New Council to Unify Organizations in Geoscience-Environmental Fields

by James A. Jacobs, Brian Lewis, and Robert E. Tepel

Recently there has been a rapidly changing political climate in Sacramento toward the various types of professionals who practice in the geological, environmental, engineering, scientific and resources fields. In January, 1997, representatives from leading California-based geoscience, environmental and related organizations met in San Jose to discuss ways to bring geoscience organizations together in an affiliation of a council. The council would encourage the use of sound geological knowledge and practice in proposing, reviewing, and monitoring statutes, regulations, and public policies. The council would monitor California legislation and examine the activities of the various related professional boards in the state.

The world of legislation and regulation requires a lot of work that gives employment to many geologists, engineers and professionals in related fields. However, the laws and regulations requiring the work are often so poorly focused that they cause wasteful expenditures for clients, businesses, and taxpayers. Worse still, the legislation and regulations that would save lives and dollars have been ignored. Earthquake safety measures routinely recommended by panels of experts after major earthquakes are a prime example of good ideas quickly forgotten. Professionals working in the groundwater resources and environmental fields are quick to point out that water well log confidentiality continues to make their work harder and more costly. Second, our business opportunities and professional practice conditions are under scrutiny, not only by the Department of Consumer Affairs, but by other parts of the governor's administration and, by legislators, by public interest groups, and by other business coalitions.

If GRA members decide that the council is an appropriate affiliation, then the council will be an avenue in which GRA can participate in the legislative process using a larger and unified voice. In addition, the council may help to contribute toward resolving some of the issues that affect our members. Some examples of issues that the council could assist with include monitoring the new registrations for the Registered Environmental Assessor Class I and Class II, and the sunset review process of a particular state board. In addition, there are hydrologists, who by the nature of their degree, can not qualify for the registration exam for either the geology or engineering boards. These types of professional challenges have not been addressed effectively by existing professional societies. The council of geoscience organizations could address the many different needs in the areas in which we work. If a unified voice of several organizations can be heard in Sacramento, it is hoped that the important safety and professional issues that affect us will be appropriately addressed.

The organizing meeting of the California Council of Geoscience Organizations was attended by representatives of these state and local organizations: the American Institute of Professional Geologists, the Groundwater Resources Association, the Northern California Geological Society, the Inland Geological Society, the Association for Women Geoscientists, and the three California Sections of the Association of Engineering Geologists. Brian Lewis and James Jacobs attended for GRA. No commitments were made by any of the organizations or representatives at this organizing meeting. Governance and finance issues were discussed, and bylaws are being drawn.

The initial concept for the Council is that membership will be open to geoscience organizations, organizations in related professional fields, and businesses. In one governance plan under consideration, the Council would be controlled by a Board of Directors appointed by the member organizations for staggered three-year terms. An Executive Director, and possibly a lobbyist, would be retained initially on a part-time basis. These concepts may change as we get more input.

Frank McClure, former U.S. Senator from Idaho, in addressing a group of scientists and engineers, said "If you don't like politics and don't get involved in politics, you will be governed by those who do." Through CCGO, California professionals practicing in the areas related to geology, environmental science and engineering will be able to address some of the issues confronting our profession. The CCGO will be able to monitor the legislative process much better than the many professional societies can do on their own. It is for this reason that we suggest

that the GRA membership consider the possibility that GRA become a member of the California Council of Geoscience Organizations. Please send your comments to Brian Lewis at GRA, P.O. Box 1446, Sacramento, CA 95812 or e-mail "admin@grac.org." Is this an organization that GRA should support? We need your input.

James A. Jacobs is president of the San Francisco Chapter of the Groundwater Resources Association of California and president of the California Section of the American Instate of Professional Geologists. He is president of FAST-TEK Engineering Support Services. Brian Lewis is the Vice-President of the Groundwater Resources Association of California and a director for the organization. He works for the Cal EPA/Department of Toxics Substances Control. Robert E. Tepel is past president of the Association of Engineering Geologists. Mr. Tepel is a scientist with the Santa Clara Valley Water District.

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New Study Advocates No Purging Prior to Sampling

by Floyd Flood

The Western States Petroleum Association (WSPA), composed of the major oil refining and transportation companies operating in the western states, has recently released their report, "The California Groundwater Purging Study for Petroleum Hydrocarbons." This report was unsigned, but prepared by SECOR. WSPA's cover letter states, "The study's findings show that with few exceptions, purging does not have a significant affect on petroleum hydrocarbon constituent concentrations in groundwater samples. Therefore, purging should not be necessary to ensure that groundwater samples are representative of formation water." This conclusion is contrary to current practices. Most guidance documents recommend that purging, or even low flow purging, is necessary to get a representative sample from wells. This is especially true when volatiles are being sampled. How, then, did WSPA and SECOR come to their contrary conclusion?

Michael Barcelona, Ph.D., formerly with the Illinois Water Survey and now Director of the "National Center for Integrated Bioremediation Research and Development" at the University of Michigan, Ann Arbor, was asked to peer review the study. Dr. Barcelona reviewed the initial workplan and the final report. His general comments on the final report included, "The study seems to have been well organized and documented although it is clear that they adopted their original study design with its flaws. I had communicated my concerns on the design to you last year. It is somewhat disheartening to read the final product which suffers from the serious bias I had identified at that time. Most of the problems with the work arise from the highly variable, poorly controlled purging methods which were expected to cause bias in sample results. Comparison of the biased unpurged bailer sample with another biased (bailed) sample after purging is fruitless. These methods problems are significant and evidenced adequately by the high (relative) standard deviation of the relative percent difference between field duplicates (Table 5-13)." In essence, Dr. Barcelona is saying the bailer is a poor sampling device and that it is meaningless to design a study that is based on a device that biases the sample.

WSPA and SECOR were made aware of these concerns prior to the study being initiated. WSPA responded to Dr Barcelona's initial concerns with the following comments, "While we believe that your concerns are valid, WSPA's study is not intended to evaluate the relative merits of alternative purging methods. Rather, it is intended to investigate differences in groundwater samples collected before and after purging, *based on current practices and requirements*. The success of this effort is contingent on acceptance of study results by regulators under the current system. Therefore, the protocol *must* simulate current field practices." (Emphasis not added.)

Some wells were even purged with a vacuum truck. Dr. Barcelona raises a poignant point. He stated, "The greatest systematic difference [25%-vacuum (truck) pump] shows this as a biased method. Analytical and sampling errors can easily be controlled to <1% of natural variability. Why would anyone accept the use of such a biased purging method?"

In 1994, GRA held a short course on groundwater sampling. Robert Puls, Ph.D., from the United States Environmental Protection Agency's Kerr lab in Ada, Oklahoma gave a demonstration on sampling devices. The short course indicated that bailers are poor sampling devices. Dr. Puls went on to say that he could bias the analytical results by using bailers.

One effect of the WSPA study is to question why we allow the current poor sample practices. It is unfortunate that it is easier to let the current, but poor, practices continue when we know they are questionable. WSPA may have a lot to gain by not purging. They state that, "based on a survey of six major oil companies, annual purging costs are about $2,000 per site. Therefore, with approximately 12,000 leaking underground storage tank (LUST) sites, the saving could be on the order of $24 million" by not purging.

It seems appropriate to question current practices. The tools for sampling have improved. Perhaps it is appropriate for the GRA Technical Committee and other members of GRA to work with regulatory agencies, counties, and the regulated community to select sampling devices that minimize purge water and control the natural variability to <1%.

If you would like a copy of the study and Dr. Barcelona's comments, please send $5.00 to GRA to cover reproduction and mailing costs.

Floyd Flood has been in the water business for most of his life. Currently, he is editor of HydroVisions.

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PRESIDENT'S MESSAGE

by Susan Garcia

The Groundwater Resources Association of California (GRA) enters its sixth year as an organization this 1997. We have about 600 members and over 100 additional individuals statewide that have expressed an interest in GRA activities. Our membership consists of a wide array of disciplines and interests with California groundwater being the common interest. The diversity of our membership requires us to provide a balanced approach to California groundwater issues. Active participation in GRA assures that your concerns are addressed and implemented, as appropriate to the overall membership. We look forward to making 1997 a stellar year for providing technical leadership to California groundwater issues. Join us in making 1997 a very successful year.

State Officers elected to lead GRA during 1997 are David Von Aspern of Wallace-Kuhl & Associates as Treasurer, Tim Parker of Law Engineering as Secretary, Brian Lewis of the California Department of Toxic Substances Control (DTSC) as Vice President, and myself as President. Many thanks to our 1996 State Officers, namely, Kent Parrish (URS Consultants) our Past Vice President and Steve Goldberg (Downey, Brand, Seymour & Rohwer) our Past Treasurer, who helped make 1996 such a successful year. We look forward to their continuing involvement as leaders of GRA as either Advisory Committee Chairs and/or members of the Board of Directors.

GRA had a Strategic Planning Retreat and Board of Directors Meeting on Sunday January 19 and Monday January 20, 1997. The objectives for the Retreat were to develop a mission statement and identify short and long term goals for GRA. The quarterly Board of Directors Meeting addresses day-to-day operational issues and activities for 1997, and also reaffirmed items developed during the Retreat. See article, Page 3.

GRA Board of Directors Meeting

During the Board of Directors Meeting, we discussed a variety of items, including the 1997 Budget, proposed changes to our Bylaws, Executive Director Applicants and the search committee, the California Council of Geoscience Organizations, the 1997 Annual Meeting and Seminar, and GRA's participation in the dedication of Placer Hall, the new United States Geological Survey (USGS) Water Resources Center and Science hall at California State University at Sacramento. Meeting minutes will be forthcoming. Schedules for HydroVisions and Board of Director Meetings for 1997 also were issued. Our next Board of Directors meeting will be held at Placer Hall in Sacramento on April 19, 1997. Please see the calendar of events for HydroVision deadlines and Board of Directors Meeting schedule.

Forthcoming Events

GRA will be participating in the grand opening of Placer Hall, at California State University at Sacramento (CSUS) on Friday, April 18, 1997. The California District Office Water Resources Division of the USGS and CSUS collaborated their efforts constructing Placer Hall, the new science building at CSUS. The USGS will house their research operations at the facility and will in turn provide a variety of internships and opportunities to interact with the students at CSUS. The grand opening ceremony will include tours of the facility and will encourage the exchange of information. GRA as a contributor to Placer Hall (see article in this HydroVisions) will have an informational booth at the ceremony. All members are invited to participate in this event.

Our 1997 Annual Meeting will be held on September 15 and 16, 1997, at the Radisson Hotel in Sacramento, California. The annual meeting theme is "Ground Water and Future Supply." The meeting is being held jointly with the University of California Water Resources Center Biennial Ground Water Conference. This meeting is being co-sponsored by the DWR, California State Water Resources Control Board, Water Education Foundation, and GRA. We have a tremendous agenda with technical sessions ranging from groundwater quality and quantity issues to major hazards and remediation issues facing the industry. Place this event on your calendar. Additional information on this event is included in this HydroVisions.

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GRA's Maiden "Retreat"

by David Von Aspern

The GRA Board of Directors, State officers, Branch officers and invited guests participated in GRA's first-ever administrative planning and solutions-seeking Retreat. Carl Hauge, Chief Hydrogeologist for the Department of Water Resources, facilitated the session and pointed out that the event was actually an "Advance," as opposed to a retreat, for an advance brings something forward or accelerates the growth and progress thereof. Carl did an excellent job keeping the working group focused and moving along on a very full agenda. The attendees worked non-stop from nine in the morning to 5:30 in the afternoon.

The event was held on January 19, 1997 at the recently opened Rocklin Park Hotel in Rocklin, California, about 20 minutes east of Sacramento along Interstate 80. The Retreat was coordinated and attended by David Von Aspern; the other attendees included Tim Parker and Kent Parrish, representing GRA's Sacramento Branch; Susan Garcia, GRA President and representing the Southern California Branch; Michael Foster and David Abbott representing the San Francisco Branch; and Board members Anthony Saracino, Vicki Kretsinger, Paul Dorey, Tony Ward, Brian Lewis and Steve Goldberg. The Retreat was followed the next day by a regularly-scheduled, quarterly meeting of GRA's Board of Directors. The fact that attendees devoted two full days of participation speaks immensely of the high level of commitment that GRA's existing leadership has in regard to continuing the success of the organization.

The first order of business at the Retreat was development of a Mission Statement for GRA. While GRA already has a sound set of Objectives and a well-defined Purpose, each of which can be seen on the Membership Brochure and in the Membership Directory, the new Mission Statement rounds out the endeavors of GRA in a succinct way. After much deliberation, the working group came up with the following Mission Statement:

The Groundwater Resources Association of California is dedicated to resource management that protects and improves groundwater through education and technical leadership.

Let that Mission Statement sink in for a moment. Then think about what the Mission Statement does and how you, in your own way, can either grow personally or professionally by being a part of it, and how you can contribute toward it. The Mission Statement attracts attention; it provides focus; it discourages shooting from the hip; the Mission Statement provides guidance; it builds loyalty and camaraderie; and it lets others know that we hold something meaningful that deserves our and their efforts. As a founding officer of GRA's Sacramento Branch, I cannot say enough about what a thrill it has been to have helped develop something totally from scratch into a fiscally sound, thought-provoking, safe haven for me and my peers in the industry. With all the sweeping changes in environmental regulations lately, the company downsizings and buy-outs, and the ever increasing hustle and bustle of life in the '90s, I actually look forward to GRA meetings where I can let go of the competitiveness and chat with folks who are the only ones who can truly relate to what goes on in our profession - it's all part of contributing to the Mission.

After having spent about one-quarter of the Retreat on development of the Mission Statement, the working group spent the rest of the day forging plans to address administrative needs, procedural issues, membership services, long-term goals and finances, and improvement of external and internal communications. It was a very full plate. The material generated was boiled down to four broad categories, under which specific and less-broad topics were prioritized. The categories and prioritization, which were determined by vote of the attendees at the Retreat, are presented below. The reader should be aware that the Retreat attendees are taking immediate action on these items, rather than just talking about them. Parenthetical information shown below contains the GRA members charged with tackling the prioritized items, as well as a timeline, where appropriate.

Standing Committees also were formed, and are shown below under the categories to which they are most closely related; the committee chair(s) are in parentheses.

1. Organization

Fill the now vacant Executive Director as a part-time position (Board of Directors, A.S.A.P.)

Develop job descriptions for Board members, State and Branch Officers (Executive Committee - by April '97)

Standing Committees: Executive Committee (Saracino, Kretsinger, Lewis); Bylaws (Goldberg)

2. Communications

Continue to improve/expand *HYDROVISIONS* (Lewis - on-going)

Improve State/Branch communications, and the Internet site (Kretsinger, Parrish - status report by April '97)

Standing Committees: Newsletter (Flood, Lewis); Liaison (Kretsinger); Annual Meeting (Saracino, Kretsinger); Electronic Communications (Lewis, Parker, Parrish)

3. Membership

Member retention, maintenance and recruitment (Dorey - status report by April '97)

Make better use of the GRA membership database (implementation already in the works re: Paula Noble, Membership Administrator)

Standing Committees: Membership (Dorey, Lewis); Education (Saracino); Technical (Bob Nicholson); Legislative (chairperson needed, new Executive Director?)

4. Finances

Evaluate present membership dues structure and Develop a Business Plan (Ward, Dorey, Goldberg - by April '97)

Establish guidance and procedures for Branch Treasuries, build uniformity into the way each Branch operates and reports to State for income tax purposes (Goldberg, Von Aspern - by April '97)

Seek increased corporate contributions and grants (new Executive Director, Saracino, Goldberg)

Standing Committees: Finance (Goldberg, Von Aspern)

Concluding Remarks

GRA's first-ever Retreat stimulated thoughts, dialogue and action plans for continuing the success of the organization into the future. Volunteers that would like to help with any of the action items should contact the appropriate chairpersons named above. Comments also are welcome; use GRA's e-mail address, or send letters or faxes.

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McClellan Hosts Environmental Class

By Kerry Little and Philip Mook

The Groundwater Resources Association of California, in cooperation with McClellan Air Force Base Environmental Management Directorate, CAL/EPA Department of Toxic Substances Control (DTSC), and the University of Waterloo presented a short course on Rapid Site Characterization (RSC) at McClellan AFB on 20 November, 1996. Over 150 environmental professionals attended the course that started with presentations at the base theater and ended with vendors' displays at the Coast Guard hangar. The course addressed the need to shorten the time and reduce the cost of investigation and characterization of contaminated sites. Frequently this characterization process is long and costly, and takes away resources that could be used for actual cleanup efforts.

The RSC process is intended to accelerate the site characterization process through onsite collection of soil and groundwater data. Typically, soil and groundwater data is collected and sent to a lab for analysis. This is costly in terms of time and manpower. The RSC process can also result in more cost-effective monitoring and remediation system design. "The information covered in this course is directly applicable to the environmental cleanup efforts on going at McClellan and our satellite facilities," said Jerry Vincent, McClellan's Restoration Field Team Leader. "The speakers were excellent and knew their subject areas."

The keynote address was presented by John Cherry, Ph.D., Professor of Earth Sciences at the University of Waterloo and former Director of the Institute for Groundwater Research, Ontario, Canada. Dr. Cherry is widely recognized as a world leader in groundwater contamination research. His talk focused on modeling the behavior of dense non-aqueous phase liquids beneath ground. Examples of these liquids include solvents similar to those found in soil and groundwater at McClellan. In addition to Dr. Cherry, seven other experts presented RSC topics, they include:

- Murray Einarson, principle hydrologist with Einarson, Fowler and Watson, who gave an overview of the RSC process and direct push methods for RSC
- Peggy Harris, Chief of the Standardized Permitting Section, DTSC, who spoke about the California Resource Conservation and Recovery Act
- Bart Simmons, Acting Director of the Hazardous Materials Laboratory, DTSC, who discussed RSC and data quality
- Kenneth Blom, NORCAL Geophysical Consultants, Inc., who spoke about using surface geophysics for environmental applications
- Peter Balas, Principal, ONSITE Environmental Laboratories, Inc., who gave an overview of onsite analytical methods
- Blayne Hartman, Transglobal Environmental Geochemistry, who discussed active soil gas sampling
- John Cusick, W.L, Gore & Associates, Inc., who discussed passive soil gas sampling in environmental investigations

Thirteen technology vendors were on hand to display their RSC tools.

Brian Lewis of DTSC and the Groundwater Resources Association was the main organizer of the course. He received many positive comments from attendees, including:

"I want to thank you for putting the Rapid Site Characterization together. It was one of the better trainings I have attended."

"I wanted to let you know some of the VERY POSITIVE feedback that I'm getting about the seminar from our people that attended yesterday. The speakers were very dynamic and informative."

"I just wanted to let you know that the Rapid Site Characterization training course was excellent! You did a really good job organizing it!"

"Everyone I spoke to said they really benefited from the course."

Technology vendors were very pleased with the quality and quantity of contacts they made.

The Environmental Management Directorate would like to make this type of seminar an annual event at McClellan. For further information about this course, please contact Mr. Philip Mook, Senior Technology Advisor, (916) 643-5443 or Brian Lewis, DTSC, (916) 323-3632.

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Announcement for Sanitary Landfill Static and Dynamic Slope Stability Conference

This conference is being held to seek technical input for static and dynamic slope stability analyses of sanitary landfills. The input will be submitted to the AB 1220 workshop group for consideration and possible inclusion in the new California Code of Regulations, Title 27 regulations governing solid and liquid waste management facilities. This conference will be of interest to regulators, operators, consultants, and other individuals working in the solid and liquid waste management industry who wish to provide input for development of the new Title 27 regulations.

The conference is sponsored by the Association of Engineering Geologists, American Society of Civil Engineer (Sacramento Geotechnical Section), and the California Integrated Waste Management Board. The registration fee is $70 (if received by March 1, 1997); or $95 (if paid at the door). The conference will be held: March 27 & 28, 1997, at the Los Angeles County Sanitation District Office 1955 Workman Mill Road, Room 126 Whittier, Ca.

Make checks payable to Sacramento Section AEG and mail to Landfill Stability Conference c/o Sacramento Section AEG, P.O. Box 220968, Sacramento, CA 95822-0968. For more information, call (916) 421-5276.

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Containment Zone Review Committee Public Workshops

On October 2, 1996, the State Water Resources Control Board (SWRCB) adopted Amended Resolution 92-49, Policies and Procedures for Investigation and Cleanup and Abatement under Section 13304 of the Water Code to include a "Containment Zone Policy" to establish conditions under which a Regional Water Quality Control Board may approve containment zones (specific portions of ground water bearing units where water quality objectives cannot be reasonable achieved). Pursuant to Section lll.h.11 of Resolution 92-49, a Containment Zone Review Committee has been created to review current implementation of the policy and to potentially provide recommendations to the SWRCB on revisions to the policy. This Committee invites public participation and comment on the following issues:

1. Containment zone application requirements
2. Incorporation of a risk-base framework in Regional Board Containment zone determination
3. Regional Board implementation flexibility
4. Mitigation requirements
5. Technical Advisor Committee
6. Inter-agency Containment Zone requirement consistency

The workshop will be Tuesday, March 11, 1997, 10:00 am, Sheraton San Diego, Room Terrace D, San Diego Airport, 1380 Harbor Island Drive. There already was a workshop on February 11, 1997 in Sacramento. An additional non-workshop meeting of the containment Zone Review Committee will be held April 8, 1997, 9:00 am in Sacramento, 714 P St., First Floor Auditorium, (Room 102). This meeting shall be open to the public but no public testimony will be taken at the meeting. The Committee is tasked to present its final recommendations on the above issues to the SWRCB in May 1997.

Parties wishing to make written comments on any of the issues listed above should submit 15 copies of their materials not less than 10 days prior to the meeting to: San Francisco Bay Regional Water Quality Control Board, 2101 Webster Street, Suite 500, Oakland CA 94612, Attn: Containment Zone Committee.

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Northern California Geological Society (NCGS) Field Trip

NCGS proudly invites members of NCGS and GRA and their families to attend this event. This trip will begin at Concord Chevron Park at 7:30 am. Buses will leave at 7:45 am (pick up at San Jose at 8:30.) Stops will include:

1) Moss Landing for an introduction to California State University's Moss Landing Marine Laboratories by its Director, Professor Gary Greene, and

2) A tour and talk by Debra Stakes, Ph.D., of the Monterey Bay Aquarium Research Institute.

We will visit the Aquarium's new exhibit "Fishing for Solutions: What's the Catch?" This exhibit take an in-depth look at shrimp fishing around the work and the impact the industry has on marine life.

Time: March 15, 1997, concord - 7:30 am; San Jose - 8:30 am

Return Saturday evening at Concord 7:00 pm.

Place: Concord - 2101 Diamond Blvd. (Chevron Parking lot) From I-680 exit Willow Pass Rd., go east 1 block and turn left on Diamond Blvd. San Jose - TBA

Cost: $35 (18+); $30/adolescent (13 to 17); $25 (3 to 12), includes lunch, transportation, refreshments and admission fee to the aquarium.

For more information call Tim Ault (510) 372-9100 (days) or Tridib Guha at (510) 370-0685 (evening 8 to 10 pm.) Seating is limited.

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Preventing and Detecting Lab Fraud

by Bart Simmons

In 1995, Eureka Laboratories, Inc. was fined $1.8 million and two chemists who worked at Eureka were convicted of federal fraud charges related to the manipulation of lab results for federal contracts. The convictions came after the federal government suspended Eureka from contracting because of allegations of fraudulent practices. The Eureka case, although one of the most prominent, is only one of many cases of laboratory fraud which have been uncovered nationwide. Although the Eureka incident has passed, several efforts are underway to prevent future similar occurrences. The U.S. Environmental Protection Agency Office of Inspector General issued a report[1] which was critical of quality oversight at the military facilities in Region 9; a major issue was the impact of lab fraud. Subsequent audits in other EPA Regions have led to similar conclusions on data quality, and EPA is expected to develop a national response to the issues raised by the OIG. Concurrently, the California Military Environmental Coordination Committee (CMECC) is developing guidelines for the prevention of laboratory fraud at military facilities. The techniques which are being considered include the following:

Double-blind (disguised) Proficiency Test Samples: These are samples submitted along with field samples in a way that the lab is unlikely to know that they are proficiency samples. A number of companies offer certified samples; the certification may be based on ISO 9001 certification, a federal contract, or self-certification. Submitting disguised samples requires the participation of field staff so that they appear to be environmental samples. Disguised samples are regarded as much more powerful tools than announced proficiency test samples.

Audits: Although audits of laboratories are required by lab certification programs, as well as by many clients, few of the audits involve actually reviewing raw data and the process used to generate a final lab report. These performance audits may be a cost-effective tool for discovering poor practice or fraudulent practice.

Data Validation: Data validation involves a review of either a hard copy lab package, with supporting documentation, or electronic review of the lab package in an electronic format. The U.S. EPA Contract Lab Program uses electronic reporting and electronic data validation using the CADRE program. Although data validation is a relatively expensive tool, it will be required on some projects, typically on 10-20% of the lab reports**.**

Electronic Record Audits: A powerful technique which has been used successfully in fraud investigations is the review of magnetic media records and an independent analysis of the data by an experienced chemist. Results of gas chromatography/mass spectroscopy (GC/MS) tape audits were used to prove the fraud allegations in the Eureka case.

The CMECC lab fraud guidelines are scheduled for completion in early 1997. In addition, a Cal/EPA Environmental Data Quality Team is preparing recommendations to Cal/EPA on data quality issues, including lab fraud prevention. The increased use of lab fraud detection and prevention techniques will have an impact on all those who are involved in the collection of environmental data; their effectiveness and cost will likely be a major issue for the future of environmental measurement.

[1] "Environmental Data Quality at DOD Superfund Sites in Region 9," U.S. E.P.A. Office of Inspector General, E1SKF5-09-0031-5100505, September, 1995.

Bart Simmons, Ph.D., is the Acting Chief, Hazardous Material Laboratory, Department of Toxic Substances Control, Berkeley, CA.

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Finding Your Way Around THE World Wide Web

by Mary Kean, P.E.

Lots of people use the Internet these days, but finding your way around is difficult. The first Web address people usually learn is the one advertised at the end of their favorite TV show or movie. Finding your way to things that are useful to your career is a little harder. At the same time, it's becoming vital, as more and more government agencies turn to Web publishing on the Internet. I recently got an email notice that a two volume EPA manual on "Bioventing Principles and Practices" is "not in print in hardcopy form because the EPA does not have enough funds this year for printing. The manual is available for downloading from the world wide web at *http://www.epa.gov/ORD/WebPubs/biorem*. Web publication is saving the EPA money and getting the information available much more quickly than traditional paper publications can, but it's adding another skill you'll need to learn as part of your career growth.

Here are some tips on how to get started.

Getting started

To use the Internet, you'll need an "Internet Service Provider" (usually called an ISP) and a browser. You pay your ISP a one time setup fee (typically around $10 or $20) and a monthly fee (usually around $20/month), and in return you get a number you can call to connect your computer to the Internet. In addition, in a basic access package, you should expect an email address, access to the Usenet News discussion groups, and sometimes the right to publish a small Web site of your own. Well known national ISPs include America Online and Netcom, but if you live in any large urban area you'll also find many smaller providers. If you travel, or think you may relocate, it's easier to deal with a national ISP that has local dialup access in many cities. Many people feel, though, that the local ISPs provide better and less expensive service.

A browser is a tool that displays Web pages, and in many cases can be used to handle your email and read Usenet News as well. The two major browsers in use today are Netscape Navigator and Microsoft Internet Explorer. Both are available for all versions of Windows and for the Macintosh. Which browser should you use? If you have to ask, the best choice is whichever one your ISP recommends, or the one a more experienced friend uses, or whichever one came installed already if you've just bought a new computer. If this doesn't help, Netscape Navigator is the more popular of the two.

New versions of browsers come out about every six months. Don't feel like you need to keep updating, though; most useful sites make sure that they are usable with older browsers. You find cutting edge features used first on personal sites (where the author cares less about reaching a wide audience) and on entertainment-related sites (which actually can use technologies like downloadable video clips). A browser that supports "frames," "forms" and "tables" has all the features you need for accessing most sites intended for the general public. One last browser tip: find out how your browser creates and organizes bookmarks, then set bookmarks to the sites you find yourself using frequently. This saves you from constantly typing the same address into your browser each time.

Eventually, you'll need to get the Adobe Acrobat reader, either as a separate program or as an add-on for your browser. Some sites use Adobe Acrobat as a way of publishing pages that look just like their printed manuals; they get better control over format than the Web allows, at the cost of making you get another piece of software. This is required to look at the EPA bioremediation manuals I mentioned above, for example. The Acrobat reader is free; most sites that publish information in this format include a link to Adobe (*www.adobe.com*), where you can download the latest version of this software.

Sites for Environmental Professionals

Here's a sampling of specific sites to get you started. The Groundwater Resources Association of California maintains its home on the Web at *www.grac.org*. The California water code and regulations can be found at

SWRCB home page at *www.swrcb.ca.gov/pub*. The California Environmental Resources Evaluation System CERES) has a variety of links at *ceres.ca.gov*; a catalog of sites is at *ceres.ca.gov/topic/water.html*. The EPA's home page is at *www.epa.gov*. From here, you can find regulation and guidance documents. A "Groundwater Remediation Technologies Online Resource Guide" is at *gwrp.cciw.ca/internet/neff.html*. This is a Canadian site but the guide is primarily focused on US resources. These are only a few of the many useful sites available. You can find more by following links at the sites I've just mentioned, or by using one of the Web's "Search Engines."

Search Engines

A book usually has both a table of contents and an index. The Web's table of contents can be found in "search engine" services such as Yahoo (Web address: *www.yahoo.com*), that categorizes information by topic, and in indexing sites like AltaVista (*www.altavista.com*). At Yahoo, you can choose the categories "Government," and "Documents," to find categories such as "United States Federal Register" and a link to the "Defense Environmental Restoration Program." Other useful categories at Yahoo are the various engineering categories (under "Science") and "Environment" (under "Society and Culture"). Sites like Yahoo are categorized, which is very useful when you're on a general search; the disadvantage is that an organized reference guide like Yahoo can't keep up with the enormous expansion of the Web. Newer sites will not yet be categorized yet, and some of the existing categories are already too large. For example, if you spent only one minute examining each site, completely searching the "Waste Management" listing would take more than three hours. Another popular table of contents site is Lycos (*www.lycos.com*).

When you're searching for more specific information, it's often easier to use an index. AltaVista runs programs that constantly search Web pages and indexes their text. For example, if you're looking for HazMat certification classes, and you live in California, you would want to look for any site that mentions "HazMat" and "Certification" and "Class" and "California." This will return a customized list of sites containing that phrase. Another useful index site is HotBot (*www.hotbot.com*).

Searching with an index can be tricky - it often returns too many entries, or none. If you get too many entries, keep adding search terms one a time till you narrow down the list to something manageable - 10 or 20 hits. Remember that AltaVista indexes everything - for example, you can try a search on "Pat Jones" if Pat Jones works at a company whose Web page you're trying to find.

Another search trick is to look for people who provide links to sites you use. "ISO 9000" is a well known quality certification standard. The official ISO 9000 site can be found at *www.iso.ch/9000e/forum.html*. Searching on this same address at AltaVista turns up about 100 different pages that mention, including those of a number of consulting firms that deal with this standard.

A different index site is *www.dejanews.com*, which lets you search through old postings to "Usenet News." AltaVista provides an index to Usenet News as well, but most people recommend DejaNews as easier to use.

Other useful sites to try include:

- *www.webdirectory.com* : a "table of contents" site devoted to environmental issues.

- *www.search.com* : lets you enter one search, then sends it to AltaVista, Yahoo, Lycos, and several other search engines. It provides links to dozens other directories, such as the AT&T 800 number directory and the US Postal Service's online zip code database.

- *www.411.com* : both of these provide a "White Pages" service, allowing you to look up email addresses and phone numbers of people. Both are good, but neither are complete; check both before you give up looking for someone.

- *www.microsoft.com/kb* : Microsoft's "Knowledge Base," a database of tips for using all of their products. Most computer companies have a Web site; this is one of the best.

Finally, the best way to learn to use the Web is to use it. Get in the habit of going to search engines instead of just looking at the same sites week after week. You'll soon have a custom collection of bookmarks that reflect your needs and tastes.

Mary Kean is an environmental engineer with 10 years of experience. She works for ENSR in Alameda, CA. For copies of her environmental engineering website list, email her at mekean@slip.net or call her at (510) 748-6739.

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Government's New Role in the Environmental Industry and the Opportunities for Consultants

by Stephen J. Baker and James A. Jacobs

The present shift in policy associated with the Lawrence Livermore National Laboratory (LLNL) report moves the ultimate long-term environmental responsibilities and liabilities away from the government and onto land owners and banks. This shift in responsibility is nothing less than revolutionary in the environmental field. These changes, which can be seen on a national basis, are due to past unrealistic reactions of the regulating community trying to safeguard society and the environment by setting soil and groundwater compliance goals with little consideration of the financial burdens. In the process, countless businesses and individuals went bankrupt trying to comply.

There are national political trends that are large, so large that the movements initiating these changes come deep within our society. These changes reflect our desire for a different role of government in our society and a more limiting environmental protection. In the early 1960s, visionary writers such as Rachel Carson, the author of *Silent Spring*, helped to catalyze the environmental movement. By the mid 1960s, there were still few government environmental regulations and fewer of these were enforced.

By the late 1960s and early 1970s, America woke up to realize that point source pollution from the country's industrial and agricultural centers had left the air, water and soils impacted beyond safe levels. By the time Lake Erie was declared dead in the early 1970s, and Cleveland's Cuyahoga River caught on fire, it became apparent that corporations in America required additional oversight and monitoring by the Federal, state and local governments to insure clean air and safe drinking water. Popular demonstrations culminating with "Earth Day" brought new energy to a widespread, grass-roots environmental movement in this country. Eventually President Nixon set up the U.S. Environmental Protection Agency (EPA). The focus of his environmental agenda clearly shifted from a public health responsibility of inspecting meats and sanitary facilities to an engineering and regulatory responsibility which included the assessment and remediation of soils and groundwater, and the development of clean air process equipment.

The major changes we are seeing now in mid 1990s are nothing less than a complete reevaluation of the governmental role in protecting the environment. President Clinton is the first president since President Johnson who has not delivered new and significant environmental legislation. Although most of the highly visual point sources of industrial pollution have been corrected, the less accessible and invisible soil and groundwater contamination still exist in large part in this country. In spite of few successfully closed EPA Superfund sites, the high intensity popular demonstrations regarding environmental protection of the past have been limited in the 1990s.

The philosophical changes that have occurred on a national level over the past few years include having less government regulation. As for soil and groundwater remediation of fuel hydrocarbons, major changes are occurring in California, creating a regulatory shock wave. The California Leaking Underground Fuel Tank cleanup program has been around for well over a decade. In July, 1994, a complete review of the California Leaking Underground Fuel Tank cleanup procedures was requested by the California State Water Quality Control Board. The California State Water Quality Control Board requested the review to be performed by Lawrence Livermore National Laboratory and the University of California at Berkeley, Davis, Los Angeles, and Santa Barbara. Participation in the review process was also supported by the petroleum industry. Finally in October, 1995, the Lawrence Livermore underground storage tank study was completed. The Executive Director of the State Water Resources Control Board proposed that laws no longer direct responsible parties to design and implement active, engineered corrective remediations at sites where the regulators deem less active approaches to be acceptable.

What this means to property owners and business owners is that once the substantial portion of the hydrocarbon contaminated soil or source material has been removed, active pump and treat or vapor extraction systems may

no longer be required. Up to now, changes in the regulatory climate with respect to hydrocarbon contamination do not affect sites located in sensitive environments such as fractured rock aquifers, adjacent rivers, bays or marshland or sites having metals, pesticides or chlorinated solvent contamination.

It is clearly recognized that the LLNL document is not really a scientific report. No comprehensive compilations of associated data, charts, figures and tables were included in the LLNL report. Rather, the LLNL report is a policy document reflecting realistic financial limitations of the California Underground Storage Tank (UGST) Fund. If viewed as a policy document and not as a scientific document, the LLNL report attempts to limit the regulatory community's requirements for government agencies to supervise assessments and remediations. The LLNL report ultimately allows for site closure to occur more easily than in the past, thereby spreading the UGST Fund financial resources to a greater population of contaminated sites.

To put the LLNL report into perspective, up until last year, gaining regulatory acceptance of a site which appeared to be a low risk to society and the environment was rarely accomplished quickly or without great expense. In the past, some regulators required that all contamination be removed down to non-detectable levels. This resulted in driving businesses and individuals into bankruptcy due to these technically unrealistic clean-up expectations.

Based on the implications of the LLNL report and other recent changes in the California UGST Fund, most sites in California are likely to be perceived as low risk sites. Consequently, regulatory acceptance is achieved far more easily than in the past. The present shift in this new policy transfers the environmental responsibilities off the government and on to land owners, banks and their associated consultants and lawyers. Even with a site closure letter from a regulator, a land owner may still have the long term liability of chemical exposure to tenants and adjacent property owners.

Business practices will change in order to protect against this greater responsibility needed to minimize financial exposures. Landowners and banks may be required to accept deed restrictions and devaluations caused by the elevated environmental contamination on a property even though the property meets regulatory site closure criteria. The "stigma" or devaluation of environmentally impacted sites is real. Two 1996 cases were reviewed, one in Marin County and one in San Luis Obispo county. Both cases illustrated devaluations of up to 50 % on impacted properties compared to the appraisals of similar non-stigma property values. The loss in real value in both cases exceeded $400,000 per parcel. Adjacent properties may also have been affected by significant loss of value associated with the environmental stigma or offsite movement of contaminants. Even with regulatory changes, these real losses, especially to innocent adjacent property owners, may encourage lawsuits against owners of impacted properties to recover lost real estate value.

In addition, the one-in-a-million cancer risk studied in the ASTM Risk Base Corrective Action (RBCA) and other similar models do not evaporate just because a regulator has granted site closure. Banks eventually will independently create risk criteria which will be driven by the perception of business risk. Other recent national and state government decisions regarding reform, such as welfare reform, propose to transfer government oversight into personal responsibility. Following this same trend in the environmental area, it will be the personal responsibility of the landowner to minimize environmental liability to tenants and adjacent property owners. Government will supply minimal oversight and monitoring to insure that immediate and significant human health dangers are mitigated. The driving force in human health protection in the workplace has been OSHA, not the EPA. The OSHA toxic exposure laws will remain strong to insure worker safety, even if environmental regulations are eased. The recent environmental changes reflected in the LLNL report may not necessarily address the one-in-a-million cancer risk, or satisfy a prudent investor or bank. The property owner will be fully responsible for any and all environmental liabilities beyond that minimal level of safety provided by government.

To minimize pollution related risks, many land owners will hire reputable specialists to evaluate adjacent property risks and the risks of human exposure that are not addressed by the regulatory agencies. Therefore, a need for more scientifically based studies will become critical in minimizing future long-term environmental liability. Consultants will be required to provide more value to property owners and banks. The long term

environmental risks will not be evaluated or minimized by government regulators. Due to the minimal regulatory oversight that has become more commonplace over the past year or so, leading consultants have begun to provide far more scientifically and statistically based analysis rather than generalized professional judgments. Therefore, environmental consultants will acquire additional long term environmental liabilities associated with their work assessing and analyzing the long term environmental risks for land owners.

The recent national shifts in environmental policy as well as the more local changes and the LLNL report reflect a national trend of more personal responsibility for land owners, less governmental intrusion into the long-term environmental liability area and greater importance for scientifically-based evaluations of environmental risk to business. Consultants can provide their clients with value by quantifying risks and uncertainties and helping landowners and banks cope with long term environmental risks.

Stephen J. Baker, a Certified Hydrogeologist, is president of HydroSolutions of California, a Nevada City, California based consulting firm. James A. Jacobs, a Certified Hydrogeologist, is president of the San Francisco Chapter of the Groundwater Resources Association and California and president of the California Section of the American Instate of Professional Geologists. He is president of FAST-TEK Engineering Support Services. Both authors have over 18 years of experience each.

Mr. Stephen J. Baker, HydroSolutions of California; P.O. Box 922, Nevada City, CA 95959; Phone: (916) 478-1260; Email: HSCI@gv.net.

Mr. James A. Jacobs, FAST-TEK Engineering Support Services, P.O. Box 10123, San Rafael, CA 94912, Phone: (415) 455-1899.

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San Francisco Branch

by Jim Ulrick, Branch Secretary

For our November meeting, we were fortunate to have Dr. John Cherry, from the University of Waterloo, speak on "Anatomy of Chlorinated Solvent Plumes in Sandy Aquifers."

Dr. Cherry presented detailed transects illustrating the internal concentration morphology of chlorinated solvent plumes in relatively isotropic and homogeneous sandy aquifers. The plume transects were based on intensive research monitoring and very closely-spaced samples. The general observation was that plumes consist of relatively small, high-concentration cores, and relatively large, low-concentration fringes. Plume cores can have cross-sectional areas as small as a few square feet.

The morphology of plumes has significant implications for the interpretation of typical cost-constrained groundwater contaminant concentration monitoring results. The apparent distribution of chemical concentrations in a plume may be inaccurate due to random sampling of "core" and "fringe" areas within a plume. This random component in reported concentrations results from sampling at a relatively coarse spatial scale relative to the variations in concentration within a plume. An understanding of the morphology of plumes should improve (or at least restrain and qualify) our interpretation of groundwater quality data.

The speakers for our January meeting were Steve Morse and Linda Spencer from the San Francisco Bay Regional Water Quality Control Board. Steve Morse is chief of the SF Board's Toxics Cleanup Division and is responsible for programs for the cleanup of soil and groundwater contaminated by fuel and non-fuel spills and leaks. Linda Spencer is the lead engineering geologist in the SF Board's Planning Division and chairperson of the Groundwater Committee.

For 1997, the SF Board will continue its strong emphasis on closure of fuel leak sites, utilizing draft State Water Resources Control Board fuel leak policy proposed in late October 1996. SF Board staff view the State draft policy as an extension of their current policy. The draft policy is a tiered risk-assessment/management approach, but it is not ASTM RBCA. It is a "stand-alone" policy and is independent of SWRCB Resolutions 68-16 (Statement of Policy with Respect to Maintaining the High Quality of Waters of the State), 88-63 (Sources of Drinking Water), and 92-49 (Policies and Procedures for Investigation and Cleanup and Abatement Under Section 13304 of the Water Code). A key element of the policy is the distinction between "low risk" and "non-low risk" sites. This policy is expected to simplify site assessments, site investigations and tank removal requirements. It should reduce corrective action costs by allowing for natural attenuation of petroleum hydrocarbons. This draft policy is expected to see minor revisions by the SWRCB with public comment on the policy and Functional Equivalent Document beginning early February 1997.

SB562, the Underground Storage Tank Cleanup Fund Program became effective January 1, 1997. This bill makes changes in the way program funds may be used and how fuel tank owners and operators are reimbursed for cleanup costs.

For non-fuel sites, the SF Board will continue with a site-by-site approach and will be receptive to Containment Zone applications for appropriate sites. Innovative approaches, such as "Brownfields," economic resource valuations, and Prospective Purchaser Agreements, also will be considered. The use of risk assessment/management will be encouraged as a basis for better decision making.

The "Containment Zone" policy, an amendment of SWRCB Resolution 92-49 was adopted October 1996 and approved by the Office of Administrative Law on January 13, 1997. In the past, the Regional Board has enforced the investigation and cleanup and abatement of sites under Resoultion 92-49. The Containment Zone policy will require the Board also to manage and contain sites that cannot be cleaned up.

Where appropriate, SF Board staff encourage qualified potential sites to complete a site investigation and risk assessment, evaluate source reduction and corrective action, and submit a partial application for Containment

Zone status. After a preliminary screening of initial applications, Board staff will work with the applicants to continue the process (public notice, notice to technical advisory committees, development of site cleanup requirements, negotiate written agreement with property owners, RWQCB SCRs adoption hearing, and submission of site information to the SWRCB).

SF RWQCB projects for 1997 include the following:

An economic analysis of groundwater basins using methods of decision science. Basins to be evaluated and compared include downtown San Francisco, the Niles Cone, and Santa Clara by the airport.

An investigation of beneficial uses of groundwater in the East Bay Plain Basin.

The next San Francisco Bay branch meeting will be held on Tuesday, March 11 and will feature a presentation by Jack Peabody of Regenesis on the injection of Oxygen Release Compound (ORC) for bioremediation.

For our May meeting we have invited Dr. Tanya Atwater to speak on the regional tectonics of California and the formation of groundwater basins. This will be a joint meeting with AIPG. Check the GRA Internet home page or call to confirm speaker and date.

For reservations, contact David Abbott at Todd Engineers in Emeryville: (510) 595-2120.

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Southern California Branch

by Jim Carter, Branch President

Elections were held for the Southern California Branch Officers, and the final results have been tallied. Serving a second term as President is Jim Carter of SPL Laboratories. The office of Vice-President went to Gary Beckerman of England & Associates. Lou Reimer was elected to a second term as Treasurer, and Carmen Guzman of Geraghty & Miller was also re-elected as Secretary. The Member at Large post went to Leslie Alford of the Santa Ana Regional Water Quality Control Board. The Branch Officers are excited about the new year as we look to increase our membership and provide useful and informative meeting. As a measure of the Branch's successful growth, the officers are planning to chart a course to split the Southern California Branch into two branches serving Los Angeles and Orange/San Diego Counties. Comments are being sought on this proposal.

The Southern California Branch was pleased to have as speaker for our November 29, 1996 diner meeting Mr. John Burton of the Los Angeles County Department of Public Works. John is a civil engineer with the Hydraulic/Water Conservation Division, Seawater Barriers, and his presentation was titled "Seawater Barrier Projects: Future Remedial Strategies and Project Update." John gave us an inside view of the challenges facing the barrier operations team in mitigating seawater intrusion into costal aquifers. There are three barrier projects which are successfully protecting over 254 miles of costal aquifers. All three barrier projects currently being implemented in LA and Orange Counties were discussed, each with its own intrusion defense strategy. John's talk was presented at the Wyndham Garden Hotel at the Citadel in Commerce and was well received.

On January 22, 1997,, we hosted Mr. Anthony Brown of Komet-H2O Science as our keynote speaker. The response to this meeting was fantastic, as we had over 77 people attend. Anthony discussion was titled "MtBE in Groundwater and the Impact on the City of Santa Monica Drinking Water Supply." Anthony gave a very comprehensive talk on MtBE and the hydrogeology and possible migration pathways for the impacted wells in Santa Monica. The presentation also covered the chemical properties, production and use as well as fate and transport of MtBE in the subsurface.

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People on the Move

Marjorie Namba has joined the Saramento Off ice of URS Griener, Inc. as the Marketing Manager for their Environmental Services Division. Ms. Namba has over ten years experience in the environmental field and previously worked as the Business Development Manager/Project Manager at Sequoia Analytical Laboratory.

Mr. Andre Fiedler has joined Colorado Silica Sand Inc. as Technical Sales Representative to the Drilling and Mining Markets. Mr. Fiedler received his bachelor's and master's degrees in geology from the University of Wisconsin-Madison and was with Woodward-Clyde Consultants, where he worked as a hydrogeologist involved in environmental remediation projects throughout the Untied States.

Submissions, including photos, for *People on the Move* may be made to Editor, HydroVisions, P.O. Box 1446, Sacramento, CA 95812 or e-mailed to editor@grac.org.

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Water Forum Representatives Release Key Recommendations for Regional Water Agreement

Sacramento - After three years and 28,000 hours of negotiations, Water Forum Stakeholder representatives are releasing to their respective governing boards the "Draft Recommendations for a Water Forum Agreement" (Draft Recommendations.) A milestone in the process to create a regional water agreement, the Draft Recommendations includes seven key elements that will fulfill the group's co-equal objectives: to provide a reliable and safe water supply for the region's economic health and planned development through to the year 2030; and to preserve the fishery, wildlife, recreational and aesthetic values of the Lower American River.

Ironically, the release of this document comes at a time when the region is dealing with the impacts of recent storms. It may seem unbelievable now, but the region faces serious water shortages in the future unless a regional water plan is developed. California can face a drought one year and flooding the next. That is why Stakeholders, including business and agricultural leaders, environmentalists, citizen groups, local governments and water managers, have been working to address this unpredictable water situation.

The Draft Recommendations outlines the region's best hope for ending the long-standing battle for water. Specifically, the Draft Recommendations calls for these seven key elements:

Increased surface water diversion on the Lower American River. In average and wetter rainfall years, the diversions would increase from the current level of 210,000 acre feet to about 525,000 acre feet annually by 2030.

Alternative water supplies to meet customers' needs while reducing impacts on the Lower American River in drier years. These supplies include conjunctive use of groundwater basins consistent with sustainable yield objectives; utilizing other surface water resources; reservoir reoperation; increased conservation; and reclamation.

An improved pattern of fishery flow releases from Folsom Reservoir. To more closely match the pattern of water releases to the needs of anadromous fish, the Draft Recommendations calls for actively supporting continued implementation of the U.S. Bureau of Reclamation's "fish friendly" flow patterns. These releases would preserve the fall run chinook salmon even with the proposed increased diversions.

Lower American River habitat mitigation. To soften some of the impacts of increased water diversions, the document includes the following four components: a monitoring program to assess the health of the river as diversions increase over time; a technical assistance program to provide input to federal and state agencies for actions that will preserve the values of the river; a habitat mitigation plan to identify what can be done to offset impacts of future diversions; and specific measures to diminish impacts of increased diversions.

Water conservation. The Draft Recommendations supports residential water meters and pricing based on the quantity of water used. Since 1992, the state has mandated meters for all new residences. For those not equipped with meters, a gradually phased-in retrofit program is proposed to start in the year 2000 and be completed by 2030. For areas that prohibit water meters or may not greatly benefit from the final water agreement, voluntary programs would be pursued.

Groundwater management. This element creates a framework to protect and manage the area's groundwater resource. Because the majority of residents rely on groundwater and the region lacks a coordinated strategy for its use, a groundwater management plan is vital. Three groundwater management councils would monitor the amount of groundwater withdrawn and establish sustainable yields. By using existing authority and institutions, a publicly accountable governance structure would be established.

Water Forum successor effort. Implementation of this complex agreement over the next three decades will require an ongoing successor effort. The successor effort would ensure that the plan is meeting its objectives,

track the progress of the agreement and adapt to any unforeseen changes.

In addition to the seven elements, the Draft Recommendations addresses assurances needed for each element to be realized. Additionally, nothing in the document calls for the reduction or forfeiture of existing surface water entitlements. Likewise, it does not call for any land use authority to be transferred from local governments that currently are responsible for planning decisions.

Undoubtedly, over the next three decades the region will need to spend money to maintain a reliable and safe water supply. By working together as a region, the Water Forum stakeholders have developed recommendations that are cheaper, avoid gridlock, and make the most of the limited water supply by taking everyone's needs into account.

The Water Forum consists of 46 Stakeholders from Sacramento, El Dorado and Placer counties who are working together in a unique collaborative process that has brought the Water Forum members to this stage in the unparalleled negotiation process. Stakeholder representatives will now bring these recommendations to their governing bodies for a review and comment period lasting until March 31, 1997. During this time, the various boards are asked to generally endorse the recommendations and authorize their respective representatives to develop the final recommendations.

Once all the feedback is received and the Stakeholder representatives have approval to continue negotiations, the final recommendations will be presented for Stakeholder review in July of 1997.

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Friends of Placer Hall

California State University, Sacramento, (CSUS) and the Water Resources Division, United States Geological Survey (USGS), have joined in a partnership that has resulted in a five story, 80,000 square foot joint teaching and research facility. This new building, on the CSUS Campus, is home to the Geology Department and their new teaching labs as well as the Water Resources Division of the USGS.

The Geology Department at CSUS has embarked on a comprehensive fund raising campaign to equip the teaching and research facilities in *Placer Hall*. This campaign has already received contributions from the California Minerals Education Foundation, The Grundfos Pump Corporation, and Instrumentation Northwest in addition to support from public and private granting agencies and individual contributions. The W.M. Kech Foundation gave $221,000 and Homestake Mining Company gave $133,315. This amounts to a little more than half of the $600,000 earmarked for the campaign.

Over the years, the CSUS Geology Department has been a supporter of GRA. They have co-hosted seminars and short courses. We have been able to use the campus facilities, including their well field for demonstrations. This well field was installed by the Department of Toxic Substances Control for teaching purposes. The well field consists of six monitoring wells and an extraction well. Apparently it is the largest facility of its kind in the nation, and allows students of all levels to combine theory with practical experience. This well field is also used by the USGS for instruction of proper sampling techniques.

Two GRA Board members are on the Campaign Committee to help raise funds. Vicki Kretsinger recently joined the campaign committee. Brian Lewis has been on the committee for the past two years. This is a unique opportunity for geology students at CSUS and for others, including GRA members, who want to take short courses to continue their education. Please join us in supporting this partnership between the University, government, and private industry. If you would like more information on how gifts from individuals and corporations can be made at all levels, contact Vicki or Brian.

GRA members are invited to the opening ceremonies on April 18th. The following day, the GRA Board will have their next quarterly Board Meeting, April 19th, in the new building. The Sacramento Branch of GRA will hold one of their meetings in the new building too. If you would like more information regarding either the opening ceremonies or the Board meeting, contact either Vicki or Brian.

We are excited about the potential of this new partnership and hope you join us on April 18th to celebrate the opening of the new building.

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GRA's Annual Meeting and the 21st Biennial Groundwater Conference
"GROUND WATER AND FUTURE SUPPLY"

The 21st Biennial Ground Water Conference in conjunction with GRA's 1997 Annual Meeting will be held September 15-16, 1997, in Sacramento, at the Radisson Hotel. This 21st Biennial Ground Water Conference continues to emphasize that ground water managers must be concerned not only with quantity, but also with water quality. The program includes a discussion of ground water quantity, ground water quality, and protection of the resource to ensure usefulness in the future. Sessions devoted to ground water and interbasin transfers, major hazards, implications of widespread transfers on ground water management, rights and claims, and implications of widespread ground water transfers in California, groundwater quality and the Safe Drinking Water Act are planned.

The 21st Biennial Ground Water Conference is sponsored by University of California Water Resources Center, Department of Water Resources, State Water Resources Control Board, and the Water Education Foundation. This year is the first time GRA is also a sponsor.

A brochure detailing the conference's program, registration process, and accommodations information will be sent in the near future. For more information, contact Vicki Kretsinger at (916) 661-0109 or visit **21st Biennial Ground Water Conference web site**.

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1996 Annual Report
1/1/96 Through 12/31/96

Beginning Cash Balance - 1/31/96	**$50,548**
INCOME	
Advertising Income	$100
Contributions Income	$775
Interest	$538
Membership Dues	$22,016
Program Fees	$21,690
Total Income	**$45,119**
EXPENSES	
Association Promotion/Develop	$1,554
Contract Labor	$7,792
Dues and Subscriptions	$1,061
Meeting and Program	$9,600
Miscellaneous	$575
Office Supplies	$92
Postage and Delivery	$2,659
Printing and Reproduction	$27, 702
Professional Fees	$375
Telephone	$422
Travel	$1,374
Total Expenses	$53,206
OPERATING LOSS	($8,087)
GRANT ACTIVITY	
Grant received	$12,660
Adminstrative Expenses	($196)
Grant Labor	($20,500)
Net Grant Activity	($8,036)
NET LOSS	($16,123)
ENDING CASH BALANCE - 12/31/96	**$34,425**

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Sponsor Acknowledgment 1997

GRA operations are funded through membership dues and donations made by members and their affiliated companies. We would like to recognize those that have contributed to GRA's future in 1997:

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Carl J. Hauge

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Dan Day

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1997 Board of Directors Meeting Dates

April 19, 1997. Placer Hall, California State University, Sacramento

August 17, 1997. Wallace-Kuhl & Associates, Inc., West Sacramento. Contact: David Von Aspern(916) 372-1434.

November 10, 1997. Downey, Brand, Seymour & Rohwer, Sacramento. Contact: Steve Goldberg (916) 441-0131, ext. 231

1997 Annual Meeting

The 1997 GRA Annual Meeting will be September 15-16, 1997, at the Radisson Hotel, Sacramento. This year's meeting will be held in conjunction with the Biennial Groundwater Conference. More information to come.

Placer Hall, California State University, Sacramento, Open House, April 18th.

Contact Brian Lewis (916) 323-3632 for more information.

The next HydroVisions due date for articles is April 25, 1997. We welcome your articles and photos. Articles may be e-mailed to editor@grac.org.

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