

HYDROVISIONS

GROUNDWATER RESOURCES ASSOCIATION
OF CALIFORNIA

Volume 1, No. 3

Fall 1992

PRESIDENT'S MESSAGE

Make Plans to Attend GRA's First Annual Meeting

-See pages 6 & 7 for details

Time is running out to register for GRA's Charter Year Annual Meeting. To commemorate the occasion, we have selected one of San Francisco's famous landmarks, the Mark Hopkins Hotel. In conjunction with the annual meeting, the conference *Vision's into California's Vital Resource* will address water quality monitoring at hazardous waste facilities in California and groundwater basin management. The conference will be an excellent opportunity to learn from a variety of speakers who are recognized for their specialized experience and to exchange ideas with all factions of the groundwater industry. The conference is being conducted in cooperation with the Cal EPA Department of Toxic Substances Control and the State Water Resources Control Board, the Water Education Foundation, the Association of California Water Agencies, and the U.S. Environmental Protection Agency.

"The conference will be an excellent opportunity to learn from a variety of speakers who are recognized for their specialized experience and to exchange ideas with all factions of the groundwater industry."

Association Update

Nine months into GRA's charter year, the Association has grown to nearly 450 members. As a very young organization, we have made our mark on the groundwater industry. GRA has been recognized in other states, nationally and even internationally. Most importantly, our primary objectives, to provide a ground-

water organization which allows for local and statewide interaction and information exchange among members, and to provide the infrastructure which allows an equal voice for groundwater professionals comprising all avenues of the groundwater industry, have been implemented. We have gained recognition by state and local health officials and have been asked to provide technical review and comments on draft ordinances and other documents. In response to the expressed desire of the members to get involved in educating not only its members, but also the public, GRA has participated in three educational workshops. GRA's member participation and enthusiasm have helped our association progress a long way in a very short time.

As we enter the last quarter of 1992, we still have a lot of foundation building yet to accomplish. We have established a number of committees, some of which have been very active this year. By the end of 1992, we will establish goals and objectives for GRA's standing committees so that all committees are functional next year.

With our phenomenal success, we've also had some growing pains. The rapid membership growth has made State/Branch interaction on a timely basis a challenge to say the least. We have retained the services of Wendy Ernst of Gordian Business Solutions to assist us with organizing our membership information in a database and with producing our membership directory. She is also coordinating the annual meeting. We will soon be providing the Branches with a monthly news update and also a monthly listing of new members to ensure that the Branches have current membership rosters and to improve member awareness of State and other Branch activities.

Education Workshops/Seminar

One of GRA's stated objectives is to "assist the development of scientific educational programs that promote the understanding and implementation of groundwater assessment, protection, and

Continued on page 2

Taking A Closer Look At Well Design

-by Gene Luhdorff, Jr., P.E.

Regardless of your use of a well, be it for water development for potable use, a monitoring well for aquifer evaluation, or an extraction well for site mitigation, chances are your understanding of well design principles have been formulated based upon industry standards that came into general acceptance in the mid-1960s and early-1970s. And, I think they are wrong.

J. L. Lummus, writing in the Journal of Petroleum Technology in 1970, under the subject of "Drilling Optimization," divided the development of rotary drilling into four distinct periods: the Conception Period - 1900 to 1920; Development Period - 1920 to 1948; Scientific Period - 1948 to 1968; and Automation Period, which began in 1968. If we were to amend his

Continued on page 2

IN THIS ISSUE

Litigation Avoidance 3

Chemists' Corner 5

Branch Activities 8

GRA Development in Education 9

Committee Reports 11





PRESIDENT'S MESSAGE

Continued from page 1

management." The Association recognizes the benefits of encouraging cross-education between its members. We all have something we can learn from one another. The varied composition of our membership provides us with outstanding educational opportunities. We intend to encourage members and non-members to get involved.

Another area of educational opportunity exists in what we as an association can provide to the public. GRA envisions the support of educational programs at all levels. By providing input to children's programs, we can encourage their interest and their parents' interests in science and technology. The protection of groundwater in this state and the nation requires that the public be aware of water concerns and be interested and motivated enough to actively participate in solutions.

GRA participated at the California Environmental Health Association, Superior Chapter Conference that was sponsored by San Joaquin County Public Health Services, Environmental Health Division. The conference included a series of educational topics related to groundwater protection, investigation and remediation. GRA's Vice President, Anthony Saracino, participated in the National Groundwater Education Consortium along with the Water Education Foundation (WEF) in September in Minnesota (see article in this issue). As a result of that conference, GRA is participating with WEF and the California Department of Water Resources in a proposal for grant funds from the W.K. Kellogg Foundation to develop groundwater educational materials. Most recently, GRA was invited by Andrew Stone, program director of the American Groundwater Trust, to participate in an educational workshop conducted October 1, 1992 at the National Groundwater Association Convention. The workshop allowed for

information and idea exchange among many different states and encouraged further networking among groundwater groups to capitalize on our collective strength.

Membership Directory

With the assistance of Wendy Ernst, membership information on the Association's application form is being processed into a relational database using the software, Paradox. The database includes such information as member names, addresses, companies, type of business, counties, specialty fields, and Branches. Please let us know if you have had a change of address since becoming a member.

Board of Director's Meeting

On October 14, the Board of Directors and representatives from the Branches are meeting in West Covina to discuss activities of the Association. The Board will review Branch operations and activities and exchange ideas on how to improve membership benefits and encourage participation at the local level. We will also be discussing committee functions, bylaws modifications, plans for 1993, educational activities, and association goals for the future.

Newsletter

We hope members find the newsletter interesting and informative. Special recognition is due the two most active members involved in the production of HYDROVISIONS, David Von Aspern and Sue Erikson. We are also grateful for the talents of Janie McGinn and Frank Espinoza of DrawingBoard Studios for the layout and final presentation of the newsletter. We encourage you to submit articles. Membership contributions result in active dissemination of scientific and technical information and facilitate involvement by others in continued advancement of the groundwater industry in this state. ●

Well Design

Continued from page 1

writing today with respect to the water well industry, we might close the period of Automation in 1980 and establish the period from 1980 to present as the Environmental Period of rotary drilling development.

Interestingly, we could also drop the name "rotary" and apply these time periods to all forms of drilling used in the field of groundwater development and investigation.

Truly the period from 1948 to 1968 was the period in which the concepts of proper well design began to be accepted and practiced in the groundwater industry. The drilling industry, like all industries, has always been in a period of transition. Nearly 100 years of drilling technology have been recorded and documented by the U.S. Petroleum Industry, the U.S.G.S., numerous engineering societies, the National Ground Water Association, universities across the country, and by members of the groundwater industry. My library is replete with numerous books and publications on the subject of well construction and design. I gave my first lecture on well design before the California Irrigation Institute in 1963 (which I titled "Engineering a Hole in the Ground"). So why, after all these years, do I say there is something wrong with well design principles? They are wrong because our design principles are based on the concept that groundwater flow into a well is uniform across the length of one or more well screens, a condition that does not occur in the "real world." But more on that in a little while.

During the period of the 1960s, I had the pleasure of meeting with and becoming friends with some of the "giants" of well design principles in the groundwater industry. Among them were Tom Ahrens, USGS, who served with distinction on the Board of Directors of NWWA; Gerald Briggs and Joe Mogg of the Johnson Well Screen Company; George and Roscoe Moss of the Roscoe Moss Company;

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and John Mann of USC to name just a few. Each wrote extensively on the subject of groundwater development and well design. Yet each shared differing approaches to final well design. With each, I discussed their individual views on such topics as gravel pack design, slot selection, screen length and well development. It is safe to say that none of these men, with their years of on-hand, practical experience, were they all with us today, would agree with the strict rules and regulations regarding well design we see so rigidly applied today in this industry. Moss and Mann practiced the use of higher inlet velocities in well design and the use of standardized gravel packs; Ahrens proposed the use of larger pack-aquifer ratios and larger slot sizes for most well completions, while Briggs and Mogg promoted the use of their wire-wrapped well screens and low inlet velocities. All of these men produced excellent well completions in the field.

I, for many years, remained puzzled by the conflicts of design principles used in the industry. As a drilling contractor, drilling throughout the western United States, I applied all of their concepts from time to time with

generally good success. In fact, as the result of my years of experimentation, I, like other drillers, established my own accepted principles. So who was right? Or who, if any, was wrong? For most of the environmental industry and to a large degree, the municipal groundwater industry, the acceptance by many federal and state agencies of the Briggs, Mogg well design principles, put to rest further review on the subject of well design. Their work was promoted in UOP Johnson Division's book "Ground Water and Wells" first authored primarily by Briggs and Mogg, then later revised by Driscoll. It has by regulation, and therefore by default, become the only accepted way to design and construct a well. And we see rigidly applied the application of their design parameters. "Entrance velocities shall not exceed 0.1 ft./sec."; "the pack-aquifer ratio shall be 6"; "slot size shall be determined by the size of the pack at 90% retained or 10% passing"; etc.

I do not know how many wells I have designed, constructed, or tested in my lifetime. But it has been a lot and sufficient in number for me to know that the rigid design principles are not necessary nor are they cost effective in

producing a successful well. And interestingly, Joe Mogg and Jerry Briggs, if they were with us, would be the first to agree!

But back to my original comments on flows into a borehole. Commencing in 1969, I began to evaluate flow into a well caused by pumping. By placing a velocity probe into a pumping well, one can determine the distribution of flow into a well across the length of a well screen. My first application of this tool was to determine the vertical distribution of water being produced through a 1000-foot-long well screen in a near homogeneous aquifer in southwestern Arizona. Analysis of the data indicated that nearly all production was occurring (up to 3000 gpm) from the upper 200-foot portion of the screen. As pumping tests were performed at varying flow rates from 500 to 3000 gpm, only small increases in contribution from the lower depth of the aquifer were noted, and no production was occurring from the well below approximately 300 feet of screen. Near the top of the screen (which was placed nearly 1000 feet beneath the ground surface), inlet velocities were quite high.

I have repeated this study on numerous wells in Arizona, Washington, and California. I have conducted this study in single aquifer completed wells and from multiple aquifer completions that are so common in California well construction. In nearly every well tested, the greatest production always was from the shallowest formation, or from the screen which was closest to the suction of the bowl unit of the pump. The lowest screens, or those screens farthest from the bowl unit of the pump, seldom produced water to the well. Calculations showed that inlet velocities from the producing wells would be quite high in the screens nearest the bowls and progressively lower as distance increased away from the bowl unit. And yes, if the bowls were lowered to areas of the well below the highest screen, production could be induced into the well from screens (aquifers) which were not producing water when the bowls were placed above the upper screens.

What does this suggest regarding how deep a well should be constructed or how much screen should be installed in a well? In the case of the Arizona wells, well depths in the area were routinely 2000 feet. Based on this study, successful wells were completed at depths of 1500 feet without a reduction in yield. Inlet velocities however, greatly exceeded 0.1 ft./sec. in the upper screens, and yet they were

Techniques For Litigation Avoidance

-by Jeffery Scharff

[Editor's Note: This is the second in a series of three articles on some techniques and issues to avoid getting sued. The article is a continuation of Mr. Scharff's speech at the April 1992 Groundwater Resources Association, Sacramento Branch meeting.]

You will recall that in the first article of this series, our hypothetical entity, Generic Environmental Firm (GEF), had set up as a new environmental consulting firm. We discussed some potential areas of liability that related primarily to the organizational aspects of a new business.

GEF is now fully established and staffed. But that does not mean our fictional principals can rest on their laurels. Instead, the day to day press of business often lays unwitting traps for the unwary. Diligence and common sense are the guidelines that govern business conduct in California, and nowhere more so than in the rapidly expanding and constantly changing field of environmental law.

As GEF grows the principals find the time demands are too great and, as a result, additional staff is added. New staff members require proper orientation on both firm practices and policies including such routine matters as personnel manuals, not to mention specific training such as 40 CFR 1910.120. Memory is short and the only adequate way to ensure that these matters are covered is through documentation. This means that readily accessible, well organized records are kept available should they need to be referred to in the future.

Speaking of documentation, there is an emerging issue surrounding the availability, of insurance coverage. Although still expensive and limited in availability insurance carriers are beginning to offer some pollution insurance. For both GEF and its clients (not to mention yours) it is advisable

Continued on page 4

Continued on page 5



Litigation Avoidance *Continued from page 3*

to keep any and all insurance policies that may ever be issued. This means not only the certificate of insurance, but the actual text of the policy which the company issues. Insurance companies are routinely destroying policies as soon as they are legally entitled to do so. Over the years policy terms and conditions change and although current policies have the so-called absolute pollution exclusion, earlier policies had less rigorous exclusions and in some cases, exclusions were non-existent. This suggests that if there were changes in the past, there are likely to be changes in the future, and the only way to absolutely prove the type of insurance coverage that may have existed is through the physical possession of the policy and its contents.

Although we are discussing litigation avoidance, once sued, keep in mind that insurance policies have not only a provision that speaks to coverage and reimbursement for potential liability but also a much broader duty on the part of the insurance carrier to provide a defense in the event of a lawsuit. Many times lawsuits are brought on claims that, at best, may be questionable and as a result can be defended. However, the cost of defending these suits can be significant for a large firm and potentially devastating to the smaller consulting firm like GEF. As a result, the duty to defend that is part and parcel of an insurance policy can have as much or greater value to the coverage provisions.

Environmental consultant liability can take many different forms. One of the areas of greatest activity and involvement by environmental consultants is the Preliminary Site Assessment. These will be referred to under a variety of different names—Phase 1, Phase 2—but the general idea is to provide a prospective purchaser or financier with information about the existence of environmental issues or the lack thereof on a property being evaluated for purchase or as collateral. Under the law, any person who owns or has operated on a property that is determined to have toxic problems is subject to joint and several strict liability. This means that any one individual could be held accountable for the entire cost of cleanup and they have no meaningful opportunity to defend against the liability. A responsible party's only recourse is to seek indemnification or contribution from others who may also share the liability. These are the provisions of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA as set forth in Title 42, United States Code, sections 9601-9675).

As many of you are aware, CERCLA makes provision for the so-called Innocent Landowner Defense. To qualify, the innocent landowner must show that the hazardous substance released was caused solely by a third party who did not have a contractual relationship with the current owner, who exercised due care with respect to the hazardous substance, and the current owner took precautions against the foreseeable acts or consequences of those third parties.

One of the keys to the Innocent Landowner Defense is the exercise of due care to "anticipate foreseeable acts and consequences." These rather vague legalistic standards have very real meaning for purchasers and their consultant's when evaluating a property. To the extent that a purchaser is relying on their consultant's professional opinion as to the presence or absence of hazardous substances on a property it has the potential to create consultant liability for either missed or improperly characterized contamination on a property purchased.

CERCLA has the potential for enormous liability to otherwise innocent purchasers of real property. In order to protect themselves from this liability, environmental consultants are hired to diligently evaluate conditions prior to taking title. The consultant has the dual task of being ever diligent and mindful of their own potential liability while performing work on behalf of a client, as well as the independent contractual agreement to provide services and evaluation on the client's behalf that will be relied upon now and in the future.

There are some thought provoking ideas for a further "sharing" of potential liabilities by both clients and their consultants which will be discussed in the final article in this series on litigation avoidance.

Jeffery J. Scharff, Esq. is a partner in the lawfirm Scharff & Greben. The firm specializes in business, environmental, real estate law and related litigation.

REGULATORY NEWS

The July 17, 1992 Issue No. 948 of *Western States Water* contained an announcement indicating that EPA has released a draft comprehensive state groundwater protection program guidance, as part of its overall groundwater protection strategy for the 1990s. The EPA's strategy, according to EPA deputy administrator Henry Habricht, emphasizes the need for a more comprehensive approach to groundwater protection through the development and implementation of Comprehensive State Groundwater Protection Programs (CSGWPPs). Six strategic activities of a comprehensive program are listed in the draft CSGWPP guidance document and include:

- establish a common groundwater protection goal
- establish priorities to direct all relevant programs
- define authorities, roles and resources
- implement efforts to accomplish the state's goals
- coordinate information collection and management
- improve public education and participation.



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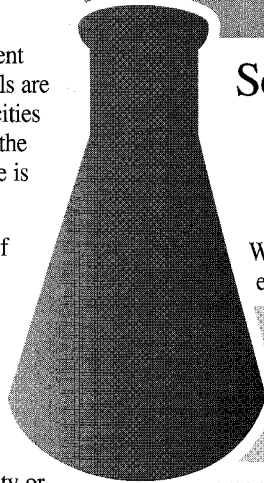
Well Design

Continued from page 3

sand free and efficient wells. I am confident that in California, the vast majority of wells are producing efficiently with high inlet velocities occurring in some of the screened area of the wells. And regardless of regulations, there is nothing we can do about it!

And so when we calculate the open area of the screens in a well and determine the "average" velocity of flow into the well based on our selected screen length at our design flow rate, we should do so recognizing that while our design may provide the desired entrance velocity, the mechanics of groundwater flow will not provide us with the desired average velocity or flow rates in the field. Interestingly, when we calculate transmissivity values from multiple flow rate tests, in an efficient well the values remain "in the real world" fairly constant. We would expect this. But, recognizing that, 1) transmissivity is defined as being the product of the hydraulic conductivity (or permeability) and the depth of the aquifer (even though we are not using the entire depth), and 2) flow rates increase with higher rates of pumping without utilizing the greater depth, what is changing—the hydraulic conductivity? Frankly, we have much to learn. What we can say is that merely adding a lower aquifer to a well completion is absolutely no assurance that it will produce water to the well. In fact, if probably won't! And inlet velocities through upper screens (if located nearest the pump bowls) probably will exceed 0.1 ft./sec.

This phenomena of groundwater flow is not all bad. In fact, understanding this concept of flow into a well, i.e. that flow is not uniform along the length of a screen, offers the design engineer numerous opportunities in altering future well designs, which I will share with you in our next issue. ●



CHEMISTS' CORNER

Seven Seasoned Laboratory Veterans Speak Out On Sampling Pitfalls

-by Kendra DeSantolo, et al

What sort of problems are likely to send your samplers right back out into the field even before they have scraped the mud off of their boots? Why does the sample custodian roll his eyes when you say you don't have the chain of custody (COC) form with you? And, why can't you save up your samples all week, then ship them to the lab on Friday? In the last issue of HYDROVISIONS, Joel Kiff in *Chemist's Corner* discussed the sampling protocol necessary to provide legally defensible laboratory data. This article discusses some more practical, everyday concerns from a laboratory perspective and tries to answer the above questions, among others.

Laboratory testing is a delicate phase of any project. Repeated samples add lab costs and costly time to your sampler's log and can delay analytical results for two to three weeks. It really pays to take the time to lay out a careful sampling plan, building in contingencies for the things that are likely to go wrong—especially sample transportation problems or delays in the field that endanger short holding time tests. The list below is compiled from a poll of seven lab employees having a cumulative experience of over forty years in the business. Anyone can tell you that's a long time in this business, so it's probably worth taking a few minutes to read. Does any of this sound familiar?

Bubbles in VOC containers. When filling VOC vials, reduce the flow rate (if possible) to reduce aeration. Always invert vials to check for bubbles, then top-off if necessary.

Samples exceed holding time while determining what test to do. Send detailed instructions with samples, including contact name and telephone number.

Samples exceed holding time because sampler does not know there is a maximum holding time. Call the lab or request a summary of holding times for reference.

Sample quantity is insufficient to perform the test to optimum detection limit. Right, call the lab or ask for a summary of minimum sample quantities for reference.

Samples were collected using incorrect containers or preservation. Ask for reference. (That's what client managers are here for.)

Bottles break in transit. An all too common tragedy. You can NEVER be too careful in packing bottles for shipment. Bubble wrap! Foam packing!

Samples shipped over a weekend, spoiling because most carriers don't deliver until Monday. Don't ship on Friday unless both lab and carrier arrange for Saturday arrival. Most samples must be continuously maintained at 4 degrees C/40 degrees F!

"Field duplicates" have different color, appearance, and concentrations. Sample must be well mixed in the field, then divided into duplicate sample containers. Successive samples may not show good duplication, especially if both liquids and solids are present in the sample.

Sampler forgot field blanks or travel blanks when collecting volatiles or bacteria samples. Request laboratory travel blanks when collecting samples for volatiles testing. Also, collect field blanks by running sterile or VOC-free water through sample collection equipment.

Highly concentrated waste sample is delivered to lab unmarked as such. Sample is likely to disable the analytical instrument if contamination is not obvious or visible. Highly contaminated samples should be flagged whenever possible.

Sample has two phases (liquid plus solid). Client must provide instructions: filter out solids? analyze solids only? analyze both phases?

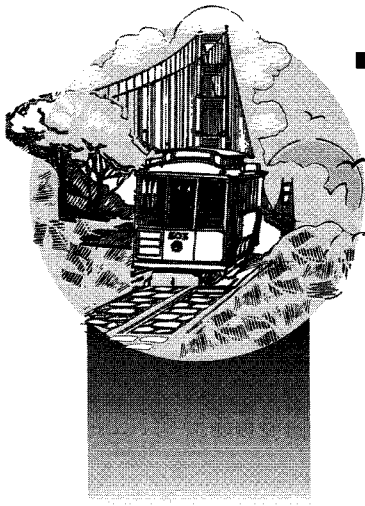
The lab goofed. (ok, it happens sometimes).

Continued on page 8

VISIONS INTO CALIFOR

Groundwater Resources Associati

November 6 and 7, 1992 • M



Keynote Speaker:
Marc Reisner

“Bringing Groundwater Management into the 20th Century – and Beyond”

Mr. Reisner is a well known author who has numerous environmental articles to his credit. He is best known for his award-winning book, *Cadillac Desert*, and his recent true adventure story, *Game Wars*. He has had extensive experience working with both governmental and environmental agencies on water supply projects. He currently acts as a consultant to the Nature Conservancy, and serves on the board of directors of the Freshwater Foundation and the Tuolumne River Preservation Trust. Mr. Reisner is presently at work on his latest project, *Life in California*, for Random House/Pantheon.

Saturday Program

November 7, 1992

Steven Ritchie, Executive Officer,
California Regional Water Quality Control
Board, San Francisco Bay Region

*“Future Directions for California
Groundwater Cleanup Policy”*

Martin Steinpress, Senior Hydrogeologist
James M. Montgomery, Inc.,
Walnut Creek, California

*“Hydrogeology of the San Francisco
Bay Region with Special Attention to
Implications of Contaminant Migration”*

Water Quality Monitoring at Hazardous Waste Facilities in California

A practical guide to compliance with state regulations for water quality monitoring. Topics to be covered include monitoring system design, monitoring parameters and constituents of concern, monitoring frequency, selection of appropriate statistical methods, verification of a release, reporting requirements, and the use of hybrid monitoring programs for evaluation and corrective action. Highlights of the general and specific differences between the Department of Toxic Substances Control and the State Water Resources Control Board monitoring requirements will be discussed. A panel of consultants, dischargers and regulators will discuss problems with regulation implementation.

Speakers

Margie Youngs

Associate Engineering Geologist,
Department of Toxic Substances Control (DTSC)

*“DTSC’s Revised Title 22 Regulations with
Special Emphasis on 40 CFR 264/ 265
Subpart F”*

Ed Wosika

Associate Engineering Geologist,
State Water Resources Control Board
(SWRCB) Chapter 15 Unit

*“Differences Between the DTSC and
SWRCB Monitoring Requirements”*

SESSION A

Panel Discussion Challenges of Compliance

Moderator: **Charlene Herbst**

Manager of Closure and
Remediation Branch, Integrated
Waste Management Board

Panel:

Jill Shapiro
Director of Planning
CH2M Hill

Dwight Hoenig
Manager of Operations,
Mittelhauser Corporation

Ed Wosika
Associate Engineering
Geologist, SWRCB

Margie Youngs
Associate Engineering
Geologist, DTSC

David Kaminski
Vice President of Business Devel-
opment, QED
Groundwater Specialists



CALIFORNIA'S VITAL RESOURCE

Conference and Annual Meeting

Mark Hopkins Hotel, San Francisco

with current groundwater legislation, as well as: 1) inform all those working in groundwater operations, and the ways government and industry California's groundwater management policies,

In Cooperation with:
 California Environmental Protection Agency
 Department of Toxic Substances Control
 State Water Resources Control Board
 U.S. Environmental Protection Agency
 Association of California Water Agencies
 Water Education Foundation

SESSION B

Groundwater Basin Management

A discussion of past, present and future issues relating to groundwater resources management in California. The morning portion of this session will focus on historic and current legislation, including recommendations from the Governor's 1977 commission on groundwater rights in California to current legislation which encourages local agencies to work cooperatively to manage groundwater resources within their jurisdictions. The morning session will also include a discussion of the legal aspects of groundwater basin management, including groundwater rights, third party impacts and area of origin issues, and the technical/institutional implications of implementing current groundwater legislation. The afternoon session will include specific examples of current and future groundwater basin management programs. The afternoon session will also include a discussion of the USEPA Comprehensive State Groundwater Protection Programs.

Speakers

Jim Costa (Invited)

Assemblyman 30th District

"Groundwater Legislation in California - Past and Present"

Anne Thomas

Attorney specializing in water and environmental law, Partner with Best, Best and Krieger

"Legal Aspects of Groundwater Basin Management"

Management"

Bill Dendy

President, Bill Dendy and Associates

"Groundwater Basins and Water Transfers"

Stuart Pyle

Consulting Engineer, Recently retired as General Manager of Kern County Water Agency

"Groundwater Management Programs in Kern County"

Sandy Figuers

Registered Geologist, Rogers/Pacific, Inc. Member of Board of Directors, Alameda County Zone 7 Flood Control and Water District

"Practical Aspects of Conjunctive Use - Considerations for Geologists, Hydrologists, Engineers"

Jim Goodrich

Executive Director

San Gabriel Basin Water Quality Authority

"Building Tools to Effectively Manage Large Groundwater Basins"

Susan Whichard

California Groundwater Project Officer, U.S. Environmental Protection Agency, Water Management Division

"Comprehensive State Groundwater Protection Programs"

Registration

(select one of three different packages)

Package 1

November 6th Conference (Session A or B, Luncheon and Reception)

November 7th Breakfast Program and GRA Annual Meeting

\$200.00 GRA Member

\$230.00 Nonmember

Package 2

November 6th Conference (Session A or B, Luncheon and Reception)

\$180.00 GRA Member

\$210.00 Nonmember

Package 3

November 7th Breakfast Program and GRA Annual Meeting

\$30.00

Registration Fees for Spouse/Companion Tickets

Lunch \$30.00 # _____

Reception \$20.00 # _____

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CHEMISTS' CORNER

Continued from page 5

The good news is that these foul-ups usually happen only once to the same person. The solutions are obvious in most cases. Plan ahead, decide on tests, collect containers and preservatives, and prepare a written summary to send to the laboratory along with the samples. Advance communication in the form of a facsimile or phone call is helpful, so long as all the critical information is addressed, but is still no substitute for sending the COC with the samples. Target dates are helpful, as well as a follow-up call a few days before samples arrive - especially when "rush" turn-around times are needed. It is difficult for the lab to separate incoming projects when weeks or months pass between the call for prices and the arrival of those samples.

Something else that would be very, very helpful to "labbers" is historical data. Nothing quite makes their day like setting up an 8-hour run of samples for low level mercury analysis, only to find that the first sample - identified to us only by client ID - was from an old mine dump, was loaded with mercury, and contaminated the next nineteen samples. After such a run, the instrument may be down for hours or days for reconditioning. It's advantageous to both clients and laboratories if high contaminant levels are anticipated beforehand.

Once again, the seven lab people speak out with suggestions that should help to minimize the "avoidable" errors on lab projects. Pack samples carefully, with adequate packaging to provide temperature insulation as well as secondary containment if initial sample container(s) should break. Notify the lab when you plan to ship samples, especially if arrival will be at the end of the day or work week. At a minimum, incoming paperwork should include:

- COC/Sample Request form with contact name and telephone number
- Tests required including method number, if known
- Turn-around time: When is data needed? Are verbal results adequate?
- Required detection limits, or the regulatory standards to which the laboratory test results will be compared.
- Date/time when sample was taken
- Name and address where report will be sent. Also include billing address
- Critical information about the sample: High levels? Hazards?
- A Ziploc bag to keep the paperwork dry, preferably placed on top of samples!

Kendra DeSantolo is Data Manager for Anlab Analytical Laboratory of Sacramento, California.

Designated Level Methodology for Waste Classification and Cleanup Level Determination.

To determine whether a particular waste management activity or pollutant release has caused or has the potential to impact water quality, RWQCBs often determine applicable water quality goals for the pollutants involved. "Water Quality Goals" are numerical pollutant concentrations, above which pollutants are considered to have adversely impacted the quality of waters of the state. Water quality goals are not necessarily water quality standards (defined specifically in federal regulations), but in effect are the implementation of the narrative water quality objectives contained in the state and regional *Water Quality Control Plans*, as they also include drinking water standards, water quality criteria, advisories and other scientific numerical values which represent concentrations of chemicals that can limit certain uses of water.

"Designated Levels" are concentrations of waste constituents that provide a site-specific indication of the waste's water quality impairment potential. Designated levels are calculated by determining what bodies of water may be or have been affected by the waste in question; site-specific water quality goals are selected and the most limiting of these are multiplied by factors that account for the magnitude of environmental attenuation expected to occur under reasonable worst-case conditions at the site of discharge or pollutant release. The result is a set of "Soluble Designated Levels" for waste constituents of concern that are specifically applicable to both the waste and site, and which, if not exceeded, should protect the beneficial uses of waters of the state.

BRANCH ACTIVITIES

Sacramento Branch

-by David Von Aspern

The third regularly-scheduled (meetings are bi-monthly on second Thursdays) dinner/business gathering of GRA's Sacramento Branch members, and others interested in the topics at hand was held August 13, 1992. The meeting was hosted at the Royal Hong King Lum restaurant in downtown Sacramento by the Sacramento County Environmental Management Department, Hazardous Materials Division. Over 120 participants enjoyed good food and the presentation by Jon B. Marshack,

D. Env., of the Cal-EPA Regional Water Quality Control Board, Central Valley Region (CVRWQCB).

Using overhead transparencies and having provided a 16-page summary paper to meeting attendees, Dr. Marshack's presentation, "California's Water Quality Standards and Their Applicability to Waste Management and Site Cleanup," was very well received, and was followed by a lively question and answer period. The presentation summarized information contained in two CVRWQCB staff reports, *A Compilation of Water Quality Goals* and *The*

The Sacramento Branch held its fourth meeting October 8, 1992, again at the Royal Hong King Lum; the dinner/business function was hosted by West Yost & Associates of Davis, California. The evening's presentation, "Water Transfers/Conjunctive Use in Eastern Yolo County" by Jim Yost, principal with West Yost & Associates and Water Transfer Associates, was for the most part responsible for the diversity of groundwater professionals in the audience of 43, i.e. the usual group of hazardous materials contamination professionals was enhanced by those that practice, for example, in municipal water supply development.

Mr. Yost, having been involved in water transfers from agricultural properties in Yolo County for the past two years, explained that the



water made available to the state's Drought Year Water Bank has in part been supplied by substitution of groundwater for irrigation purposes normally supplied primarily by surface water diversions from the Sacramento River.

Mr. Yost included color slides of the approximate 18,000-acre Conaway Ranch study area located west of the Sacramento River, east of Highway 113 and generally between West Sacramento and Woodland. Mr. Yost explained that the Conaway Conservancy Group established a 1991 Memorandum of Understanding with Yolo County that included the implementation of an extensive groundwater monitoring program.

Mr. Yost described the processes followed in facilitating water transfers related to the project area, as well as transfers in general and their significance to California's water supply. Mr. Yost summarized the project water level monitoring program and the steps that are being taken to monitor for potential land surface subsidence. Conaway, in conjunction with DWR, drilled 17 monitoring wells, constructed 16 monuments to monitor ground subsidence by using satellite technology, and put in place an extensometer, a sophisticated device that measures ground surface elevation to determine the extent and potential cause of any subsidence.

The Conaway Ranch monitoring program is providing data that will go a long way toward developing a program of long-term conjunctive use of water in this area of California. Mr. Yost expressed that the time has come to stop talking about conjunctive use and start implementing it. Conaway Ranch intends to continue to abide by its policy of being open and public on water issues, and through cooperation, hopes that its work will be the springboard for the development of an eastern Yolo County Water Management Plan that will include conjunctive use.

The next Sacramento Branch meeting is scheduled for December 10, 1992 and will have a Christmas flair. Red and white table wines will be provided, courtesy of Emcon Associates, and the evening will be a joint meeting with AEG. The event will be hosted by Wheeldon & Associates; George Wheeldon and DWR's Carl Hague will co-present "Ground Water Analysis of Fractured Rock in the Sierra Nevada Foothills - A Tool for Land Use Planning."

The upcoming team presentation is especially timely, in that groundwater resources are increasing in importance in the Sierra Nevada foothills. The complex foothill geology makes groundwater resource evaluation difficult.

Housing developments that rely on groundwater are now being more carefully planned, requiring a systematic approach to the evaluation of groundwater resources. Non-confidential well data, although limited, is extremely useful in evaluating regional availability. However, the availability of information and the existing regulatory frameworks need improvement, a topic Mr. Hauge will address.

The presentation will describe how geologic mapping allows the detailed delineation of potentially "good" and "bad" rock types that can in turn be evaluated by test wells. Additionally, it is necessary that test wells undergo some form of pump testing dependent upon the needs of the development. Water quality testing identifies those areas that may require water treatment systems. The long-term viability of groundwater resources and impacts on neighboring wells should be evaluated, especially with large projects.

The Sacramento Branch has formed a Technical Standards and Guidance Committee, the first activity of which was review and comment on the *Sacramento County Well and Pump Ordinance*. The ordinance regulates all soil borings performed in Sacramento County to a depth of within ten feet of groundwater. A constructive discourse between the GRA Sacramento Branch committee and representatives of Sacramento County lead to significant changes in the final ordinance. The committee is now receiving comments on and reviewing San Joaquin County's *Proposed Revised Well Standards (Rules and Regulations)*. Please contact John Phillips at the number below for information.

Additionally, Branch president John Phillips called for volunteers to serve on a Sacramento Branch Membership Committee; those interested in chairing and/or serving on the newly-forming membership committee should contact Mr. Phillips at (916) 925-4789.

Central Coast Branch

-by Paul Sorensen

Mr. Stanley C. Hatch, the managing partner of the Santa Barbara law firm of Hatch and Parent, was the keynote speaker at the September meeting of GRA's Central Coast Branch. The evening was sponsored by Barbour Well Surveying Corporation and was well attended by 37 participants. Mr. Hatch, as one of the state's leading authorities on water rights, laws and issues, is a member of the nine-member State Water Contractor's Board, counsel for the

GRA Developments In Education

-by Anthony Saracino

National Groundwater Education Consortium

GRA was invited to attend a Networking Retreat sponsored by the National Groundwater Education Consortium (NGEC) and hosted by the Freshwater Foundation. Anthony Saracino represented GRA at the retreat, which was held on September 17 and 18 in Wayzata, Minnesota. NGEC, begun by a broad base of organizations with a commitment to education, was developed to facilitate cooperation and communication between groundwater leaders and programs across the country. Attendees at the retreat included representatives from a number of organizations, including the American Ground Water Trust, the National Groundwater Association, the Water Education Foundation, the Environmental Defense Fund, the League of Women Voters, U.S. Water News, the U.S. EPA, the U.S. Department of Agriculture, and the W.K. Kellogg Foundation. The purpose of the retreat, which was the first organized event, was primarily to identify those organizations interested in a continuing program of groundwater education and to share some basic educational concepts that have proven to be effective in the past. GRA plans to continue its involvement with NGEC and will attend next year's meeting with the goal of bringing back some specific ideas on promoting groundwater education in California.

California Groundwater Map

GRA is working with the Water Education Foundation and the State Department of Water Resources on developing a groundwater map for the State of California. The purpose of the map will be to increase the public's awareness of the importance of groundwater as a potable water supply. The map will be constructed in a similar style to the Water Education Foundation's *California Water Map* which proved to be a big success. GRA and the Water Education Foundation plan to apply for a grant from the W.K. Kellogg Foundation to help fund the project. Our goal is to have the *California Groundwater Map* available by next spring. Anyone interested in purchasing any of the Water Education Foundation's existing maps or publications should call 444-6240. ●

Continued on page 10





Branch Activities

Continued from page 9

Central Coast Water Authority, and was the plaintiff's counsel in the 17-year landmark case of *Wright et al. vs Goleta Water District*. He presented an informative discussion on the development of new groundwater basin management strategies, particularly as related to the pending importation of State water into Santa Barbara and San Luis Obispo counties.

These two central coast counties have been subscription members to the State Water Project since its inception, yet have never developed the facilities (or public support) to receive any benefit. As the time nears to begin construction of the Central Coast Pipeline Project, and as the various communities of San Luis Obispo County continue to struggle with the decision of whether or not to contract to receive imported water, a crossroads is approaching at which it will be critically important to evaluate currently accepted policies and strategies of groundwater basin management to reduce or eliminate the present overdraft status of the majority of local basins.

The next regularly-scheduled Central Coast Branch meeting will be held November 19, 1992 and will feature Mr. Anthony Nelson, southern California regional manager of Metcalf and Eddy. The evening will be hosted by Sinclair Services. Mr. Nelson's presentation will address the fundamental need of a "team sports" approach in the development of a mutual scope of work in environmental issues, the critical issue of developing a comprehensive vision of how the project will be conducted and a concept for effective project execution.

Because of the enthusiastic response to GRA in the Central Coast Branch area, we have managed to outgrow the restaurant facilities used for our first three meetings. The November meeting will be held at Mettei's Tavern in Los Olivos.

Southern California Branch

-by Peter Jalajas and Susan Garcia

The Southern California Branch has held its second and third meetings since the last issue of *HYDROVISIONS*. Dr. Joseph H. Birman, founder and president of GSI/Water, Inc., was the keynote speaker at the second meeting, held on July 15, 1992; Seth J. Daugherty, supervisor of the Orange County Health Care Agency's Groundwater Cleanup Program and key member of the LUFT Manual Task Force, was the keynote at the third meeting, held September 16, 1992.

Dr. Birman's talk, entitled "On Becoming the Cleanest Third-World Country on the Planet," provided a timely reminder that we do not perform our work (protecting our groundwater resources) in a vacuum. His fundamental question was: Are we reaching for a level of environmental purity that cannot be achieved, and, if achieved, cannot be maintained, and—given the natural materials and processes—may not be necessary in the first place? That is, are we trying to fix some things that really aren't broken? Also important is the question of: What is the cost of striving for and reaching these perhaps Quixotic goals? Are environmental regulations and litigation driving industries out of southern California, acting as the force behind our current downward economic spiral? While to blame the environmental activists, legislators, regulators, and lawyers may be convenient, the technical basis for these other professionals is built by hydrogeologists. Hydrogeologists are the ones who can appreciate, and need to be able to communicate, the complexities of the subsurface.

Dr. Birman emphasized that the target level of detail and accuracy demanded by environmental legislation and litigation cannot be attained with today's knowledge and technology. What we see in the drill hole or test trench tells us little about what is present beyond the exploration sidewalls, particularly at the detail we are demanding. With drinking water criteria now reaching down into the fractions of parts per quadrillion, can we, as hydrogeologists, believe that any such chemical analytical results be indicative of conditions one centimeter from the sampling point or one minute later at that same point, much less interpolate between wells hundreds of feet apart? Dr. Birman pointed out that a single common sand grain would represent one part in a billion parts of sand grains laid end-to-end from Los Angeles to Denver. Regarding whether our goal of environmental purity is attainable, Dr. Birman reminded us that after a century of extremely aggressive effort, the powerful oil companies have not been able to remove organic contaminants from natural formations—and note that their practical goal is to leave a few tens of percent in the ground, not a few parts per billion.

A recent U.S. EPA review of the state-of-the-art of remedial technology indicated that extraction of contaminants works only poorly under the best of geologic conditions: "More pilot-scale testing must be conducted to support any statement on the environmental and economic

practicability of extraction technologies..." A review of major corporation annual reports indicated that these companies are annually spending tens and hundreds of millions of dollars in direct environmental costs, not a salable product, toward an elusive goal. No amount of brute force technology and vast expenditures will accomplish the objectives; either the technology or the laws must be changed.

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In summary, our profession has the obligation to determine what, if anything, needs fixing and to instruct our legislators about what is and what is not attainable in the physical geologic world. Dr. Birman's presentation provided a stimulating discussion for GRA meeting attendees. The group arrived at the general consensus that the public needs to be better educated in environmental risks in order to make more informed decisions regarding where governmental and corporate resources should be allocated.

Mr. Daugherty's talk, entitled "The MCL as the Groundwater Cleanup Level; Good Public Policy or Regulatory Cop-Out?" provided insight into the commendable effort of the underground storage tank (UST) regulatory community to balance the health-protection goals with practical technical and economic reality. UST regulations are strongly directed toward using the drinking water maximum contaminant levels (MCLs) as the cleanup goal. However, the technical consensus is that the MCL is unlikely to be reached for many or all contaminant levels at most sites, primarily due to limitation in the removal of nonaqueous phase liquid (NAPL) hydrocarbons.

Mr. Daugherty stressed that other approaches to determining cleanup levels may be practical but arbitrary (other generic values), lack regulatory acceptability (asymptotic leveling by active remediation), or involve many unacceptably high uncertainties (risk assessment, monitoring). He believes that when the State Cleanup Fund is implemented, the state will then understand first hand (in the pocketbook) the problems with the MCL as cleanup goal. He offered possible partial solutions, including addressing more appropriate points of compliance; developing a model or method for developing site-specific cleanup levels; consideration of asymptotic leveling as a valid site completion criterion; review of Basin Plans for appropriateness of present beneficial-use designations; and greater acceptance of "hybrid" closures, that is, using the best available control technology and maximum contaminant removal technology, followed by long-term monitoring and tracking. Mr. Daugherty reminded us that whenever there is even a remote probability that contaminated groundwater will be consumed by humans, the MCL is the proper cleanup level.

The LUFT Manual applies only to the potential impacts of contaminated subsurface soils to groundwater, while any actual groundwater contamination is referred to the Regional Board. Important to note is that the vapor pathway

exposures are ignored in the LUFT Manual. Also, the modeling foundations of the Manual may need reassessment. The LUFT Manual may have been around so long now that it has "played out its usefulness." Mr. Daugherty pointed out that about 500 sites with known, shallow "semi-perched" groundwater contamination exist in Orange County over extensively used aquifers, yet not a single production well is known to be contaminated by petroleum hydrocarbon constituents. He asks: "Is it worth as much as \$300 million to \$500 million per decade to cleanup this shallow "semi-perched" zone?"

As a plan for the future, Mr. Daugherty suggested: 1) admit, under the present state-of-the-art, that we are not going to remove all contamination, and admit that reaching the MCL at every site will result in an unacceptable magnitude of expense; 2) admit that the present definition of "cost effective" is too oversimplified to evaluate remedial alternatives, much less to address "Is it all worth it?"; 3) consider endorsement of some sort of fate and transport model; 4) consider technology-based asymptotic reduction as viable; 5) address the cost-effectiveness issue head-on by deciding what aquifers need to be protected at any cost and make that cost-based decision under full public scrutiny; 6) make smaller scale horizontal and vertical distinction within basins; and, 7) accept "hybrid" closures.

The audience was apparently very interested in Mr. Daugherty's subject as indicated by the large number of questions and by statements made on the audience survey forms.

Southern California Branch regularly-scheduled meetings occur on the third Wednesday of odd-numbered months. The next meeting will be November 18, 1992, at which John Allen, Esq., of the law firm Graham & James, will provide an overview of 1992 environmental legislation. The legislative plan for 1993 will also be discussed. On January 20, 1993, Dr. Robert L. Stollar, hydrogeologist and author of "Contaminant Hydrogeology," will discuss the remedial approach utilized at a Superfund site contaminated with dissolved trichloroethylene (TCE). The site is underlain by a perched zone that overlies an unconfined sole-source aquifer. ●


COMMITTEE REPORTS

Membership Committee

GRA currently has 450 members. The year end goal of 500 members has become closer than ever! Please tell a friend or co-worker about the Groundwater Resources Association and encourage them to join our organization.

Applications received after October 1st will include membership through 1993.

The Membership Committee would like to apologize to the members who have joined and have not received local meeting notices and/or newsletters. After the June seminar, we were inundated with new members and were unable to disseminate the membership information to the local branches as expediently as necessary. If you are still not receiving GRA information, Please do not hesitate to call Margie Namba (916) 393-0936; David Bardsley (916) 485-0792; or Keoni Almeida (916) 638-2085. ●



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LIAISON COMMITTEE



GRA's Sacramento Branch is planning to hold a joint meeting in December with the Sacramento Chapter of the Association of Engineering Geologists (AEG). Each association will hold a brief business meeting, followed by dinner and a program. George Wheeldon of Wheeldon & Associates and Carl Hauge of the Department of Water Resources will be discussing the hydrogeology of fractured rock in foothill regions and water supply development in those areas.



GRA was invited by Kevin McCray, assistant executive director of the National Groundwater Association to speak before NGWA's Board of Directors on October 2, 1992 at its convention in Las Vegas. GRA was asked to present to the Board a brief overview of the

Association's activities and objectives. At the outset of the presentation to the Board, it was explained that GRA has goals and objectives that are compatible with NGWA, and particularly with those of the Association of Groundwater Scientists and Engineers. GRA proposed that NGWA and GRA, therefore, explore an affiliate or liaison relationship. It was further explained to the Board that a primary goal throughout GRA's development is to encourage balanced participation by professionals from a variety of areas in the groundwater industry. It was suggested that liaison or affiliate activities might include:

- joint sponsorship and planning of working sessions, short courses and seminars
- working together on legislative issues pertaining to groundwater and the groundwater industry
- dissemination of technical information, including information of significance to California which may be applicable to other states

collaborate technical/scientific input and evaluation of proposed regulations and technical documents

encourage groundwater professionals throughout the industry to contribute to the education of not only themselves or other members, but also of the public and especially children.

GRA is encouraging NGWA to explore an affiliate relationship that results in actions to address our state and national groundwater needs. It was emphasized to the Board that, in order to develop solutions to groundwater management and protection issues for a resource as complex and important as groundwater, a multitude of concerns and constituencies must be equally represented.

GRA operations at this time are solely based on membership dues and contributions by sponsors. Financial support is being sought to establish the new Association in an effective and timely manner to address the many issues related to California's groundwater resources which are facing us today.

To date, the following people and firms have contributed financial support to the Groundwater Resources Association:

Supporters (\$10 - \$24)

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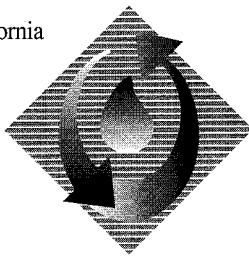
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