

HYDROVISIONS

GROUNDWATER RESOURCES ASSOCIATION
OF CALIFORNIA

Volume 2, No. 1

Spring 1993

GRA's LEGISLATIVE DAY

Energized Committee Organizes First Annual Event

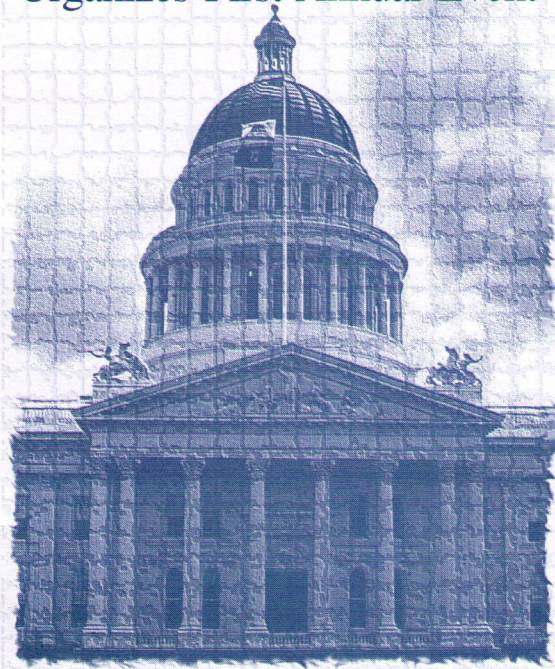
The Groundwater Resources Association of California (GRA) conducted its first Legislative Day at the State Capitol on April 27, 1993. Participants helped GRA develop the foundation for future government relations activities. The purpose of the event was two-fold:

First, the Day brought participants up-to-date on the issues that are facing the groundwater industry in the Legislature. Attendees were provided with handout material and oral presentations that addressed specific legislation as well as familiarized participants with the legislative process. Also discussed was how GRA, as a statewide association, can have input into, and impact on, legislative issues.

Second, the Day introduced GRA to the Legislature. There are hundreds of associations in California that represent different interest groups. By participating in GRA's Legislative Day, we are sending a signal to the Legislators that GRA is interested in the issues that affect our professions and our environment.

Keynote Speaker

Senator William Craven (author of SB 433, the Hydrogeologist Certification legislation and Vice Chairman of the very powerful Senate Rules Committee) was scheduled as GRA's Legislative Day keynote speaker during the luncheon; unfortunately, Senator Craven was taken ill on the date of our event. Thanks to the swift and directed efforts of Jeffory Scharf and others, GRA was able to schedule Senator Kelley as the keynote speaker. Subsequent to the keynote presentation, Legislative Day participants held a lively discussion during an



extended lunch period covering a variety of topics of interest to GRA members, particularly the hydrogeologist registration legislation.

Also discussed was the possibility of GRA sponsoring legislation that would modify the present confidentiality rules for drillers' reports. Participants were briefed on key hazardous waste bills; this is a heavily legislated area and can have a tremendous impact on groundwater professionals.

Benefits

Legislative Day attendees benefitted by:

- Gaining a greater understanding of how the legislature functions
- Removing some of the aura of mystery and perhaps intimidation that tends to surround the state Capitol

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Legislative Committee Appreciates Your Input

— by Jim Graham

Think about all of the times that you have said to yourself, "there ought to be a law..." Well, there probably is. GRA's Legislative Committee is reviewing all of the bills that are being considered by the state Legislature that have some impact on the way all of us do business on a daily basis. To date, the Committee is looking at 50 bills. Each of these has the ability to become a new law that we will need to comply with next year.

Now, if you find yourself amazed that so much in our industry appears to need fixing based on, for example, the number of bills being studied, don't be surprised; in actuality, the simple number of bills is misleading! Legislators get paid to respond to the concerns of their constituents. When one of them says "there ought to be a law...", the legislator makes sure that one gets introduced. Because there is no central clearing house for introduced items, it is very common to have many pieces of legislation covering nearly the same subject. Here is a case in point: GRA's Legislative Committee is considering three separate bills on the subject of water transfers alone!

This is the first year of the 1993-94 legislative session (sessions are for two-year duration). So far, there have been 3,786 different pieces of legislation introduced. These include bills, resolutions, and constitutional amendments. Statistically, each of these will be amended, and reprinted, three times each. Although we are only interested in a small percentage of the

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NEWSFLASH

LEGISLATIVE DAY UPDATE

[Editor's Note: Jim Graham, GRA's Legislative Committee Chairman, prepared the following update concerning SB 433 and made an updating presentation during the GRA Board of Directors meeting held May 15, 1993 in Oakland, California.]

The hydrogeologist certification bill has been brought back to life for this legislative session. Although GRA formed an ad hoc Certification Committee during the Legislative Day for the purpose of studying language that might be acceptable to all sides of this issue, the ad hoc committee has not yet met, given a mere few weeks since the ad hoc committee formed.

As discussed by participants at GRA's Legislative Day during the extended keynote speaker/lunch period, the Board of Registration for Geologists and Geophysicists has the existing statutory right to create any specialty area that it so desires. Legislation is not necessary for this purpose. SB 433 was introduced in order to establish an immediately identifiable pool of qualified persons in the classification. These would be persons who are currently performing this type of work. Such persons would be "grandfathered" into the hydrogeologist classification and be exempted from taking an exam. The Board points out that this is standard procedure followed each time a new classification is established.

Since GRA's Legislative Day, the bill has been amended, has been moved out of the Senate Business and Professions Committee, and is

currently [as of May 14, 1993] pending in Senate Appropriations. The bill is on track to clear the Senate before the deadlines.

The amendment to SB 433, in its entirety reads, "The Board, by regulation, shall establish criteria to determine whether a geologist is qualified in hydrogeology for purposes of supervising persons seeking certification in hydrogeology." This amendment was adopted by the bill author in an attempt to address concerns submitted by the soil scientists. Obviously, the concern was raised that any geologist, qualified or not, could certify an applicant for the "grandfather" clause.

This new language is being evaluated by GRA's Legislative Committee and the ad hoc Certification Committee established at the Legislative Day. All GRA members having an interest in the hydrogeologist certification are requested to send comments to committee chairman Jim Graham. All comments will be reviewed by the ad hoc committee and will be forwarded to the Board of Directors such that an official GRA position pertaining to this subject can be established. Mr. Graham's mailing address is via HydroSource Technologies, P.O. Box 277575, Sacramento, CA 95827; his facsimile number is (916) 368-0643.

Legislative Day

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- Broadening their exposure to the public policy formulation process.

The Day included:

- Briefings on important current legislative issues of interest to groundwater professionals
- Discussion of GRA's grassroots role as a technical advisory group
- Legislative representative visits
- Legislative committee attendance
- Lunch at Posey's Cottage (a Capitol institution) with keynote speaker
- A debriefing of the day's activities.

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PLEASE KEEP US INFORMED OF YOUR CURRENT MAILING ADDRESS!! SEND CHANGES OR UPDATES IN THIS REGARD TO GRA AS SHOWN IN THE EDITORIAL BOX BELOW. Changes may also be telephoned to Wendy Ernst at (916) 661-0884.

HYDROVISIONS is the official publication of the Groundwater Resources Association of California (GRA). GRA's mailing address is P.O. Box 355, Davis, California 95617-0355. Any questions or comments concerning the contents of this publication should be directed to the newsletter editor.

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Legislative Committee

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introduced legislation, we do have to go through the amendments in order to evaluate how the changes might affect our industry.

Although we are an association of members with similar interest, each of us has his or her own area of personal interest. The bills that GRA is following cover such topics as water transfers, licensing, hazardous materials, groundwater districts, drinking water, public works and water rights, among many others. None of us can be experts in all subject matters. That is why we need your help. Your comments can help to shape the laws that govern specific areas of interest to you.

To join the Legislative Committee, contact GRA president Vicki Kretsinger, or Jim Graham, GRA Legislative Chair, at 800-238-WELL (9355), or (916) 361-WELL. And the next time you say "there ought to be a law" - shame on you!

Current Legislative Issues

The California state Legislature is now in full swing.

Fortunately for our industry, the drought has been declared officially over. Had it continued, the volume of legislation that would have dealt with controlling groundwater would have been staggering. Even with the drought over, we are still looking at about 50 bills that may impact some of our members. These bills include the following:

Senator Craven has introduced SB 433 which will establish certification for the classification of Hydrogeologist. People who have been doing this kind of work under the direction of a

geologist will qualify for this certification. If you also happen to be a geologist, the bill waives any examination requirements.

The bill was introduced at the request of the Board of Registration for Geologists and Geophysicists to help ensure a quality standard for individuals working on subsurface water. The Consulting Engineers have sent a letter of opposition to Senator Craven, stating that subsurface water has always been handled by public engineers, and that such certification may allow less qualified persons to practice in this field. The Board, however, feels that because working on subsurface water is not limited to engineers, this certification may, in fact, eliminate individuals who are truly unqualified.

Of several measures that encourage groundwater conservation, Senator Kelley has introduced SB 650 that provides incentives for the Coachella Valley constituents to use reclaimed water, or water from the Colorado River, in place of groundwater. SB 1020 by Mello authorizes the Monterey County Water Resources Agency to require the installation of flowmeters on groundwater extraction facilities and water distribution systems. To protect the rights of persons who continue to conserve water, Assemblyman Cortese, Chairman of the Water, Parks and Wildlife Committee, has introduced AB 2014. Under existing law, if a person who is entitled to the use of water fails, for a period of five years to use the water, the unused portion of the allocation reverts to the public. Because this is too much like a penalty for conservation efforts, this bill provides that water not used as a result of conservation is not subject to reversion.

There are three bills that deal with water transfers. AB 52 (Katz) allows transfers providing that the transfer does not unreasonably affect the environment. It also creates the Aquatic Habitat Mitigation Account in the Fish and Game Preservation Fund for the purpose of mitigating long-term aquatic harm caused by

such transfers. AB 97 (Cortese) allows transfers of water, the use of which is voluntarily foregone during the transfer period. Water users may transfer all or part of their water allocation outside of the service area. AB 144 (Richter) prohibits surface water that is leased under existing law from being replaced by pumping groundwater.

Assemblyman Cortese has said that there will be only one water transfer bill that will be allowed to leave his committee; the one that leaves the committee reportedly will be a consensus bill. The GRA Legislative Committee will track these measures and solicit input from the members so that the "consensus" includes our thoughts and addresses our concerns.

One other bill appearing at face value to be relatively harmless is worthy of note; this bill is SB 1017 by Senator McCorquodale. The entire bill is only a few sentences long, and says that it is the policy of this state to recognize the importance of local management of groundwater and to encourage local entities to preserve and protect the quality and quantity of groundwater for future generations.

Although this is a noble sounding policy, it most definitely will encourage the establishment of local groundwater management districts. Additionally, the bill cannot be ignored, as its author is the Chairman of the Senate Agriculture and Water Resources Committee.

These measures call to mind the time honored statement that "No man's life, liberty or pursuit of happiness is safe while the Legislature is in session!"

[Editor's Note: These and other bills were discussed at GRA's Legislative Day - see related article in this issue.]

REMINDER

**Have You Renewed
Your GRA
Membership for
1993?**



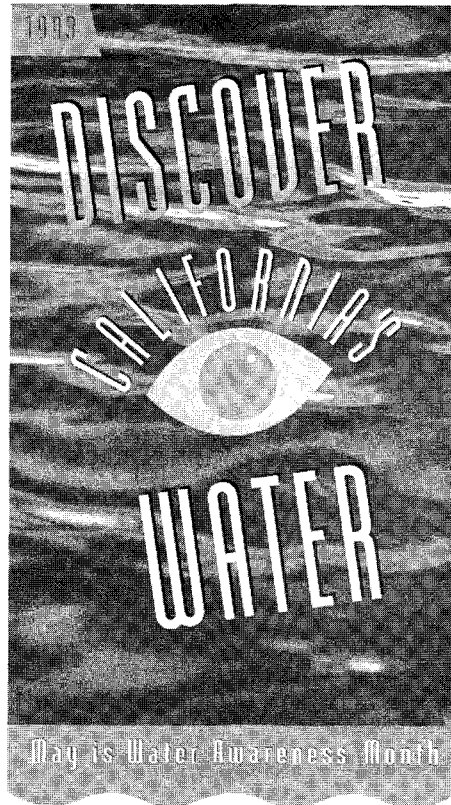
PRESIDENT'S MESSAGE

WATER AWARENESS MONTH

May 1993 was the Sixth Annual Water Awareness Month. This year's theme... DISCOVER CALIFORNIA'S WATER... was designated to fulfill the mission of the California Water Awareness Campaign, which is to heighten public awareness for water and its many uses, and for the role organizations play in conservation, water management, water supply, distribution and water quality. Public agencies, water districts, schools, environmental groups and others have developed numerous activities to promote conservation efforts and greater public awareness of the water resources in this state that we all too often take for granted. The groundwater industry has had tremendous growth and development in the past two decades, particularly with regard to environmental contamination and remediation. The burden of our past practices as a society will assuredly result in equally rapid technological advances in the next two decades.

In the past few years, this state has experienced an awakening to the general public of the importance of the "big picture". Groundwater banking, water transfers, attention to the widespread impacts of ubiquitous contaminants, and local groundwater management programs are but a few examples of the public's piqued interest in the state's resources. Many of you are familiar with the name Dr. Oscar Meinzer; he was the former head of the Groundwater Branch of the U.S. Geological Survey who did so much to establish groundwater hydrology as a recognized science in the United States. In 1937, he addressed the American Association of Water Well Drillers at a convention in New York. His urgent message of nearly six decades ago is as pertinent today as it was then. Following are excerpts from his speech:

"It is evident that we are confronted more than ever before with the practical problem of the quantity of water that can be withdrawn from wells, year after year, either by pumping or artesian flow. Everywhere this problem involves the question as to what extent the water withdrawn from wells is



replenished and to what extent it is merely taken from ground storage. Obviously, as the limits of the groundwater supplies become known there will be increasing restrictions on the drilling of wells for new developments. There is still a vast amount of work to be done in drilling wells in areas that are not yet fully developed and in the heavily pumped areas, in replacing old and defective wells, and distributing the draft so as to reduce natural waste, avoid excessive local drawdown, or prevent inflow of salt water.

The consumption of water in the United States is increasing more rapidly than is the population. This is as it should be. The water is ours for beneficial purposes; there is no advantage in letting it go to waste if it can be made to serve human welfare. Only, we must guard against the depletion or spoiling of our extremely valuable underground reservoirs. Indeed, the conservation and efficient use of these natural reservoirs is one of our major national problems, and it is immediately urgent."

— Dr. Oscar Meinzer, 1937

One of the goals of this Association is to broaden our own awareness of the big picture issues — too often we lose sight of the forest for the trees. And, an equally important goal of the Association is to increase the knowledge of the general public. Take some time this year to consider ways in which GRA can actively work toward accomplishing these goals. The Directors will incorporate your ideas into the Association's near-future and long-term development program.

Member Benefits

Many of our members belong to multiple professional organizations. Many of those organizations produce one or more technical bulletins or journals. As a new Association, GRA may not measure up to such immediately tangible benefits, particularly if the measurement is pound for pound of technical articles provided.

At our first annual meeting last fall, it was suggested that the Association move toward developing a bulletin which would be an annual publication initially. Further, this bulletin would be comprised of a compilation of reviewed technical papers detailing studies and technology pertinent to the groundwater professionals of California. Production of such a publication is obviously a future goal.

Even though GRA is a new Association, the Directors, branch officers, committee members and members have worked hard in the past year to lay the foundation for even more important benefits, including:

- Economic educational seminars
- Interaction with a multi-disciplinary group of groundwater professionals
- Information dissemination
- Technical and scientific input to state and local agencies on issues regulating the industry.

This year the Directors are focusing on committee development and function, and the role of GRA in the legislative process as a technical advisory group. The Association will also be considering group insurance plans as a future member benefit.





Committees

If the number of people responding to our request for committee participation is an indication of the level of interest and support of GRA, our members are TREMENDOUSLY INTERESTED AND SUPPORTIVE! The 1992/1993 committee lists have a total of 112 members. Your enthusiasm is most appreciated. The next issue of HYDROVISIONS will feature a special section on committee goals and objectives.

New Branch

Tom Venus and William Bergman of Metcalf and Eddy in Chico are coordinating the start-up of the North-Central California Branch. If you are located north of the Sacramento area and are interested in assisting their efforts please give them a call at (916) 342-6958.

Joe Newman of Welenco, Inc. in Bakersfield has been working to get the San Joaquin Valley Branch off the ground. He could use some help from other members in that area.

The nine Branch areas established by GRA in its Bylaws do not preclude the formation of Chapters within those Branches. The Branch areas cover large regions which can make meeting coordination and attendance challenging. If you are aware of a group of groundwater professionals located in a small area of the Branch, let the Directors know if you are interested in organizing a local Chapter.

Membership Directory

Yes, we're late. Our February publication date has come and gone. GRA's first directory has taken longer than anticipated since we've been getting the database in order. Future directory production should be much smoother. We think you'll find that the extra time has resulted in a useful membership tool. We've subdivided the Directory into eight sections, including purpose and scope, programs and sponsors, members, company affiliations, specialty fields, branches, committees, and vendors.

June Seminar

GRA is planning a Vadose Zone seminar in late June which will address vadose zone hydrology, monitoring techniques, and remediation strategies. Technological advancements in the

monitoring arena and the application of a variety of remedial methods will be discussed (See the article in this issue for more details).

Legislation

GRA conducted its first Legislative Day on April 27 at the Capitol. Jim Graham, Chair of the Legislative Committee, and Jeff Scharff of the law firm Scharff and Greben did a great job of coordinating the event - their efforts are greatly appreciated. During the planning of this event, Jeff warned us that we should remain flexible in our program plans since the political/legislative process is always subject to change. He couldn't have been more on target as our day was highly dynamic due to a multitude of events. Even though our day was not entirely as planned, those in attendance expressed enthusiasm about GRA's involvement as a grass roots organization in the legislative process.

Of particular note, we had a lengthy and lively discussion at lunch about Senator Craven's bill to implement certification for hydrogeologists. GRA is comprised of groundwater professionals who have backgrounds and experience of a

multi-disciplinary nature. Our technical diversity reflects the progression of the state of groundwater technology and particularly the focus which has been given to the investigation and remediation of soil and groundwater contamination. Our members have expressed a variety of opinions about the bill. Your input on this issue is important! (See the article in this issue for more details). ●

**Mark Your Calendars
for GRA's
Annual Meeting!**

**Applied Hydrogeology-
Innovative Technologies**

*See HYDROVISIONS
Summer Issue for Details.*

SPECIAL NOTE

Membership Renewal Update

— by Wendy Ernst

I thank all the GRA members who have renewed their membership before the April 1, 1993 deadline. Little did I know that when we chose April 1st, it would become the reality of "April Fool's Day." You may have noticed that when you received your membership renewal that something(s) were slightly skewed. These may have included: smeared cover letter; incorrect name on second page of invoice; no return envelope; no postage on outside envelope; or, a new and different way of spelling GRA on the return envelope. I could go on, but let's not.

Instead, let me say that for a first-time effort we did accomplish our goal! We sent out membership renewals to all applicable GRA members. We didn't foresee, however, that the mailing house we selected to do the actual processing of the renewal materials would drastically fall down on the job. Their response, when presented with examples of the numerous "errors" was one of contrition and immediate reparation. The individual or individuals responsible for this travesty have been, I'm told, soundly "thrashed" and all heavy metal music has been removed from the premises....

I want to thank all those who called to let us know of the mistakes and despite these errors, renewed anyway. Live and learn. If you still have questions about membership renewal, or did not receive renewal materials, please call or leave a message at (916) 661-0884. Thank you.

Wendy Ernst is proprietor of Gordian Business Solutions of Woodland, California.



SEMINAR

Vadose Zone Monitoring and Remediation Techniques

GRA Seminar June 28 and 30, 1993

GRA will conduct a one-day seminar on vadose zone gas flow characterization and vadose zone monitoring and remediation techniques. The course will be held in Long Beach on June 28 and in Concord (north San Francisco Bay Area) on June 30. The seminar will be divided into three sections and will include the following topics and instructors:

Gas Flow in the Vadose Zone (Dave Schafer)

- DEFINITION OF GAS CONDUCTIVITY
- DETERMINING GAS CONDUCTIVITY AND TRANSMISSIVITY
- APPLICABLE GAS FLOW EQUATIONS
- MODELING GAS FLOW

Vadose Zone Monitoring (Dr. Lorne Everett)

- SOIL PORE-LIQUID AND GAS MONITORING METHODS
- INDIRECT MONITORING TECHNIQUES
- GROUNDWATER MONITORING WEAKNESSES
- VADOSE ZONE MONITORING FOR UNDERGROUND STORAGE TANKS
- VADOSE ZONE MONITORING CONCEPTS FOR SOLID AND HAZARDOUS WASTE LANDFILLS AND SURFACE IMPOUNDMENTS

Remediation Using Venting Techniques (Dave Kill)

- CONDUCTING A FIELD PILOT STUDY
- TYPES OF VACUUM EXTRACTORS
- MOISTURE AND PARTICULATE REMOVAL
- ELECTRICAL REQUIREMENTS
- INSTRUMENTATION-VACUUM AND AIRFLOW
- SPARGING EQUIPMENT
- SYSTEM OPERATION

The course instructors will be Dave Schafer, a principal scientist of Geraghty and Miller, Inc.; Dave Kill, founder of Recovery Equipment Supply, Inc.; and Dr. Lorne Everett, chief research hydrologist and vice president of Geraghty and Miller, Inc.

Course fees (if enrolled by June 11, 1993) are \$160.00 for GRA members and \$185.00 for non-members. Course fees after June 11 are \$185.00 for GRA members and \$200.00 for non-members. To enroll or for further information, please call Sue DeMers at (916) 372-1434.

ANNUAL FINANCIAL REPORT

*Groundwater Resources Association
1/1/92 through 12/31/92*

INCOME

Annual Meeting	\$ 21,618.00
Assessments	5,326.00
Inaugural Meeting	1,816.00
Low Yield Aquifers	23,810.00
Membership Dues	16,217.00
Sacramento Branch	5,530.00
San Francisco Branch	316.50
So Cal Branch	3,507.00
State Refund (Corporation)	840.97
Travel Agent Rebate	7.23
TOTAL INCOME	\$ 78,988.70

EXPENSES

Accountant	130.00
Annual Meeting	22,003.79
Bank Fees	41.54
Directors' Meetings	350.84
Education Consortium, MN	413.00
Inaugural Meeting	200.00
Low Yield Aquifers	12,077.00
Membership Administration	543.16
Membership Directory	130.00
Misc. Postage	59.73
Newsletter Postage	1,669.87
Organization/Incorporation	1,678.40
Printing & layout	6,542.82
Promotional Postage	1,311.03
Promotion Misc.	3,764.55
Sacramento Branch	4,269.80
San Francisco Branch	356.98
So Cal Branch Postage	748.40
So Cal Branch	4,611.94
TOTAL EXPENSES	\$ 60,902.85

NET TOTAL \$ 18,085.85

The net total will be reduced by \$8,000 for the 1992 membership directory and \$2855.00 for the Winter 1992 newsletter, HYDROVISIONS. This information was provided to our certified public accountant for the 1992 tax year.

Respectfully submitted,

*Brian Lewis
Secretary/Treasurer*



Computers and the Future

— by Gene Luhdorff, Jr. P.E.

I wish I was “thirty something.” I wish I could start my career now, with the tools, in particular my computer, currently available to the scientific world. When I entered college, some 45 years ago, one of the first semester courses taught in every school of engineering was a class on the use of a slide rule. On every campus the engineering student could be identified in any group of students simply by observing who carried a slide rule. Math problems were solved in class by calculating results to slide rule accuracy. Detailed solutions involving complex formulas and constants required the use of engineering handbooks which were published with engineering formulas, mathematical operations and tables of constants. No one dreamed that the future would provide us with the personal computer.

After college, after my Naval service, I entered the real world. Solution of the most basic groundwater equation required the use of log tables and hand cranked calculators. That is, until Hewlett-Packard introduced its first hand-held, battery operated, scientific calculator; these were similar to the kind you see for sale at your favorite drug or department store for under \$20.00 today. But in the late 1960s, it sold for \$450.00! This was soon followed by programmable calculators, and eventually, the introduction of the personal computer. I remember well, the major discussions regarding which operating system one should choose for your first computer. It really came down to the choice between three: Apple's, CP-M, or IBM's DOS.

In 1982, I purchased IBM's first edition of its personal computer. The system was complete with its infamous green screen monitor, two 360k 5-1/4-inch drives and a hefty 64k of RAM! The software consisted of DOS and Basica from Microsoft, a word processing program from Spellbinder (its biggest competition was Word Star) and a spreadsheet named SuperCalc (that was chosen over a new company named Lotus who offered Lotus 1-2-3.) Well, later I often thought that 1 out of 3 wasn't too bad for choices. You can't always be right.

But today where are we? And what's in the future? I now sit at home, prematurely retired because of an illness, but equipped with a 486-33 clone, 320MB of hard disk storage, 8MB of RAM, both 3-1/2 and 5-1/4-inch high density drives, a built-in tape backup, a modem, a CD

drive, a color scanner, a sound board, and a little mouse. How can it get any better? For equipment, maybe by mid-year, a 586 upgrade. For software, by mid-year, perhaps MS-DOS version 6.0. But all of this equipment and software are merely toys unless you use them. I have observed so many who do not use their existing equipment to anywhere near its potential. That is sad to me; and perhaps you would understand that better if you had started with the slide rule. Let's examine two of the short comings I have observed in the past few years.

1. I don't understand why every engineer or scientist does not have a computer at his or her desk or at least near his or her work station. It can't be because of costs. How much easier it is to write memos, letters and reports, to solve equations, and play “what if?” games to better understand your alternatives in solving a complicated problem. I can't imagine an alternative to production or management of one's time that would be better than using a computer.
2. I don't understand why people don't have, or use, their modems more regularly. Maybe because I sit in a wheelchair and have a little less freedom than most, I have had a greater need or opportunity to access information through my computer than others. Or is it simply a case of not knowing what is available to the user? Let's examine a few of the most basic opportunities available to you via the modem:
 - a. **Remote Operations.** Today, many computer users in the scientific community have computers at home as well as in their office. There are several commercial software companies producing communication programs that allow you to access your computer at the office either directly or through its network, if so installed. The programs allow you to use your home computer as a keyboard to your office machine as if you were sitting in front of it. It allows you access to all your hardware and software, including your files.

Need to finish your report at night, at home? Why copy a bunch of floppies? Just dial up your computer at the office and complete your work. This is

particularly useful when you need to access software you do not have installed at home or on your laptop computer in the field. The programs work effortlessly, and provide a tremendous tool for the price of a phone call. I must admit to the extreme elaboration of this process. I have my laptop computer equipped with a modem that I can attach to my cellular phone when traveling in our motorhome. In my grandson's words, “that's awesome.”

- b. **Databases.** One of the most useful utilities of a modem is accessing remote databases. Several national organizations offer extensive databases which are categorized by topic, author and keywords. In the groundwater industry these include NGWA and AWWA. Both of these services are offered at a fee, but provide a researcher valuable information on many subjects.

In California, the Division of Mines and Geology (916/327-1208) has a bulletin board service (BBS) that offers a newsletter and numerous files and programs that can be downloaded for your use. Another excellent source of geotechnical files and programs is offered by Geraghty & Miller (703/758-1203). Both of the listed phone numbers are for use with your modem. The services both use “Wildcat” software and you will find that you answer the same start-up questions to enter each database. The last two services are free except for your on-line phone costs.

- c. **CompuServe (CS).** A discussion on modems would not be complete without mentioning CompuServe (or their competitors, *America Online* and *Prodigy*). As most of you know, it is a subscription service that provides access to so many services via your modem that it defies a simple listing here. I would be lost without it. Every major software supplier has a Forum on CompuServe. If you are having a problem with a program, chances are you can find the answer on the manufacturer's message board or by leaving a question for them

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Computers & the Future

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to answer. And, a valuable service CompuServe and the users provide is that of "shareware" software to complement your programs. Just download the software to your computer and try it out.

I have a daughter living in Hawaii. I can make a local phone call to CS, drop her a message, and she receives it at her home on her computer. If I want to FAX a message to someone, I access CS, load the message and the FAX is sent immediately, even from the motorhome. It is just part of the service.

The best way to use a modem is to have it assigned to a dedicated phone line either at the office or at the home. When staff desires to send in a report to the office, have them upload their report to an office computer. If the person in the field needs data, reports or instructions, have them download your directions from the office computer. Interestingly, most major hotels now have a computer phone jack in every room for use with laptop computers.

The future is what I'm excited about. (Maybe I should say *envious* about.) I recently installed a CD-ROM drive on my 486 along with a sound board. With it came an extensive array of CD disks. The CDs included a dictionary, an encyclopedia, an atlas and the world almanac, all complete with sound and animation. After some experimentation, I called up the program *Action*. Here is a presentation software designed to add music and animation to your presentations, such as developed with Harvard graphics and other similar software. Imagine your technical presentations being made with animation. Imagine being able to model a spreading plume, complete with sound, using your recorded voice if desired, or that of any other sound track you might desire. Imagine the use of various other multi-media devices to complement your proposals. The possibilities are simply endless.

What an exciting future these tools will provide. We've come a long way since that slide rule so many years ago.

Gene Luhdorff, Jr. P.E. is the co-founder of Luhdorff and Scalmanini - Consulting Engineers. The firm specializes in groundwater development, management and use throughout the state. Formerly, Mr. Luhdorff was a water well drilling contractor for 35 years in the western United States. He is now retired.

STATE UST FUND UPDATE

— by Ronald Liebert, Esq.

[Editor's Note: One of the most widespread problems facing environmental regulatory agencies are leaking underground storage tanks (USTs). In California, the State Water Resources Control Board (SWRCB) has been assigned the task of responding to this problem. This is the first of a three-part series of articles discussing the SWRCB's role in regulating the operation of USTs and cleaning up the contamination associated with leaking USTs.]

The SWRCB has created two internal departments to fulfill its regulatory duties concerning USTs: 1) the UST Section; and 2) the UST Cleanup Fund Section. The UST Section is responsible for issuing leak prevention and corrective action regulations and administering the local oversight program, among other functions. The UST Cleanup Fund Section operates the SWRCB's financial assistance program, from which "eligible" responsible parties can seek reimbursement for the costs of remediating soil and groundwater contamination associated with a leaking UST.

The first two articles of this series will discuss the operation of the SWRCB's UST Cleanup Fund and UST Sections. The final article will focus on the interaction of consultants and attorneys in responding to SWRCB requirements, from the initial discovery of a leaking UST to the receipt of a closure letter, including issues related to the possibility of litigation.

PART 1:

The Underground Storage Tank Cleanup Fund

Enacted pursuant to Senate Bill 2004, Chapter 6.75 of the California Health and Safety Code (H&SC) authorizes the SWRCB to reimburse eligible owners and operators of leaking petroleum USTs for the corrective action and third party liability costs associated with the removal of those USTs. The SWRCB adopted regulations for the operation of the reimbursement program, known as the UST Cleanup Fund (Fund), which became effective on December 2, 1991. The purpose of the Fund is to provide a mechanism to help eligible owners and operators of USTs satisfy federally imposed financial responsibility requirements.

Following the satisfaction of an initial \$10,000 deductible, the Fund will reimburse "eligible" applicants for up to \$990,000 of their corrective action or third party liability costs per occurrence. The Fund does not reimburse costs to

repair, remove and replace leaking USTs. The Fund is supported by a \$0.006 per gallon storage fee assessed on permitted owners of petroleum USTs. Since State and Federal agencies do not pay the storage fee, they cannot participate in the Fund.

The Fund is available only to "eligible" owners and operators of petroleum USTs who have complied with all of the following requirements: 1) incurred corrective action costs after January 1, 1988; 2) properly reported the unauthorized release of petroleum; 3) complied with all permit requirements; 4) complied with all state and local UST requirements; 5) complied with all corrective action requirements; 6) obtained three bids for the corrective action work; and, 7) performed "acceptable" corrective action work.

By now, most consultants and attorneys are familiar with the SWRCB's system for prioritizing and ranking applications for reimbursement from the Fund. The remainder of this article will focus, therefore, on controversial issues associated with the SWRCB's recent affirmations, on appeal, of the UST Cleanup Fund Section's rejection of applications.

Possibly as a way of reducing the overwhelming number of applications for reimbursement from the Fund, the UST Cleanup Fund Section is strictly applying the Fund's eligibility requirements. Many applications have been rejected because of the applicants' failure to comply with two of the eligibility requirements: 1) the applicant must have been the owner or operator of the UST; and, 2) the applicant must have obtained or substantially completed an application for a permit to operate the UST by January 1, 1990. To date, four appeals of UST Cleanup Fund Section decisions to reject applications have been decided by the SWRCB. All four have been based on the SWRCB's interpretation of these two eligibility requirements. Unfortunately, the SWRCB has affirmed the UST Cleanup Fund Section's decisions in every case. A brief review of the SWRCB decisions, though



perhaps disheartening to many applicants, is very illuminating.

A. An applicant must have "owned or operated" the UST.

In two of the appeals, the applicants were property owners who sought reimbursement for the costs of cleaning up contamination from leaking USTs that had been removed from the property prior to the applicants' ownership of the property. In both cases, the SWRCB affirmed the rejection of the applicants' applications on the grounds that the applicants had not "owned or operated" the USTs causing the contamination, even though the applicants were responsible for cleaning up the contamination caused by the leaking USTs. *In the Matter of the Petition of RJW Lumber Company*, WQ Order No. 92-15-CWP, and *In the Matter of the Petition of Bruno Scherrer Corporation*, Order No. WQ 93-2-UST.

One of the applicants argued that it should receive reimbursement as a "de facto" owner of the UST. The Fund's regulations do allow the SWRCB to reimburse "de facto" owners, although the term is not defined in the regulations. The SWRCB determined, however, that a "de facto" owner refers to a property owner whose tenant installs USTs, but later abandons them without relinquishing legal title to the property owner. In such circumstances, the property owner might qualify for reimbursement from the Fund as the "de facto" owner of the USTs. Since the applicant did not own the property during the time the USTs were present, the SWRCB held that the applicant could not qualify as a "de facto" owner. *Scherrer Corp.* at pgs. 4-8.

In addition, the SWRCB rejected the idea that a person could become an "owner" of a leaking UST for the purpose of filing claims with the Fund by acquiring an "assignment of rights" to file claims with the Fund from a previous tank owner. *Scherrer Corp.* at pgs. 8-12.

B. An applicant must have obtained or substantially completed an application for a permit to operate the UST.

Originally, owners and operators were required to have obtained a permit for all USTs, including those no longer in use, by January 1, 1984. In adopting its Fund regulations, the SWRCB selected January 1, 1990 as the date by which "eligible" applicants must have either obtained an UST permit or substantially completed an application for the permit. Although the SWRCB has the authority to reimburse applicants who can demonstrate it was "unreasonable or inequitable" for them to have obtained a permit by the January 1, 1990 deadline, the SWRCB has yet to accept such arguments on appeal, firmly stating that ignorance of permit requirements is no excuse. See *In the Matter of the Petition of Lloyd Properties*, WQ Order No. UST 93-6-UST and *In the Matter of the Petition of Herold J. Christenson, et al.*, WQ Order No. UST 93-12-CWP.

The SWRCB has acknowledged, however, that the UST Cleanup Fund Section has waived the permit requirement rule in certain, specific circumstances. These circumstances include:

- 1) Where the applicant "justifiably" lacked knowledge of the existence of the UST in time to obtain or apply for a permit by January 1, 1990, provided the tanks were properly permitted when the UST was discovered;
- 2) Where the UST was closed or decommissioned prior to January 1, 1984 such that the UST could not be subsequently used without significant effort and was not, in fact used again;
- 3) Where the UST was removed or in the process of being physically removed prior to January 1, 1990, under the oversight or with knowledge of a regulatory agency;
- 4) Where the applicant was not the owner of the UST on January 1, 1990, i.e., because the applicant had previously sold the property;
- 5) Where compliance was beyond the control of the applicant, i.e., due to mental incompetence; and,

- 6) Where the permitting agency actually inspected the UST but failed to advise the claimant of the permit requirement. *Lloyd Properties* at pgs. 9-10.

While the SWRCB has affirmed, on appeal, all the UST Cleanup Fund Section's decisions to date, other appeals are certain to be filed. It is expected that future appeals will be crafted along the lines of the "unreasonable and inequitable" exceptions discussed in *Lloyd Properties*, and the success or failure of such appeals will be closely watched by those following. The bottom line, however, is that an applicant who cannot confidently meet the Fund's eligibility requirements must be prepared to successfully argue that one of the "unreasonable and inequitable" exceptions applies, or face the agonizing prospect of funding the cleanup work at his own expense.

Ronald Liebert is a member of Downey, Brand, Seymour & Rohwer's Environmental Practice Group, a team of environmental transactional and litigation attorneys which advises lenders, developers, private industry and public agencies on all aspects of toxics and environmental law. In addition to his legal credentials, Ronald Liebert has a B.S. degree in Nuclear Engineering, with extensive experience in the design of hazardous waste processing systems.

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INNOVATIVE TECHNOLOGIES

— by David S. Bardsley

Horizontal drilling and well installation techniques have been used extensively in the oil industry since the early 1980s.

The advent of highly controllable steering and locating tools has moved horizontal drilling methodology into the area of environmental remediation.

The advantages of horizontal drilling for environmental remediation are numerous. A single horizontal well can perform virtually every aspect of remediation more efficiently and economically than the multiple wells required in a vertical drilling system. The advantages of horizontal wells include the following:

- Horizontal wells can traverse the entire length of the contaminant plume, maximizing wellbore exposure and contaminant recovery
- Horizontal wells can accurately access contaminants that are unreachable with vertical wellbores

- The need for fewer wells drastically reduces total drilling time and cost-per-foot of exposed plume

- Treatment of the contaminant area can be administered by fewer wellheads, pumps and pipelines, thus reducing surface system installation costs
- Higher yields due to increased hydraulic characteristics greatly shorten the time required for remediation, lowering operating and maintenance costs over the life of the project.

Horizontal Well Installation

The drill rig is set up over the entry point with the derrick slanted approximately 14° from horizontal. A short conductor pipe is set and cemented to prevent the drilling fluid from eroding the borehole beneath the rig. The conductor pipe also channels the drill fluid to a surface pan for pick-up to the self-contained fluid handling system. The mud system consists of a shale shaker, desanders and desilters.

After the conductor casing is set and cemented, a bit will be run in the casing to drill out any cement in the bottom of the hole. The boring is started at a 14° angle until the "build" or turn portion of the borehole is reached. This section is drilled using 2-7/8" diameter drill pipe with a positive displacement motor assembly. Drill fluid volume and pressure turn the positive displacement motor which in turn rotates the bit; the drill string does not rotate. The 2-7/8" pilot string is directionally controlled with a three axis magnetic steering tool; constant directional information is transmitted via a 12-volt signal along a wire leading from the drill bit to a surface computer.

The turn or "build" section is then drilled until the drill string reaches horizontal. The entry angle and build radius are controlled by several

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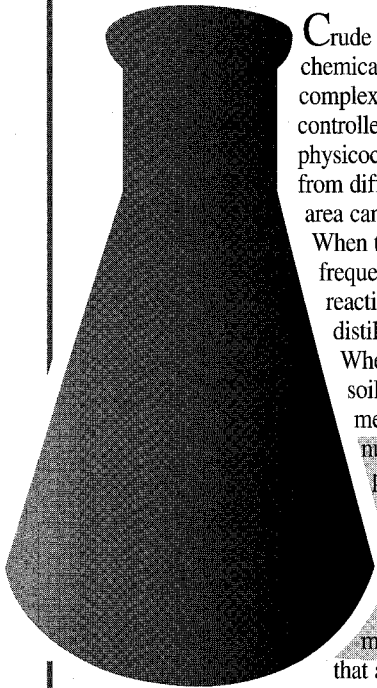
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CHEMISTS' CORNER

Characterizing Petroleum Contaminants in Soil and Water and Identifying Source of Escaped Petroleum Product

— by Dr. Hossein Alimi



Crude oil and its refined products are chemically very complicated. Crude oil is a complex natural product whose composition is controlled by biological, geological and physicochemical factors. Crude oils produced from different basins in the same geographic area can have different chemical compositions. When these crude oils are refined, they frequently undergo a series of chemical reactions, catalyst enhanced cracking, and distillations, which result in a final product. When crude and refined oil products enter soil, groundwater or an aqueous environment, they begin to be degraded by numerous microbiological or physical processes. The result of such changes is to alter the molecular composition of the product so that its source is unrecognizable.

There are a variety of geochemical methods for characterization of petroleum that are used extensively in exploration and production operations. Many of them, especially those related to oil-oil correlations and the typing of condensates, are suited for environmental investigations of fugitive oil spills or natural gas leaks, in order to identify the chemical characteristic of the escaped hydrocarbons. Because the methods used are often able to reconcile the chemical properties of petroleum products even after long exposure to air and

water, they are frequently useful in identifying the type and the source of biodegraded products in soil, or floating on water. Additionally, these methods can be used in estimating the approximate time of exposure of hydrocarbons to the environment.

Most of the methods for forensic characterization of petroleum and its products depend on the known chemistry of the original petroleum. Because petroleum can be formed under a variety of different biological and geological conditions, the type of oil generated and composition of trace components can differ significantly and can permit geochemists and analytical chemists to distinguish one product from another in soil or in groundwater.

"When crude and refined oil products enter soil, groundwater or an aqueous environment, they begin to be degraded by numerous microbiological or physical processes."

For the environmental characterization of petroleum products a suite of analyses will be used that includes:

- Gaseous hydrocarbons in the C1-C5 range, by gas chromatography (GC)
- Gasoline range (C3-C8) hydrocarbons by GC and FID detector
- Determination of total and/or organic lead by ICP or atomic absorption spectroscopy
- Quantitative determination of ethylene dibromide, ethylene dichloride and lead alkyl additives in gasoline by GC
- Aromatic hydrocarbons (BTEX) and the oxidation additive methyl tertiary butyl ether (MTBE) by PID detection
- Gas chromatography of n-alkanes through carbon numbers C35 or greater, for fingerprinting of jet fuels, kerosene, naphtha, diesel, refined oils and crude oils
- Stable isotope ratios for carbon, hydrogen and sulfur, by dual collecting isotope ratio mass spectrometry for all types of fuels
- GC-mass spectrometry (GC-MS) of polycyclic aliphatic biological markers, i.e. steranes and triterpanes, which are chemical fossils containing the hydrocarbon skeletons of components in the fossil biological material from which the petroleum was originally formed
- GC-MS of polycyclic aromatic hydrocarbons (PAHs)
- Trace metals, especially vanadium and nickel in crude oil, and lead, copper, zinc and chromium in waste oil, by ICP, AA spectrometry or neutron activation.

The descriptions above are brief and general, but will indicate the variety of tools at our disposal to characterize petroleum fractions. It should be noted that each study case is likely to be different from another, and the use of all the above methods is not suggested for every case.

For example, in a case where a soil or water contaminant is present, these answers are possible: 1) the contaminant matches a specific suspect source; 2) it is derived from a mixture of products or sources; 3) it is unlikely any source(s) are available; or, 4) the results are ambiguous and the evidence does not allow a definite decision.

The more recent the timing of contamination, the more likely it is to match the contaminant source. In some cases, where the suspect source will not be available, using the methods described above may make it possible to describe the source with some accuracy and to eliminate other possible sources that are available, or to show that mixing of products from various sources had occurred. ●

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LETTER TO THE EDITOR

[Editor's Note: We've been awaiting one of these! GRA member Markus B. Niebanck has generated the first official Letter to the Editor of *HYDROVISIONS*. The subject probably couldn't be much more controversial and will likely generate additional letters on this and other topics.

Mr. Niebanck's letter was written in response to a memorandum authored by senior environmental specialist Jon B. Marshack with the Environmental/Technical Support unit of the Cal-EPA Regional Water Quality Control Board, Central Valley Region (RWQCB). As requested, Mr. Niebanck also provided GRA with a facsimile copy of Mr. Marshack's December 11, 1992 memorandum, the text of which is included below (the facsimile of the memo that we received also included a table that was not included due to limited newsletter space). Mr. Marshack's memorandum was addressed to "Technical Staff, Sacramento, Fresno & Redding Offices, and Other Interested Parties."

The following information is provided as a service to GRA members and in no way represents the policy, opinions or beliefs of GRAJ.

"The Role of Risk Assessment and Chemical Transport Modeling in Site Assessment and Cleanup Level Determination."

— by Jon B. Marshack

Through my involvement in Department of Defense (DoD), CERCLA (Superfund), and other contaminated site cases, I have seen an increasing reliance, by responsible parties and their consultants, on risk assessments and chemical transport modeling to determine whether sites pose health or environmental threats and to determine the degree to which such sites must be remediated. In fact, the current approach of the Department of Toxic Substances Control (DTSC) and the U.S. Environmental Protection Agency (EPA) to assessing health and environmental risks at contaminated sites and for determining cleanup levels relies on these methods, as contained in the EPA's *Risk Assessment Guidelines* for

Superfund (RAGS). Staff working on site assessment and cleanup cases will, likely, be asked to accept this type of analysis as sufficient to protect water quality. However, by their very nature, conventional risk assessments and chemical transport modeling methods are insufficient to protect existing and probable future beneficial uses of waters of the State, as required by the Porter-Cologne Water Quality Control Act. In order to safeguard water quality, site-specific resource protective methods and criteria must form the basis for site assessments and cleanup levels.

The Limitations of Conventional Risk Assessment Methods

Within EPA and DTSC, the development of methods for site assessment and cleanup level determination has been dominated by a single branch of science, namely toxicology. Environmental toxicology is the study of the toxic effects of chemicals on the health of animals and humans, with the aim of better understanding the relationships between environmental chemicals and the health of human populations. For this reason, toxicologist-derived site assessment and cleanup level determination methods view risks to health and the environment largely through our knowledge of the health effects of chemicals on humans. More recently, attempts have been made to broaden this conventional risk assessment dogma to encompass other "biological receptors," such as fish and wildlife; however, our database on the effects of chemical pollutants on these organisms is far smaller than that for humans and for the laboratory animals used as surrogates for human in toxicological research. For this reason, this expanded risk assessment system has largely failed to adequately address potential impacts of environmental chemicals on non-human life forms.

Because toxicology-dominated conventional risk assessment methods have been inadequate to address risks to other than human health, EPA's and DTSC's environmental protection mandates have been largely ignored by their site assessment and cleanup level determination methods. Procedures such as those contained in EPA's RAGS are sufficient only for the assessment of risk to human populations.

Because conventional risk assessment methods focus almost entirely on threats to human health,

as opposed to threats to wildlife and other natural resources, such methods will not sufficiently protect water resources so as to comply with the mandates of Porter-Cologne and the regulations, water quality control plans and policies of the State and Regional Water Boards. The attached chart [not included] shows the main areas of dissimilarity between EPA and DTSC's risk assessment approach and the Water Board's requirements for water resource protection.

Chemicals addressed by conventional risk assessment methods do not encompass all potential pollutants that are capable of causing adverse impacts on beneficial uses of surface and groundwaters. This is because many beneficial uses of water do not involve potential human health impacts. An example is where a chemical causes adverse taste or odor at a concentration lower than it can cause toxicity. The impact of boron or dissolved solids on the ability of a body of groundwater to be used for agricultural or industrial supply cannot be predicted by conventional risk assessment either.

The concept of antidegradation is also excluded by conventional risk assessment procedures. Antidegradation principles are critical to water quality protection under both the Porter-Cologne Act and the federal Clean Water Act. Multiple waste dischargers within an area and the contribution to water quality degradation potentially imposed by each must be considered. If one discharger (e.g., a single DoD site) is permitted to degrade a water resource to just below the level where beneficial uses are impaired, then no additional capacity exists for further degradation by other existing or future discharges of waste. If a discharger is allowed to degrade a water resource to just below a present-day standard of 10 ppb, then if the standard changes to 5 ppb, beneficial uses are lost. Our knowledge of the health and environmental effects of chemicals or combinations of chemicals is constantly evolving.

For these reasons, antidegradation forms a basis for Chapter 15, Article 5 and State Water Board Resolution No. 92-49 corrective action requirements. These requirements set background levels as the goal of cleanup actions unless this goal is technologically and/or economically infeasible to achieve. In those cases, cleanup levels must be "consistent with



the maximum benefit to the people of the state," and must "not unreasonably affect present and probable future beneficial uses." In many cases, this involves the application of "best available technology" to the cleanup effort.

To be an effective tool for long-term water resources protection in site assessment and cleanup level determinations, conventional risk assessment methods must be substantially altered to consider the resources themselves, such as surface and groundwater bodies, as the receptors of chemical pollutants, and not simply the nearest human populations.

The State's water quality standards - the beneficial use designations, water quality objectives, and implementation programs contained in the State and Regional Water Boards' *Water Quality Control Plans* - which are applicable to the particular site in question must be used as indicators of impacts on the "health" of the water body. Staff should require that these adjustments be made, when requested by dischargers to consider that risk assessment methods be used to assess risks to beneficial uses of water resources.

The Uncertainties of Chemical Transport Modeling

Conventional risk assessment methods use chemical transport models to determine the availability of a chemical to cause an impact on a receptor. Models used to determine the potential for impacts of pollutants in soils on groundwater quality involve pollutant transport in the unsaturated zone. The modeling of pollutant transport in unsaturated soils is not clear and exact science. Many unknowns exist in our knowledge of chemical transport and retardation mechanisms in the unsaturated zone. To be workable, these models are forced to greatly simplify a highly complex natural situation. In addition, most models are derived from knowledge of micro-scale environmental fate processes. Models often ignore larger scale factors, such as fracture flow in soils, which can have significant effects on chemicals transport in the field.

Decisions that would be based on these models can be of great import. Acceptance of the results of a model that proves not to be valid could result in the pollution of groundwaters beneath and adjacent to contaminated sites. Without rigorous laboratory and field verifica-

tion, chemical transport models are not really science, but essentially computerized theory on the interaction between chemicals and the soil environment. Field verification of a model's output is critical to the reliability of site assessment and cleanup decisions that will be based on that model.

Few models have been rigorously field verified under the wide range of hydrogeologic conditions present in California. To be usable, all assumptions and boundary conditions of a model would have to be clearly demonstrated to be consistent with conditions present at the site being studied. The model(s) must also be justified as being appropriate for the types of attenuative mechanisms actually available for protection of groundwater at the site. Specifically, a theoretical model should be developed based on site-specific properties and attenuative mechanisms that are known to be available. Only then should an existing computer model be selected, based on a good fit with the theoretical model. Unfortunately, consultants all too often simply select a computer model off the shelf, without a real understanding of its appropriateness to the site and the situation at hand.

"However, by their very nature, conventional risk assessments and chemical transport modeling methods are insufficient to protect existing and probable future beneficial uses of waters of the State, as required by the Porter-Cologne Water Quality Control Act."

Dear Editor,

I recently came across a memo written by Mr. Jon Marshack of the Central Valley Regional Water Quality Control Board. The memo was written for the technical staff of Board offices and for "other interested parties." There seem to be a good number of these parties, because at the writing of this letter memo copies have been

spotted on the East Coast, in Los Angeles, Houston and the Bay Area. I have had the good fortune of discussing the contents of the memo with a number of people, and feel that a summary response is in order. I feel that HYDROVISIONS is an excellent forum for this response, as the broad cross-section of professional readers will provide for productive, creative dialogue.

Summary of Memo:

The authors objectives are clear, and presented in a succinct, easily digested format. Objectives and supporting arguments are presented as follows:

Following a brief discussion of trends involving the use of risk assessments and chemical transport modeling for the determination of contaminated site rehabilitation levels, the premise of the memo is established - "However, by their very nature, conventional risk assessments and chemical transport modeling methods are insufficient to protect existing and probable future beneficial uses of waters of the State, as required by the Porter-Cologne Water Quality Control Act."

The establishment of current risk assessment approaches as insufficient is based on concepts of potential chemical impacts on non-human life forms, "Because conventional risk assessment methods focus almost entirely on threats to human health, as opposed to threats to wildlife and other natural resources, such methods will not sufficiently protect water resources so as to comply with the mandates of [regulatory policy]," and on historic policies of "non-degradation."

Rather than utilizing human toxicology-based models for the determination of site cleanup levels, the author instead recommends that "...conventional risk assessment methods must be substantially altered to consider the resources themselves, such as surface and groundwater bodies, as the receptors of chemical pollutants, and not simply the nearest human populations," and "The State's water quality standards - the beneficial use designations [list of regulations and policies] - which are applicable to the particular site in question must be used as indicators of impacts on the 'health' of the water body."

The memo concludes with several paragraphs speaking to the inexactness of modeling as a

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Letters to the Editor

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science and to the inability of many environmental professionals to correctly apply even those models that do work, "Unfortunately, consultants all too often simply select a computer model off the shelf, without a real understanding of its appropriateness to the site and the situation at hand."

Mr. Marshack raises several important issues in his memo. Some of the points will be responded to in this letter, others must be addressed in a more comprehensive technical evaluation. A response to the adequacy of particular models and their application to specific project situations is beyond the scope of this letter, and would be better addressed by a modeling expert in a separate forum. The concepts of potential chemical impact and antidegradation, however, can be examined a bit more closely in this brief response.

My primary observation involves the characteristic of the memo that I found to be most influential, namely the tone of the presentation itself. The author offered the evaluation of risk assessment goals and methodology in a very cautious context, particularly with regard to the consulting community's ability to accurately determine types of models that are best suited for given situations. While caution and prudence are certainly important, I feel the memo as presented will likely be interpreted in the wrong light by the implementing regulators that receive it.

The risk assessment process should be perceived as a tool to assist professionals in the determination of what makes the most sense, to establish site rehabilitation levels that are consistent with a realistic list of priorities. It is equally imperative that the development aspects of risk assessment as noted in the memo, including present day limits of applicability, receptors of concern, etc., are balanced by the promise of the pragmatism and economic benefits that an effective risk-based program will yield. A less than objective evaluation will result in the continued application of site characterization methods and rehabilitation requirements that are dated and less than forward thinking.

The question/definition of degradation is central to the process of considering what truly constitutes a negative chemical impact. As cited in the memo, "requirements set background levels as the goal of cleanup actions unless this goal is technologically and/or economically

infeasible to achieve." These requirements speak to the current assumption that any release, regardless of magnitude, must be considered degradational in a regulatory sense, and background levels should be strived for at all cost. While the establishment of background quality as a cleanup goal is a good place to start, it is perhaps time to focus more completely on the economic feasibility of the endeavor, and consider costs and benefits in a more pragmatic light. This "New Environmental Pragmatism" is a topic unto itself, and is far too involved to discuss in length here.

The author also contends that the conventional method of establishing risk to the environment is ineffective due to the fact that it is almost entirely based on considerations of human toxicology. While it makes sense to assume that the fitness of all species cannot be modeled and evaluated based on the response of humans to a given set of chemical circumstances, it does not necessarily follow that the response of every indigenous organism must be individually evaluated when determining levels of chemical compounds that can be tolerated by the community as a whole.

To a certain extent, some of the questions that come to mind when reading the memo are grounded in semantics. They are worthy of note, as definitions have a large impact on the accurate characterization of problems at hand. The author recommends that implementing agencies consider surface and groundwater bodies as the receptor of chemical contamination, rather than as a conveyance of chemicals to organic receptors. It must be noted, however, that the idea of beneficial use is grounded in the consumption or utilization of these waters, and as such one cannot truly address water bodies as receptors unto themselves, as they are not self consumptive. It would therefore be more useful to continue to consider surface and groundwater supplies in the context of what they provide to the community in general (the receptor), rather than treating the water bodies as receptors themselves.

I believe the initiation of a comprehensive dialogue on the economic costs and benefits of methods such as risk assessment is overdue. I truly hope such a dialogue will generate more in the way of pragmatic environmental thinking from the regulating and regulated communities. California considers itself a leader in the formulation of environmental policy. Forward thinking will keep it that way.

Respectfully submitted,
Markus Niebanck, R.G.

BRANCH ACTIVITIES

Southern California Branch

—by Susan Garcia and Pete Jalajas

The southern California Branch holds its meetings at various locations across Southern California. The meetings are scheduled on the third Wednesday of the odd-numbered months. Be sure to mark your calendar, look for the meeting announcement flyer, and call the branch officers if you do not receive a flyer (to conserve our cash resources during our current financial drought, our non-member mailing list is shrinking rapidly!).

The May 19th meeting featured Phil Hall, principal hydrogeologist for Earthware of California, who described the complex technical and regulatory issues surrounding wellhead protection. These issues include the importance of hydrogeology, assigning responsibilities among the various agencies, and point and non-point sources of contamination. The meeting was held from 5:30 to approximately 9:00pm at the Rio Hondo Country Club in Downey, CA.

Groundwater and California's Economic Climate

As a follow-up to the recent U.S. and California Economic Summits, and Joe Birman's 1992 GRA presentation (HYDROVISIONS, Fall 1992), the July 21, 1993 Southern California Branch meeting will be a unique open-forum discussion to address the impact of California groundwater resources on the economic and business climate in the state. The product of this meeting is expected to be the transmittal of a list of practical recommendations to the relevant groups working in fields related to California's groundwater resources, including legislators, regulators, industry groups, consultant groups, attorney groups, and other trade associations. By hosting this meeting and preparing the subsequent "transmittal list," we will have contributed in our own way toward getting the California economy back on track.

Recommendations that may appear on our list might address such questions as: Is the right amount of water of the right quality in the right regions of the state? Are valuable regulatory consulting and business resources being wasted upon minor unauthorized hazardous materials releases to soil and groundwater? Do drinking water toxicological studies have any basis in reality? Are entities covering their rears with



over-stringent cleanup levels and enforcement effort? How much have you spent on attorney and consultant fees lately? Does it have to be cleaned up today? Do we need a reality check? Sound intriguing? The evening will be moderated by Pete Jalajas, with location and evening schedule to be announced.

Precedent Setting Event Scheduled

The Southern California Branch enters the 90s! Because of the extremely wide geographic distribution of our Branch, and due to Southern California evening rush-hour traffic hassles [*Do Southern Californians need to drive less?* -Ed.], the September 15th meeting will be held via a noon-time (lunch hour) conference call. We anticipate that this precedent setting GRA event will last about 60 minutes and will permit individuals or groups to conveniently and leisurely eat lunch as they participate in our conference call. Because we will be eliminating geographical limitations, we will be able to have a much wider audience and enhance our available-speaker list. Other GRA branches statewide are very welcome to join in. You may even join in if you're on a trip or out of state.

Call American Teleconferencing Services at (800) 947-3975 to reserve your line (have your Visa, MC, or AX card handy). The standard line will be \$50 (normal toll charges will also apply—about \$10-15). With post-call written affirmation to Pete Jalajas of the presence of three or fewer persons at your location, the fee will be \$30 (\$20 rebated). Reduce your per-person costs to near nothing by inviting co-workers and other colleagues to your location. Reserved lines will be sent a copy of the speaker's notes and visuals prior to the meeting. Regional and subject subconferences are planned near the end of the call. Audio tapes of the meeting will be available. We are awaiting confirmation of a very exciting speaker you won't want to miss, so sign up now! Then sit back and enjoy! (We plan to hold conference-call meetings at least twice per year). Coming soon: we plan to set up broadcast or cable TV links; we'll keep you posted!

Summary of Southern California Branch Meetings

January 20, 1993 "Characterizing and Remediating Subsurface Solvent Contamination at an U.S. EPA Superfund Site," by Robert L. Stollar. Mr. Stollar, owner of RLS, a groundwa-

ter consulting firm, has over 23 years of experience as an environmental consultant and expert witness. An abstract of his presentation is presented below.

March 17, 1993 "Technically and Legally Defensible Data," by C. Bruce Godfrey. Dr. Godfrey is president and laboratory director of Curtis and Tompkins, Ltd., of Berkeley, California. He is nationally active in addressing issues concerning chemical analysis. An abstract of his presentation is included below.

Announcements

The Leaking Underground Fuel Tank (LUFT) Manual is currently being updated and revised. If you have comments or recommended changes to the LUFT Manual, please provide your comments to the Underground Storage Tank Division Leader at the various California Regional Quality Control Boards. Individuals to contact are:

North Coast Region
Luis C. Rivera (707) 567-2220

San Francisco Bay Region
John Kaiser (510) 286-1255

Central Coast Region
Bob Baldrige (805) 549-3147

Los Angeles Region
Hubert Kang (213) 266-7500

Central Valley Region
J. Lawrence Pearson (916) 255-3000

Lahontan Region (916) 544-3481

Colorado River Basin Region (619) 346-7491

Santa Ana Region
Kenneth Williams (909) 782-4130

San Diego Region
David Barker (619) 467-2952.

The Los Angeles County Department of Public Works (LACDPW), Waste Management Division, Underground Storage Tank Local Oversight Program has developed draft guidelines for UST assessment and remediation in Los Angeles County. They requested that GRA members review these guidelines and provide them with their comments. Comments were accepted up to May 25, 1993; a conference concerning the draft guidelines and comments

will be held June 25, 1993. Copies of the draft guidelines can be obtained by contacting Robert A. Larson (LACDPW) at (818) 458-6973. For additional information, please contact Susan Garcia of Hart Crowser at (310) 495-6360; the conference telephone number is (818) 458-3979.

Southern California Branch Speaker Abstracts

"Characterizing and Remediating Subsurface Solvent Contamination at an EPA Superfund Site" (Abstract written jointly by D. Peterson, J. Aveggio and R. L. Stollar)

Industrial, commercial and defense-related operations make heavy use of halogenated solvents. There are many cases where these solvents have entered the ground through accidents, unregulated storage or disposal practices, and poor management. After entering the soil, the solvents may infiltrate downward through the unsaturated zone to the water table, contaminating not only the soil but also groundwater resources. Depending on Federal, State or local regulatory limits and guidelines, this contamination must be removed or remediated to meet publicly acceptable levels. In order to remediate the soil and groundwater, it is often necessary to understand the mechanism of contamination and the groundwater flow system, delineate the extent of the contamination and initiate a monitoring system before the final remediation process takes place.

Successful restoration of an aquifer from solvent contamination is being carried out by the Watkins-Johnson Company at its Stewart Division Plant in Scotts Valley, California. The contamination consists primarily of halogenated hydrocarbons such as trichloroethene (TCE), tetrachloroethene (PCE), chloroform (CF) and methylene chloride (MC). The remedial investigation and feasibility study, which began in 1984, has been accepted by the U.S. EPA. Aquifer restoration began in 1986 and the site became an EPA Superfund site in 1987.

The remedial action consists of controlling flow in the low hydraulic conductivity perched zone by injecting or recharging treated water. The new controlled gradient will cause groundwater to flow towards the drain wells above the center of the plume. These wells will allow the contaminated groundwater to drain into the

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Branch Activities

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regional zone. The regional zone is being pumped with the production wells near the center of the plume. All groundwater and contaminants near the plant site in the regional zone are flowing towards these recovery wells. The water being pumped from the regional zone is being treated by GAC process and is discharged to the perched zone.

The use of a drilling program and numerical flow and transport models facilitated a detailed description of the hydrogeologic conditions at the site. A monitoring program was initiated and the collected data was used to interpret the dynamics of the groundwater system, the effects of pumping, and the migration of contaminants within the groundwater system. The results of these studies provided a substantive basis for the remediation of groundwater and soil contamination which is acceptable to both the State of California and the EPA.

"Technically & Legally Defensible Data"

The legal requirements for entities to monitor their use or production of toxic chemicals caused the U.S. EPA to develop and codify measurement methods for laboratories. Legally defensible data requires use of approved methods. Technically defensible data need only meet project requirements for accuracy and precision. The methods promulgated by the U.S. EPA more than 10 years ago are gradually becoming technically obsolete. To improve the nation's toxic chemical measurements programs, the U.S. EPA is considering implementing a system of Performance-Based Methods (PBMs). This system would profoundly change commercial environmental labs and their users. Under PBMs, existing methods will be used as reference methods for labs to develop and use proprietary methods. PBMs will probably be better, faster, and cost less than their referenced counterparts. The advantages presented by technically sound PBMs will be challenged by requirements for legal defensibility and market acceptance.

The primary objective of most commercial labs is generation of data which are simultaneously legally and technically defensible. The technical-regulatory gridlock which created the PBM evaluation limits process innovation in

environmental labs to sample handling, and the automation of analytical and data processing functions. Legally compliant data-packages for current methods are, and will always be, substantially larger than technically defensible reports. In response to market pressures to produce legally defensible data better, faster, and cheaper, some labs have developed powerful computer networks to automate data collection, quality control, and reporting. These computer systems can use historical monitoring data to automatically and instantaneously check data for statistical variance at sampling locations, ion charge balance, contaminant level trends, and other project-specific criteria. In combination with Real Time Quality Control (RTQC) software, Automated Project Quality Assurance (APQA) software allows project level data review to occur at generation, the time of greatest value in the process. The productivity and quality improvements realized from AQPA software result in lower costs for higher quality laboratory data. Generation of chemical measurement data is a process; incorporation of an automated system of quality assurance at the point of data generation is a valuable step toward the total quality management of environmental monitoring projects.

San Francisco Bay Branch

— by Tom Holmes

The San Francisco Bay Branch has come into its own in 1993. An organizational meeting of interested members was held in Oakland on January 13, 1993. Branch officers and committee chairs were informally selected and general responsibilities were assigned. The branch has since had two dinner meetings with speakers and has performed a membership survey regarding topics of interest (identifying priorities) and preferred meeting locations.

The branch's first dinner meeting of 1993 was held on January 27, 1993 at the Old Spaghetti Factory in Jack London Square, Oakland. Approximately 65 people attended, equally divided between GRA members and non-members. Three guest speakers were on-hand from U.S. EPA Region IX: Dr. Winona Vickery, Matthew Small and Joe Greenblot. Dr. Vickery is the Regional Scientist and serves as liaison between Region IX, the Office of Research and Development (ORD) and other

research organizations. Mr. Small, a hydrogeologist in the Office of Underground Storage Tanks, provides technical support to state UST programs and directs UST program implementation on Native American lands in Region IX. Mr. Greenblot, an ecologist, splits his time between serving as liaison for the ORD and the regional hazardous waste division and providing technical support on ecological assessments.

Dr. Vickery discussed the overall organization of EPA with specific reference to ORD and the locations and areas of expertise at the laboratories. The importance of technology transfer from ORD to the public was emphasized. Information of particular interest to GRA members involved in remediation is available at the Center for Environmental Research Information in Cincinnati, Ohio (513/569-7349) and at the R.S. Kerr Environmental Research Laboratory in Ada, Oklahoma (405/332-8880).

Mr. Small discussed several sources of information on treatment technologies including publications and bulletin boards. One source is the Superfund Innovative Technology Evaluation (SITE) program, which is run by the Risk Reduction Engineering Laboratory in Cincinnati (513/569-7418). The SITE program, which was mandated by Congress, promotes the development and commercialization of technologies for remediation of hazardous waste sites. Four specific publications are required for each technology evaluated. Forty technologies have been evaluated to date through the SITE program. In 1992, seven technologies were selected out of fourteen proposals received. Region IX was reported to be the leader in the number of SITE projects. Mr. Greenblot addressed the present status of ecological assessments within EPA. This area is expected to receive additional focus as more ecologists are brought into EPA and the protocols for data collection and evaluation become more accepted.

It's obvious the government printing presses are staying busy based on the number of publications made available or brought by the speakers as references. Several which appeared to be of interest to GRA members are listed below:

- Technologies and Options for UST Corrective Actions: Overview of Current Practice, EPA/542/R-92/010, August 1992



- Innovative Treatment Technologies: Overview and Guide to Information Sources, EPA/540/9-91/002, October 1992
- EPA Technical Assistance Directory, CERL-91-29, July 1992
- Evaluation of Soil Venting Applications, EPA/540/S-92/004, April 1992
- Fundamentals of Groundwater Modeling, EPA/540/S-92/005, April 1992
- Chemical Enhancements to Pump and Treat Remediation, EPA/540/S-92/002, January 1992
- In-Situ Bioremediation of Contaminated Groundwater, EPA/540/S-92/003, February 1992
- Multiphase Chemical Transport in Porous Media, EPA/600/S-92/002, March 1992.

The second dinner meeting of GRA's San Francisco Branch was held March 10, again at the Old Spaghetti Factory in Jack London Square. Approximately 35 people attended this meeting, with its focus by the evening's speaker on a "clean water" topic. James Yost of West Yost and Associates discussed "Groundwater Ramifications of California Water Bank Water Transfers." This presentation was an updated version of Mr. Yost's presentation to GRA's Sacramento Branch on October 8, 1992 (HYDROVISIONS, Fall 1992). The Conaway Ranch in Yolo County sold 45,000 acre-feet of Sacramento River water rights during the 1991 irrigation season, and 20,000 acre-feet in the 1992 season. The water was made available by crop exchange, fallowing of cropland, groundwater exchange and fall flooding/infiltration. Extensive ground surface elevation and groundwater monitoring were performed to meet requirements of state and local agencies. Additionally, study was performed in regard to ground subsidence from the high volume groundwater pumping; extent of groundwater recharge from the Sacramento

River as opposed to surface infiltration; and, water quality impact due to relatively high salt content in the groundwater. The monitoring results and general findings were discussed by Mr. Yost and illustrated with slides. The impact of new legislation/regulations and the official end of the drought on future water transfers were also discussed.

The membership survey data were compiled and presented at the second meeting. Forty-eight responses were received representing almost half of the branch membership. The membership showed a preference to hold meetings at the

Spaghetti Factory. The speaker was Clifton Davenport of McLaren-Hart who presented "Geologic Constraints on Groundwater Contaminant Plume Migration." A summary of this presentation will be included in the next issue of HYDROVISIONS.

The summer meeting is scheduled for July 21, 1993 at the branch's regular location (Old Spaghetti Factory, Embarcadero at Jack London Square, Oakland, CA, 6:00-9:00pm). The featured speaker will be Professor Jacob Bear of the Technion - Israel Institute of Technology, Haifa, Israel, and Weiss Associates, Emeryville,

CA. Professor Bear will present "The Role of Models in Making Environmental Decisions." The San Francisco Bay Branch officers appreciate your comments; please provide feedback and speaker recommendations to the branch management team (telephone numbers for branch officers can be found on page 10 of this newsletter).

Central Coast Branch

- by Paul Sorensen

The first dinner meeting of 1993 for the Central Coast Branch was held on January 21 at Mattei's Tavern in Los Olivos. The guest speaker was Mr. Michael J. Murray of Pacific Offshore Pipeline Company. Appreciation is

extended to Floyd V. Wells, Inc. for sponsoring the evening. Mr. Murray, who is a professional engineer as well as an attorney licensed to practice in California, presented an overview of the legislative and regulatory process in California, and discussed several of the highlights of the environmental bills acted upon in 1992. We "packed the house" with 37 attendees.

During the first portion of the evening, Mr. Murray walked us through the process by which bills can be drafted, introduced, read into committee, amended, and eventually dropped or passed. Of significance to many of those

Continued on page 18

UPCOMING BRANCH EVENTS

Sacramento

"Sacramento County Panel Discussion"

June 10, 1993

Southern California

"Groundwater & California's Economic Climate"

July 21, 1993

San Francisco Bay

"The Role of Models in Making Environmental Decisions"

July 21, 1993

same location with a cost of \$15 to \$20. The site of the first two meetings was acceptable to over half the respondents and access to BART was not a concern. There was a very strong preference for contamination-related topics versus clean water resources topics. The members' topic priorities, from high to low were remediation, site characterization, groundwater basin management, regulatory issues, well design/hydraulics, water supply, and risk assessment.

San Francisco Bay Branch dinner meetings are generally scheduled for the second Wednesday of odd-numbered months. The branch's third meeting was held May 12, 1993 at the Old



Branch Activities

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present were the statistics from 1992 that, of the 5,121 bills introduced, 59 fall under the auspices of the Department of Toxic Substances Control. Although only 41% of the bills introduced into the Legislature were passed and made into law, the pass rate for DTSC bills was a staggering 80%.

The second part of the evening was dedicated to a review and discussion of many of the more significant environmental legislation that may affect us as groundwater professionals, including SB 2056 (Calderon), SB 1726 (Calderon), and SB 1469 (Calderon). Of particular potential importance to those working in water supply issues, the recently passed bills include AB 231, Appropriative Water Rights (Costa), AB 2897, Water Supply (Cortese), and AB 3030, Groundwater Management (Costa).

Our March 18 dinner meeting was held at Split Pea Andersens in Buellton and was sponsored by Filipponi and Thompson Drilling Co. After developing a last-minute scheduling problem with our planned guest speaker, we were able to recruit Kevin J. Neese, an attorney with Hatch and Parent in Santa Barbara. We are very grateful to Mr. Neese, who learned that he was our keynote speaker upon his return from vacation only five days prior to the meeting!

Mr. Neese's presentation on Groundwater Adjudication Issues turned out to be of extreme interest to attendees. He described the details and hierarchy of various groundwater rights, including appropriative rights, overlying landowner rights, and prescriptive actions and results. He then detailed the methods,

and advantages/disadvantages, of various groundwater management methods, with particular emphasis on basin adjudication and court-mandated physical solutions. A discussion of opportunities and means to develop groundwater management plans in order to avoid litigation finished up the evening, with specific discussions centering on the Fox Canyon Groundwater Management Plan, the Ojai Basin Management Plan, and AB 3030. If we hadn't rescued Mr. Neese and finally adjourned the meeting, the group would have kept him there until all hours with the many questions and "hypothetical situations" (never pass up an opportunity to get free advice from an attorney, right?).

With the March meeting, the Central Coast Branch marks the completion of a full year of activity. Although the branch does not have the membership and attendance numbers of some of the larger areas, our attendees represent a high percentage of the professionals in the Central Coast region. Most of us have to drive at least one hour to attend, and some as far as 1 1/2 to 2 hours. We wish to thank the past year's speakers, including: Mr. Richard L. Volpe of Earth Sciences Associates, Inc.; Mr. Brian Baca of the County of Santa Barbara Resources Management Department; Mr. Stanley Hatch of Hatch and Parent; Mr. Anthony Nelson of Metcalf & Eddy; Mr. Michael J. Murray of Pacific Offshore Pipeline Co.; and, Mr. Kevin J. Neese of Hatch and Parent. We are also deeply grateful to all of the sponsors that supported the meetings, including: Hoover and

Associates, Earth Sciences Associates (ESA Consultants), Barbour Well Surveying Corporation, Sinclair Well Products, Floyd V. Wells, Inc., and Filipponi and Thompson Drilling Co.

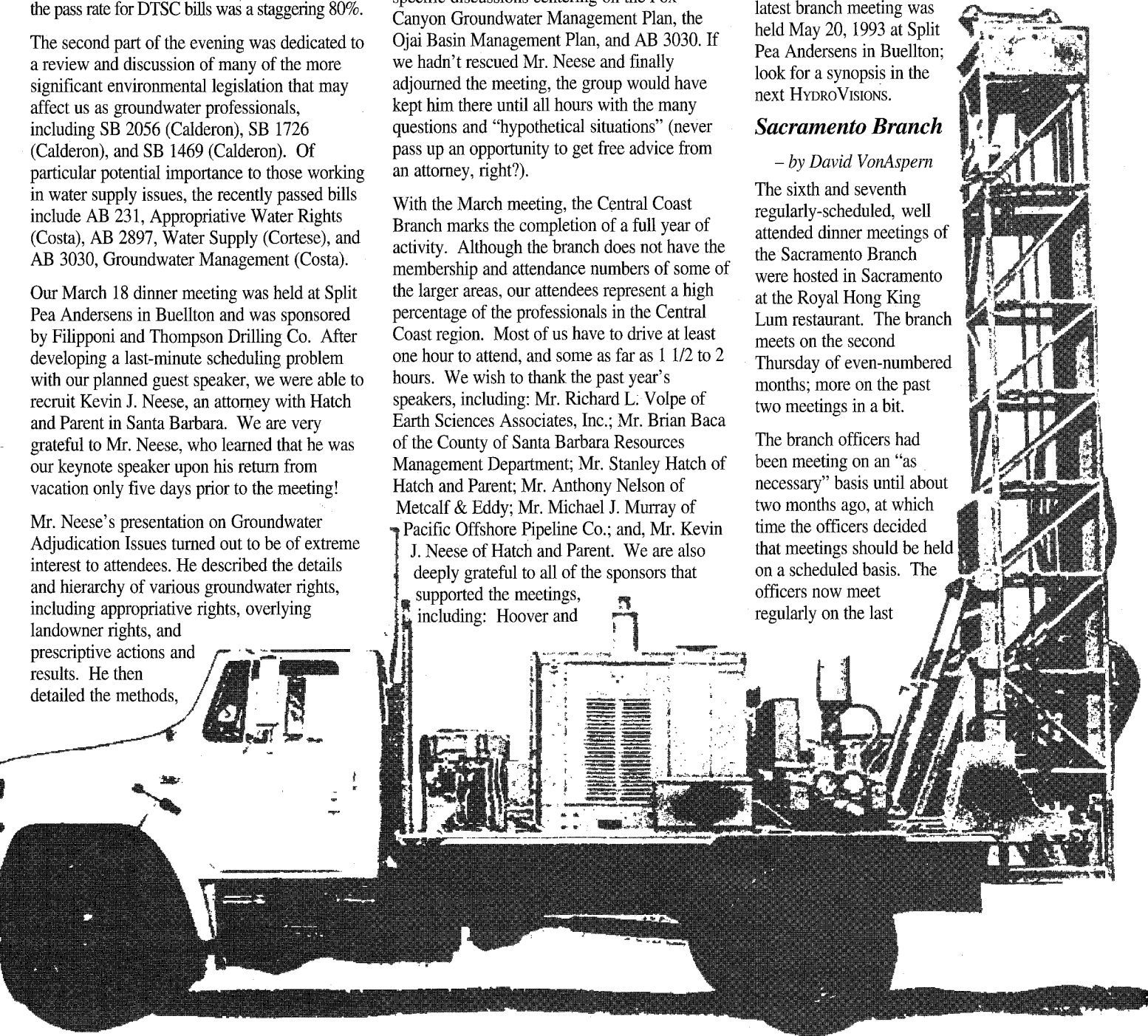
The Central Coast Branch meetings are scheduled for the third Thursday of odd-numbered months. The latest branch meeting was held May 20, 1993 at Split Pea Andersens in Buellton; look for a synopsis in the next HYDROVISIONS.

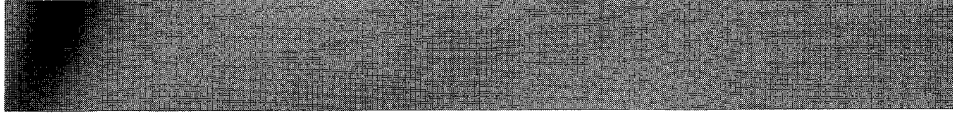
Sacramento Branch

— by David VonAspern

The sixth and seventh regularly-scheduled, well attended dinner meetings of the Sacramento Branch were hosted in Sacramento at the Royal Hong King Lum restaurant. The branch meets on the second Thursday of even-numbered months; more on the past two meetings in a bit.

The branch officers had been meeting on an "as necessary" basis until about two months ago, at which time the officers decided that meetings should be held on a scheduled basis. The officers now meet regularly on the last





Innovative Technologies

Continued from page 10

Thursday of each month, which puts every other officer meeting two weeks prior to a branch meeting. This new branch procedure is shared with readers here because other groups may want to initiate a similar schedule; the officers have found that regular meetings held just prior to, and one-month between branch meetings, have been an extremely effective mechanism for both short and long-term planning and organizing.

The Sacramento Branch has established a Special Events Committee that is co-chaired by Nicole Graham of ANLAB and Sheldon Fong of Sequoia Analytical. The branch special event(s) will most likely be in addition to regular branch meetings. GRA members can look forward to exciting, perhaps even "exotic" events thanks to the efforts of the new committee. The branch is also up and running with its 1993 officers; see Branch Contacts of this HYDROVISIONS for names and telephone numbers, etc.

The February dinner meeting was hosted by the Sacramento Branch and featured Steven Ritchie, executive officer of the California Regional Water Quality Control Board, San Francisco Region, as the keynote speaker. Mr. Ritchie presented "Future Directions for California Groundwater Cleanup Policy." The talk was illustrated with overhead transparencies and was well received and thought provoking for those attending. The program was similar to that which Mr. Ritchie presented at GRA's First Annual Meeting and Conference held last fall in San Francisco.

Radian Corporation hosted the April meeting and featured Radian staff scientist (and new Sacramento Branch member-at-large!) Jane

Faria as the keynote speaker. Ms. Faria captivated the audience with her presentation of "Interpretation of VOC Migration to Groundwater from Vertical Soil Gas Distribution," which included overhead transparency cross sections, soil gas distribution maps and other pertinent information that visually supplemented the topic at hand. Ms. Faria described a soil gas and groundwater investigation for a Sacramento area site and discussed how the data was used to identify sources of contamination and target soil gas volumes for remediation.

The June Sacramento Branch dinner meeting promises to be a real humdinger! "All You Ever Wanted to Know about Sacramento County's Well Grout Policies...(But Were Afraid to Ask!)" will fill the evening. The meeting will be held 10 June 1993 at the Royal Hong King Lum restaurant, 419 J Street in downtown Sacramento and is being co-hosted by GRA's Sacramento Branch and the Sacramento County Environmental Management Department, Hazardous Materials Division (SCEMD). The program will consist of a presentation followed by an audience question and panel answer period. The keynote speaker will be SCEMD hazardous materials program manager Robert A. Knight; the discussion panel will be comprised of SCEMD representatives.

Who says government isn't responsive?! SCEMD is currently developing policies and recommended procedures for its water well and monitoring well permitting process and seeks to receive comments from the regulated community. "The 48-hour Rule Applies to Dinner Reservations Too!" [To find out what this refers to, attend the meeting—hope to see you there! -Ed.]

factors, including geology, final horizontal section depth, distance from the entry point to the horizontal section, and strength of the well material.

Once the drill string reaches horizontal, drilling with the pilot string is stopped. A five-inch outside diameter (OD) x 3.75" inside diameter (ID) washover pipe with a bit is then rotated over the 2-7/8" pilot string. The OD of the bit will be large enough for the installation of surface casing. After opening the hole to the desired diameter, the washover pipe will be pulled from the hole leaving the 2-7/8" pipe in place. A HDPE casing is run into the hole over the pilot string. The pilot string will then be removed and the HDPE will be cemented into place.

The cement will be drilled out of the HDPE and the horizontal section will be drilled utilizing the small diameter pilot string and motor. After the horizontal length is drilled, the 5" washover pipe will be used to open the horizontal section to the correct diameter. Both the washover pipe and pilot string will then be removed from the wellbore.

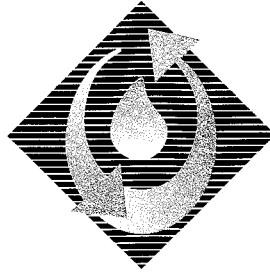
The well materials will be installed by pushing the screen into place with the 2-7/8" drill string. Well materials may consist of slotted HDPE pipe, prepacked screens or a combination of materials.

Well development consists of washing with a 360° jetting tool, pumping, and, if required, chemical treatment.

Horizontal drilling and well installation is proving to be an invaluable tool for site remediation. Horizontal wells have found uses as both extraction (when equipped with submersible pump equipment) or injection (water, air or steam) wells. Future applications may include the use of horizontal wells strictly as a means of conveyance or transmission for bio-remediation, microwaves or other innovative technologies.

David Bardsley is a Geologist/Project Manager with Drilex Systems, Inc. of Houston, Texas. For additional information regarding horizontal drilling, please call Mr. Bardsley at (713) 937-8888.

To express interest in arranging a demonstration seminar and/or in continuation of this column, please call GRA's newsletter editor David VonAspern at (916) 372-1434.



Schedule of 1993 Board of Directors Meetings

"All are welcome"

SATURDAY, AUGUST 21

Geraghty & Miller, Inc.

West Covina, CA

SUNDAY, NOVEMBER 14

Wallace-Kuhl & Associates, Inc.

West Sacramento, CA

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