 1990 Clean Air Act requires the use of oxygenated luels in areas which exceed the national standard for carbon monoxide. Gasoline containing MTBE as the only oxygenated component may contain 15% MTBE by volume.

MTBE has greater water solubility than aromatic compounds; water in equilibrium with gasoline containing 15 vol.% MTBE would contain 9,500 ppm[1]. As a result, it moves more readily into ground water than benzene, toluene, ethylbenzene and xylenes (BTEX), and can create a "halo effect" around a source. MTBE has an average odor detection threshold in water in the range of 45 to 95 ppb and has an average taste threshold of 134 ppb. Because of its low taste and odor threshold, the Oxygenated Fuel Association thinks it likely that more leaking tanks will be discovered.

Since MTBE has only recently been found extensively in ground water, the regulation of MTBE contamination is still evolving. The USEPA is expected to establish a lifetime health advisory for MTBE at either 20 ppb or 200 ppb, depending on whether it is listed as a possible human carcinogen. Because it moves relatively rapidly in ground water, MTBE may confound attempts to remediate leaking underground tanks using "intrinsic bioremediation." MTBE is also not included in the examples of Risk-Based Screening Levels used in the ASTM Risk-Based *Corrective* Action Standard for petroleum releases.

A recent U.S. Geological Survey report found that (MTBE) is the second most frequently detected chemical in shallow urban monitoring wells. They found that MTBE was detected in 27% of shallow monitoring wells and springs in urban areas. USGS found no MTBE in drinking water wells. The USGS used a sensitive GC-MS technique with a reporting level of 0.2 ppb; most of the detected MTBE was below 20 ppb.

Interestingly, the USGS found that the occurrence and concentration of MTBE did not correlate with BTEX in ground water. They offered two explanations for this lack of con'elation. The first is that MTBE is derived from point-source leaks or other discharges. Because it is relatively water soluble, it dissolves readily in ground water and moves faster than BTEX or any other fuel component. The second explanation offered by USGS is a non-point source of MTBE in the atmosphere, resulting from leaks, fueling of automobiles, and spills. Once in the atmosphere, MTBE would dissolve in rainwater and contaminate surface water or shallow ground water.

The occurrence of MTBE has prompted regulatory agencies to add it to existing monitoring programs. For example, the San Francisco Regional Water Quality Control Board sent a letter in July to local agencies and laboratories on MTBE reporting. The Board recommended a reporting limit of 5 ppb for MTBE by USEPA Method 602 or 8020. Initially, some laboratories indicated that MTBE could be added to the target compounds in 602 or 8020 without any additional charge. However, recently some labs have found very high levels of MTBE relative to BTEX. This requires an additional dilution and analysis to quantitate MTBE. The SFRWQCB is requiring collection of MTBE data to assess biodegradation, fate and transport, and potential human exposure. The Board is not requiring remediation specifically for MTBE, nor is it used in site closure at this time.

In October, Jeff Sickenger, the Environmental Issues Coordinator of the Western States Petroleum Association (WSPA), wrote a letter to John Farr, the Chair of the SB1764 Advisory Committee, in which he expressed concern that MTBE reporting by USEPA Method 8020 (gas chromatography - photo ionization detection, GC-PID), may require confirmation. Many labs in California now do "TPH" analysis

with a combination of gas chromatography with flame-ionization (GC-FID) and GC-PID. MTBE can be measured with the same technique, although there is some concern about the identification of MTBE. WSPA is concerned that MTBE may not be correctly identified by GC only, and that MTBE presence should be confirmed by gas chromatography - mass spectrometry (GC-MS), for example, with Method 8260, at least once per site. MTBE is not a target compound in Method 8260, but it can be measured by that method. At least some of the Regional Water Quality Control Boards are adopting the guidance on MTBE, and will be requiring that MTBE be added to TPH and BTEX analysis, and requiring the MTBE confirmation by GC-MS at least once per site.

In a future column, we plan to discuss the status of risk-based measurements for petroleum releases, and what role MTBE may play in risk-based corrective action.

The problem of accurately measuring MTBE is being resolved. The environmental behavior of MTBE needs better understanding before we understand the sources; the assessment and remediation of MTBE contaminated plumes are problems which will require the concerted efforts of all concerned.

Barton P. Simmons, Ph.D., is an environmental scientist with the Hazardous Materials Laboratory, California Department of Toxic Substances Control in Berkeley.

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1. "MTBE in Ground Water, Fact Sheet for Local Health and Water Authorities," Oxygenated Fuels Association, March, 1995.
2. Squillance, Paul J., *et al* "A Preliminary Assessment of the Occurrence and Possible Sources of MTBE in Ground Water of the United States, 1993-94," U.S. Geological Survey Open-File Report 95-456, 1995. Copies of the report are available from: U.S. Geological Survey, Earth Science Information Center, Open-File Reports Section, Box 25286, MS 517, Denver, CO 80225-0425.

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Developing EPA'S Groundwater Disinfection Rule

by Bruce A. Macler, Ph.D.

EPA is in the process of developing requirements for disinfection of groundwater-based drinking water systems (Groundwater Disinfection Rule, GWDR). The approach now being taken for this is somewhat different from that taken for other drinking water regulations. This paper will discuss the context, issues and status of this rule as of December 1995.

The regulatory work group, made up of representatives from States, EPA and other interested parties, has considered the goals for the GWDR to be that it make a positive impact on public health by ensuring that those drinking groundwater are safe from waterborne microbial disease, that it be feasible and that it can be successfully implemented.

Public health concern and the mandate for a GWDR

The health risks from microbial contamination of drinking water are well known. Many diseases have been identified: Hepatitis, Legionnaires's Disease, heart and liver diseases, diabetes, diarrhea and other gastrointestinal illnesses are just a few. The number of annual waterborne microbial illnesses in U.S. is estimated between 1-15 million cases. The majority of these are gastrointestinal diseases. These are generally acute and short-lasting, but for some may be chronic or yield chronic symptoms. These can be severe or fatal to some people, including the elderly and especially the immunocompromised and immunosuppressed. Estimated annual waterborne disease deaths in U.S. are between 900-1800.

It is not known how many of the 110 million people served by groundwater-based (versus surface water-based) public water systems become sick each year. Many disease outbreaks in the U.S. have been associated with groundwater systems, but we believe that this substantially underestimates the actual endemic disease rates, since the majority of waterborne disease cases go unrecognized and unreported. Because of the public health and regulatory implications of this, EPA has initiated research to better estimate these rates and determine their public health impacts.

Available occurrence data indicate at least 60-70% of groundwater sources have been contaminated with lecal viruses or bacteria. However, the health significance of these findings are unclear. This contamination is wide spread and results from human and animal fecal material migrating from surface deposition or from septic systems and sewers. Several occurrence studies are currently underway to provide a more detailed national picture of the problem, particularly to identify site conditions, such as hydrogeology and land use patterns, that may affect contamination of wells.

Analysis of EPA enforcement data show about 40,000 of 180,000 groundwater systems have had violations indicating bacterial contamination of groundwater, well or distribution system. Contamination of distribution systems results from crosscontamination events and from bacterial regrowth within a system. Larger community systems appear to have more distribution system violations. Smaller community and non-community systems tend towards source water contamination.

All these lines of evidence indicate that microbial problems exist in many groundwater systems. Fortunately, disinfection of pathogenic microorganisms in drinking water has long been acknowledged to yield significant improvements in public health. Few would question the general advisability of such treatment. Because of this, Congress directed EPA in the 1986 Safe Drinking Water Act Amendments to develop national requirements for disinfection of all public water systems. Under this legislation, these systems must disinfect their water, unless criteria are met to avoid disinfection. The Surface Water Treatment Rule (SWTR), promulgated in 1989, addressed microbial contamination of drinking water from surlace sources. The obvious vulnerability of surface waters to microbial contamination led to stringent provisions for filtration and disinfection and limited avoidance criteria. The analogous rule for groundwater systems is now in development. Since groundwaters may be less vulnerable to microbial contamination and contaminant organisms may be filtered out or inactivated during passage through the subsurface, these

regulations will include well-developed and realistic avoidance criteria.

Current status of GWDR development

The formal EPA work group reconvened in January 1995 and meets regularly. It includes representatives from all 50 State drinking water programs, as well as EPA drinking water and groundwater staff from headquarters, laboratories and regions. All interested parties are encouraged to provide input to the rule development process. The intention of this open process is to ensure adequate discussion of issues and approaches prior to the development of regulatory language.

EPA is currently under a court-ordered deadline of December.

1995 to begin negotiating a schedule for proposing and promulgating a GWDR. The realistic time requirements for the necessary research, public discussion, regulation development and review suggest a proposal towards the end of 1997 or early 1998.

A variety of issues must be considered in the development of an appropriate regulation. 1) Public health goals will largely determine regulatory requirements and will influence avoidance criteria. Should this regulation focus on good operations and maintenance to enhance system reliability and thus ensure protection, or set specific treatment requirements to achieve acceptable numerical risk goals? 2) As noted above, the impacts of microbial contamination are poorly known. If these are large and widespread, groundwater systems would be considered "guilty unless proven innocent" and GWDR requirements far reaching. Treatment might be mandatory. Avoidance criteria might be stringent. If impacts are small, systems could be "innocent unless proven guilty" and the GWDR limited. Reliance on monitoring and programs to protect sources and systems might be emphasized. 3) EPA is concerned for consistency of the GWDR with other regulations. A wide variety of State regulations currently exist addressing microbial contamination of groundwater systems. The Total Coliform Rule has provisions that address several of the microbial problems of groundwater systems. Other drinking water regulations may affect choices for treatment or avoidance criteria. Any GWDR must be consistent with these. It will be important that the GWDR reflect and support those proven to be protective of human health. In this sense, the GWDR aims to provide national standards flexible enough for States now providing adequate regulation to continue without substantial new impacts, while ensuring that protection is given to individuals in States that do not. 4) At least some systems plausibly should not require disinfection. Means to accurately determine system vulnerability to contamination and set appropriate avoidance criteria must be available and field tested. These criteria should reflect credit for source water protection and well-head protection programs, cross-connection and back flow prevention programs, as well as existing State well codes and well siting requirements. They must also consider the hydrogeological factors affecting pathogen die-off rates and travel times and distances in the ground.

Possible easts and benefits

A major concern of the regulated community is the potential costs of this regulation. Costs and benefits will be determined quantitatively when the necessary information is available and potential elements of the rule developed, but are likely to be positive. The benefits of this rule will depend on the extent of the existing national problem, the public health goals selected and the rigor of implementation and enforcement. It is not yet known how many annual cases of waterborne disease could be prevented, but they are likely to be substantial. Approximately half the community groundwater systems currently do not treat their water. Substantially fewer noncommunity systems (schools, factories, rest stops, restaurants, etc.) disinfect. The work group has recognized that costs for even a minor case of diarrhea resulting in lost workdays and a trip to the physician may exceed $500. A recent report by the Congressional Budget Office on the costs of the SDWA concluded that the benefits from the SWTR substantially outweighed its costs. We expect a similar result for a GWDR.

As with the SWTR, a "treatment technique" approach will be developed, specifying operational requirements rather than achievement of MCLs for specific microorganisms. This is because methods to detect pathogens belbre they reach the customer are not available. Utilities' concerns for high costs Irom a

GWDR are reflective of the possibility that such treatment could be required at every well. While this is possible, technologies for inactivating microoganisms in groundwater are well understood, practical and relatively inexpensive. About half the community systems currently have some type of disinfection and may not require substantial additional treatment. A major unknown being addressed is any potential need for storage capacity to achieve chlorine CT values. Storage tanks pose problems for siting, distribution system maintenance and costs. The use of chlorine itself may be a problem for some systems for compliance with the upcoming Disinfectant/ Disinfection Byproducts Rule. Besides chlorine, ultraviolet light and ozone are being considered as possible candidate disinfectants.

Alternative approaches to avoiding treatment generally require siting wells in locations not vulnerable to microbial contamination, providing adequate operations and maintenance and ensuring protection of the distribution system. These include conducting sanitary surveys, correcting any inadequacies, and compliance with groundwater source protection elements, well construction codes, cross-connection control programs and back flow prevention programs. Vulnerability to contamination varies greatly with hydrogeological setting, such that certain regions may not be significantly impacted by a GWDR, while other regions may require significant resources to comply. The magnitude of this is unknown at this time.

Current, highly speculative estimates for annual household costs suggest that these would be less than $100 for the smallest systems and in the range of $3-5 for the largest systems.

Conclusion

There are substantial reasons fbr EPA to move ahead with development of a GWDR, to determine health issues and goals, initiate necessary research and examine regulatory approaches.

The health hazards are well established. Occurrence may be widespread. Treatment technology is reliable and affordable. Approaches to avoiding contamination and treatment are practical and applicable to many contaminants. Finally, groundwater systems are not required to disinfect at this time; thus some populations may be inadequately protected from waterborne disease organisms. This does not mean that the elements of a GWDR have been determined or are obvious. The opportunity is here to fully consider a GWDR prior to proposal.

Bruce Macler, Ph.D., is the Groundwater Disinfection Rule Manager for the U.S. Environmental Protection Agency.

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Incoming President's Message

bv Susan Garcia

As the Groundwater Resources Association embarks on its fifth year in existence, we are proud to report that we have over 600 members statewide and currently have six active state branches. This is exciting, if you realize that this organization was just a vision little over five years ago, implemented by a group of individuals who sought to develop an organization that addressed the technical issues related to California groundwater. In this fifth year, we intend to continue to implement this vision by providing an exciting lineup for 1996. A few things that our membership can look forward toward this year are:

- GRA's Home Page on the Internet, so that our membership can provide us with feedback, contribute technical articles for Hydrovisions, and request information from our Board of Directors, Executive Director, and State Officers.
- 1996 Annual Meeting which will be held for the first time in southern California, during the second week of October 1996. The theme for the meeting is "Multi-disciplinary Solutions to California Groundwater Issues".
- Mini Outdoor Seminar evaluating Rapid Field Testing Techniques for Site Evaluations to be held in early July 1996.

Come join us in embarking GRA to new heights during 1996!

Thank you Anthony Sarancino, 1995 President for your service during the past year, may you enjoy your abbreviated duties as Board of Director Chair, and thank you to all those individuals, companies, and sponsors who made GRA's first four years such a success. Thank you for the opportunity to serve you during 1996. (Individuals who would like to send me a message via the Internet, 1 can be reached at 73661.1162@compuserve.com).

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GRA'S

Technical Committee Reviewing LLNL Report

by Susan Garcia

In October 1995, the Lawrence Livermore National Laboratory (LLNL) submitted their report entitled, "Recommendations to Improve the Cleanup Process for California's Leaking Underground Fuel Tanks (LUFTs)" to the California State Water Resources Control Board (SWRCB) and the *SB* 1764 Leaking Underground Fuel Tank Advisory Committee. Recommendations made in this report may be used to revise SWRCB Resolution 92-49 in early 1996. In response to this report, Wait Petit, Executive Director of the SWRCB issued a letter on December 8, 1995, requesting that cIeanup oversight agencies to "proceed aggressively to close *low nsk* soil only cases," and for *low risk* groundwater cases (groundwater with a maximum depth to water less than 50 feet of the leak)'* he recommended that "active remediation be replaced with monitoring to determine if the fuel leak plume is stable." The various California Regional Water Quality Control Boards (RWQCBs) are currently preparing their positions associated with the LLNL report and how they will implement the findings within their regions.

GRA's Technical Committee, chaired by Bob Nicholson, are currently reviewing the LLNL report for technical approach. The GRA Board of Directors, Executive Officers, and Branch President's recently held a teleconference with two of the authors of the LLNL report so that we may evaluate our position on the report. We will developing letter containing our technical comments associated with the report and submitting it to Jim Graham, Executive Director, at 916/4441418. In addition, those members who would like to give their comments on the report can transmit them to Susan Garcia via the Internet at 73661.1162@compuserv.com.

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Outgoing President's Message

by Anthony Saracino

My two years as President of the Groundwater Resources Association has afforded me many opportunities, not the least of which was the chance to formulate some extraordinarily profound theories based on my personal experiences and observations. Upon my departure as President, I am compelled to share Theory No. 86, developed after a good deal of experimentation and thought-provoking conversation at numerous dinner meetings. Theory No. 86 states: It is impossible to get a good martini in a Chinese restaurant.

If you think about it for a long time, you will come to realize that this theory is a simple yet brilliant allegory for the interrelationship between effective groundwater management and the survival of California. This relationship can be proven by way of mathematical formula, but a rather untimely lack of space in this issue of our newsletter prevents me from working through that right now.

- Instead, let me highlight some of GRA's true accomplishments over the last two years:
- We attracted over l OO new members interested in California groundwater issues
- Jim Graham was appointed GRA's first Executive Director
- We increased our involvement in groundwater education, including participation in the creation of the Water Education Foundation's California Ground Water Map
- Ground Water Model, and new Ground Water Tour in March 1996, we cosponsored the Association of California Water Agencies' seminar on conjunctive use
- Our Southern California branch hosted a workshop with the California Regional Water Quality Control Board, Los Angeles Region, on their Interim Site Assessment and Cleanup Guide book.
- Our education committee cosponsored workshops in northern and southern California on groundwater management planning
- We sponsored legislation pertaining to groundwater issues
- Our branches held numerous dinner meetings with distinguished speakers, including Jay Lehr's talk entitled Environmental Cleanup Reevaluated: Are We Compromising?
- The Board of Directors provided comments to the State Water Resources Control Board on Resolution 92-49 (nonattainment zones) that were considered and adopted in the revised resolution (containment zones)
- The Association received a grant from the U.S. EPA to prepare a guidance document for groundwater management in California
- We cosponsored a California hydrogeology seminar, including a review course for the hydrogeologist certification
- We co-hosted a successful annual meeting with the Association of Engineering Geologists in Sacramento with over 600 attendees.

I am proud to have been at the helm of the Association during these accomplishments, but none would have been possible without the efforts of our dedicated board members, officers and volunteers -- they are the true backbone of the Association and I would like to express my sincere appreciation for their help and contributions. Two particular individuals that deserve specific mention are Vicki Kretsinger, our past president, and Susan Garcia, our future president; they have worked tirelessly to organize and promote GRA's seminars and annual meeting, among other things, and I look forward to helping implement Susan's new vision for the Association.

On a final note I must say that the single most rewarding accomplishment of my career to date has been my tenure with GRA. My involvement with the Association has given me the opportunity to be involved in protecting California's most valuable resource while developing personal relationships and friendships that I anticipate will last a lifetime. I can think of no greater reward, and for that I am truly grateful.

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Passive Oxygen Barrier For Groundwater

New In-Situ Technology

by Jim Jacobs

Based on the Lawrence Livermore UST study and the recent letter by Walt Petit of the State Water Resources Control Board regarding site closure, active remediation systems for petroleum contamination may be unnecessary.

Oxygen Release Compound (ORC) can be used as the primary treatment method at sites where groundwater contamination concentrations require active remediation. The goal of using ORC is to prevent plume migration off-site. The treatment method described here uses a Geoprobe direct push technology rig and other equipment to install an ORC plug. In series, the plugs form an oxygen barrier across the contaminated plume. A properly designed row of ORC plugs will slowly release oxygen, enhance bioremediation, and cut off the plume in the oxygenated zone. Where remediation systems are presently installed, ORC can be used concurrently to improve clean-up results.

It appears that the limiting factor associated with the natural attenuation and mass reduction of the BTEX (benzene <50 ppm) compounds in groundwater plumes is oxygen. The ORC has the composition of milk of magnesia (magnesium peroxide). The ORC is activated by moisture, giving off a slow release of oxygen. The by-products of the reaction are oxygen and ordinary magnesium hydroxide. The ORC generates higher dissolved oxygen levels than is possible with air.

With regulatory acceptance, ORC has been placed in filter socks and placed in wells since 1994. A new pressure grouting technique has been designed to construct a passive bio-treatment zone or oxygen barrier to prevent off-site migration or to decrease site closure time. Prior to installation, intrinsic bioremediation surveys collect data such as lithology, contaminant concentration, dissolved oxygen content, enzyme activity of soils, carbon dioxide, nitrates, sulfates, temperature, pH and other data. Computer modeling is used to determine optimum ORC spacing, oxygen demand and length of treatment.

The plugs have a useful life of about I to 2 years, depending on the contaminant concentration, bioactivity, and flow rate. The passive system can be used on a leading edge of a plume, along sewer trenches, at property boundaries and as a full-scale passive remediation design. The costs for installation are a fraction of the costs of conventional treatment methods. In addition, operations, maintenance and monitoring costs are reduced. For more information please call (415) 455-1899.

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Current Research and Case Studies of Land Subsidence:

Proceedings of the Joseph F. Poland Symposium

Under the Auspices of the Association of Engineering Geologists, selected authors of oral and poster presentations at the recent Joseph F. Poland Symposium on Land Subsidence will prepare written papers lot this comprehensive compendium. In this volume you will find papers that describe current and historical research, new approaches for subsidence measurement and predictive modeling, case histories describing site exploration and evaluation, damage to infrastructure, and engineering of remedial construction, and discussion of legal and political issues related to land subsidence. Contributors from the United States and many other countries are researchers, practitioners, planners, and attomeys with experience in the study, mitigation, and · societal impact of land subsidence. The career and contribution of Joe Poland will be presented as discussed by his colleagues: friends, and family at the recent symposium named in his honor.

Topics include land subsidence associated with:

- migration or removal of subsurface
- fluids: ground water, brine, hydrocarbons
- hydrocompaction of moisture deficient sediments: debris flow deposits, artificial fill
- oxidation of peat deposits
- collapse of underground and solution mine voids
- tunneling
- karst
- terrain
- tectonics

This valuable addition to your reference library will be approximately 500 pages, 81/ 2 x 11 inches, enhanced by numerous maps, photographs, and a library-quality hardcover binding.

You may order copies at the discounted prepublication price of $49.95. Reserve copies for yourself, your company/University library, and your colleagues.

Contact Jim Botchers, U.S. Geological Survey, 7750 College Town Drive, Suite 208, Sacramento, CA 95826, (916) 2783005, lax (916) 278-3013.

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Secretary of State Unveils Water History Exhibit

by Vicki Kretsinger

An exhibit of California water history was unveiled by Secretary of State Bill Jones on Nov. 15, 1995 at the new State Archives building. This is the first event of the California Water History Project, a joint venture by the California Historical Society, California State Library, California State Archives, University of California Water Center, and the Water Education Foundation.

The exhibit focuses on early California water history, from the Forty-niners to the development of the State Water Project. Among other items, it features paintings from the California Historical Society, diaries, books and documents from the State Library and the UC Water Resources Center, historical documentation on the State Water Project and Central Valley Project, and artifacts unearthed during excavation for Metropolitan Water District of Southern California's Eastside Valley Reservoir. Some of the exhibits include:

Early California Water - Gold Rush mining and use of water; development of early water and irrigation companies; and reports and maps from the first state engineer's office.

Irrigation and Water Rights - Court transcripts from Lux v. Haggin, the Supreme Court decision that reaffirmed the legal preeminence of riparian rights in 1886; the Irrigation District Law, referred to as the Wright Act, permitting formation of irrigation districts and recognizing the use of water for irrigation as a public benefit due public funding; documents establishing and publicizing early irrigation districts.

The Imperial Valley and the Colorado River Development of the Imperial Valley from a desert into an agricultural region; the all-American Canal; flooding and the formation of the Salton Sea.

Bringing the Colorado River to California Construction of Boulder Dam, later renamed Hoover Dam; the Colorado River Compact.

Bringing Water to Southern California - The Owens Valley and the Los Angeles Aqueduct; the Metropolitan Water District of Southern California and the Colorado Aqueduct.

Other Uses of Water - Municipal, hydropower, navigation.

San Francisco Water Supply -The Spring Valley Water Company; John Muir's efforts to preserve the Hetch Hetchy; the construction of the O'Shaughnessy Dam and Hetch Hetchy Aqueduct.

The Federal Central Project - Documents, artifacts and photos related to passage of the California Central Valley Project Act; construction of the project.

The State Water Project - State Water Plan pamphlets and reports; Oroville Dam; San Luis Reservoir; Peripheral Canal initiative.

Metropolitan Water District's Paleontology/Archeology Exhibit - Artifacts discovered in the excavation of the Eastside Reservoir Project (formerly known as the Domenigoni Valley Reservoir Project).

Other Water Issues - Hydraulic mining; flooding and the failure of the St. Francis Dam; the Reber Plan for San Francisco Bay; water conservation.

The Delta - Modern views of the Sacramento-San Joaquin Delta.

Fiction and Scholarship dealing with Water Samples of the many books published dealing with California water.

Development of the Water Education Foundation - Founding of the Water Education Foundation; Western Water magazine.

The goal of the California Water History Project, organized by the Water Education Foundation, is to bring attention to the importance of water in the development of California – economically, politically, culturally and socially. Funds solicited for the opening event were used for the purchase of display cases for the exhibits, and for future activities, such as the collection of oral histories and to solicit materials for the Water Resources Center archives. The exhibit is open to the public from 8 a.m. to 5 p.m., Monday through Friday, at 1021 O St., Sacramento.

This special exhibit is on display until midsummer 1996. After, the importance of water in the development of the state will be interwoven throughout the exhibits being developed for the new history museum in the State Archives building. The museum is slated to open in mid-1997.

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