

HYDRO VISIONS

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GROUNDWATER RESOURCES ASSOCIATION
OF CALIFORNIA

Spring 2001

Hexavalent Chromium in Groundwater Summit

BY MARTIN STEINPRESS AND FRIENDS



The First in GRA's Groundwater Contaminant Series is a Success.

GRA's full-day symposium on January 25th in Glendale, which focused on the rapidly developing problem of how to address low levels of hexavalent chromium in groundwater, was well attended and provided a comprehensive overview of this controversial drinking water issue. The symposium was

well received by GRA members and other water agency, regulatory, consultants, and environmental professionals. Many attendees appreciated that GRA had brought science and common sense to the hexavalent chromium issue, which has become a front-page news issue in Southern

"People want to know, 'Is it [water] safe?'...even if you tell us it is safe, we won't believe you. Only if you drink the water for 10 years, then we'd believe you when you say it is safe."

*Joe Gonzalez, Attorney,
Masery & Vittee*

California since the film Erin Brockovich premiered. The meeting defined the current knowledge of the problem using the San Fernando Valley as a case study. GRA brought together leading national and state experts to present on all facets of the issue, including senior staff from USEPA, DTSC, OEHHA, DHS, water agencies, and

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

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GRA Announces Its Second Symposium in "The Groundwater Contaminant Series"

GRA and the Santa Clara Valley Water District's Leaking Underground Storage Tank Oversight Program (LUSTOP) will be hosting the second symposium in The Series on Groundwater Contaminants titled "Characterization and Remediation of Recalcitrant and Emerging Contaminants." The Symposium will be at the District's Special Projects Building on Winfield Avenue in San Jose on June 14th and 15th. The Northern California Fuel Oxygenates Committee is also sponsoring the event.

The conference will include the following sessions: (1) Bioremediation of MtBE; (2) Solvent Stabilizers and Emerging Contaminants: Occurrence, Behavior, and Treatment of 1,4-dioxane and other compounds; (3) Innovative In-Situ

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President's Message

BY TIM PARKER

Welcoming in 2001, I am very pleased to report that GRA's tenth year is shaping up to be our best year yet. This is thanks to the efforts of all our volunteers at the Statewide and Branch level, our Executive Director and Webmaster, and all our supporters. I cannot thank you enough on behalf of our Board, our Membership, and myself.

The results of the Board of Director elections are in: please welcome Martin Steinpress of Montgomery Watson, Walnut Creek as a new GRA Director; incumbents Paul Dorey and David Abbott were each re-elected to another three year term.

Our January 2001 Retreat and Board Meeting was held at the Marconi Conference Center in Marshall (Tomas Bay) California. I am delighted to say all our Board Members made this unique offsite element of our annual planning session possible through their financial support of the activity. Carl Hauge, an esteemed California groundwater expert, longtime GRA member, supporter, and friend facilitated GRA at our retreat. Through the retreat, we were able to once again evaluate GRA as an organization, who we are, consider our membership makeup, focus our energies, plan our program this year and prepare for the next several years. One of the annual elements we are planning to do is a member survey- look for a survey to come your way soon and please take the few minutes it takes to respond and send it back to us so that GRA may better serve and represent you, the membership.

Our committees continue to be the backbone of our work and accomplishments. We are always looking for additional help on our committees - please look at the article on GRA committees in this issue of HydroVisions to see if there is a place for you on one of our committees.

We have two new workshops in 2001, the first two of our Groundwater Contaminants Symposium series:

Hexavalent Chromium Summit in Glendale January 25th, which at the time of this writing, is shaping up to be a great success thanks to the support of many of our corporate members - our heartfelt thanks go out to you; and

Recalcitrant Contaminants, joint two-day session with the Santa Clara Valley Water District, in mid-June.

We are also planning to do the Environmental Statistics Seminar in the summer 2001, and the Groundwater Modeling Course in the fall 2001.

Our annual meeting will be in November 1st & 2nd in Sacramento and will be conducted jointly with the Biennial Groundwater Conference, sponsored by California Department of Water Resources, State Water Resources Board, University of California Centers for Water and Wildland Resources, and Water Education Foundation. We are in the process of planning some special annual meeting anniversary activities to mark our tenth year.

We are working on the revision to the California Groundwater Management handbook, thanks to contributions from many sources. Our largest contributor, Schlumberger/West Bay Instruments, has agreed to fund up to \$40,000 for the revision. GRA is planning to complete the effort in the summer, and have copies of the document available at the annual meeting in November 2001.

The By Laws Amendment passed last month, which will allow GRA to expand our Board of Directors from 11 to a maximum of fifteen. This gives GRA the opportunity to expand its programs and diversity further through the addition of one to four Directors.

Finally, I hope that 2001 finds you in good spirits in this time of change, with the parting of President Clinton and entrance of President Bush and his new Cabinet, the energy and water issues we now have, this indeed promises to be a year of challenge.

Best Regards, Tim.

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editor@grac.org

EXECUTIVE DIRECTOR

Kathy Snelson

Groundwater Resources Association
(916) 446-3626 - e-mail: execdir@grac.org

DIRECTORS

Vicki Kretsinger-Grabert
Luhdorff and Scalmanini
(530) 661-0109

Paul Dorey
Vista Irrigation District
(760) 806-3140 - e-mail: wn6k@cts.com

Tony Ward
Montgomery Watson
(626) 796-9141 - e-mail: tony.ward@mw.com

Brian Lewis
Cal/EPA, Dept. of Toxic Substances Control
(916) 323-3632 - e-mail: admin@grac.org

David Abbott
Todd Engineers
(510) 595-2120 - e-mail: jorjsue@msn.com

Susan Garcia
(562) 435-4055
e-mail: 73661.1162@compuserve.com

Jim Jacobs
Fast-Tek
(510) 232-2728 - e-mail: augerpro@jps.net

Jim Carter
EMAX Labs
(310) 618-8889
e-mail: jcarter@emaxlabs.com

Scott Slater
Hatch and Parent
(805) 882-1420
email: sslater@hatchparent.com

Tim Parker
California Division of Mines and Geology (CDMG)
(916) 322-6968 - e-mail: tparker@jps.net

Martin Steinpress
(925) 975-3476
email: martin.steinpress@mw.com

EXECUTIVE OFFICERS
President, Tim Parker
California Division of Mines and Geology
(916) 322-6968 - e-mail: tparker@jps.net

Vice President, Tony Ward
Montgomery Watson
(626) 796-9141 - e-mail: tony.ward@mw.com

Treasurer, David Von Aspern
Wallace - Kuhl & Associates
(916) 372-1434
dvonaspern@wallace-kuhl.com

Secretary, Jim Carter
EMAX Labs
(310) 618-8889
e-mail: jcarter@emaxlabs.com

Editor Floyd Flood
Newsletter e-mail: editor@grac.org

Committees Reviewed at Board Retreat

At January 14th Board retreat, the following committees were reviewed and discussed. Some of these committees are continuing committees while others are new committees. If you would like to be involved in any of these committees, please contact the chair or any members. As a volunteer organization, your help and knowledge are needed to keep our organization growing.

Executive Committee:

Tim Parker, Chair, Vicki Kretsinger Grabert, Brian Lewis, Tony Ward, and Kathy Snelson

The Executive Committee researches issues and makes recommendations to the Board of Directors.

Current projects include reviewing Retreat outcome - Synthesis/ providing direction and Updating the Boards' Handbook.

Annual Meeting Committee:

Vicki Kretsinger Grabert, Chair, Tim Parker, David Abbot, Jim Carter, Susan Garcia, and Kathy Snelson

Promote Annual meeting and suggest speakers. Build exhibitor contact list. Current projects include working with Biennial Conference planning Committee on technical program of interest to GRA and the ground-water industry, developing topics that provide a prelude to future seminars/workshops/activities, and increasing promotional aspects for Annual Meeting (broaden awareness of event)

Finance Committee:

David Von Aspern, Chair, Brian Lewis, and David Abbott

Advance planning for budget, tracking, and budget history. Current projects include creating a pie chart of where our membership dues cover and drafting a budget in August for approval at November Board meeting.

Membership Committee:

Paul Dorey, Chair, David Von Aspern, Kevin Blatt, Kathy Snelson

Expand our membership. Current projects include analyzing what groups do we represent and what groups are underrepresented, coordinating with the branches, continuing our membership drive, creating promotional wear, and establishing three contacts with University of California Davis, California State University Sacramento, and University of the Pacific. The following tasks will be undertaken:

1. Demographic review & report to Board on:
 - a. Who are we?
 - b. Who are underrepresented?
2. Establish 'real' contacts with Branches' member coordinators
 - a. What are we doing for them?
 - b. What do we need to do for them?
3. Exploration of a 'Membership Drive'
 - a. Establish a goal of growth
 - b. Suggest some plans to Branch Officers and the Board of Directors

STUDENT MEMBERSHIP

1. Establish at least 3 collegiate bases
 - a. UOP
 - b. UCD
 - c. CSUS
2. Student needs:
 - a) Current
 - b) Future
 - c) Scholarships

Education Committee:

Susan Garcia, Chair, Vicki Kretsinger Grabert, Scott Slater, and Jim Carter

Strengthen educational programs with Water Education Foundation and the American Groundwater Trust. Current projects include supporting Groundwater Awareness Month in May and Groundwater Week in November

Seminar Committee:

Jim Carter, Chair, Brian Lewis, Vicki Kretsinger Grabert, Tim Parker, and Barbara Heinsch

Mission: Establish GRA as a leader in tracking information on "new contaminants" that effect our Groundwater Resources, and conduct workshops and symposia to distribute that information

Goals: (1) Conduct three Symposia in 2001 as part of the Series of Groundwater Contaminates

- (2) Conduct two Training Seminars in 2001
- (3) Establish a minimum financial goal of \$5k net for each Symposium, and evaluate budget of the Training Seminars

HydroVisions Committee:

Floyd Flood, Chair, Brian Lewis, David Abbott, and David Von Aspern

Create a newsletter that is timely and informative. Current projects include creating four newsletter during the year, building advertising revenue, and keeping content timely and technical.

By-laws Committee:

Tony Ward and Scott Slater

Ensure the organization is following by-laws and keeping them current. Current projects include following-up on the recent change of by-laws vote and reviewing by-laws and making recommendations for April meeting.

Legislative/Regulatory Committee:

Michael Fife, Co-Chair, Scott Slater Co-Chair, Tony Ward, Jim Jacobs, Tim Parker

The purpose of the Legislative Committee will be to monitor pending legislative proposals and regulations in California that may be of interest to the GRA membership. The Legislative Committee will track new legislation and present the GRA membership with a summary and short analysis of each piece of relevant legislation. The Committee will then seek input from the GRA membership and, based upon this input, consider developing positions on the legislation for presentation to decision-makers and the general public. For more

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Hexavalent Chromium in Groundwater Summit

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prominent law firms.

The symposium consisted of four sessions that focused on hexavalent chromium's Geochemical Characteristics and Distribution; Risk/Toxicology and Testing;

Social, Political, and Legal Issues; and Regulatory Approach and Remediation.

There was also a lunchtime presentation on the hexavalent chromium issue in drinking water by representatives of the Cities of Burbank and Glendale. A complete description of the individual speaker's presentations (as well as additional information and links) is provided on GRA's web page (www.grac.org), which will also provide updates on this and other breaking groundwater issues.

The first session on geochemical characteristics and distribution provided a solid foundation for the day, with summaries of chromium's geochemical characteristics by Douglas Kent with the US Geological Survey, Menlo Park, and Carl Palmer with the Idaho National Engineering and Environmental laboratory (INEEL), Idaho Falls. Under natural conditions, total chromium is present primarily as chromium (III), or trivalent chromium, which tends to form insoluble

"If the chemical does not belong in the water, then don't have it in there."

*Joe Gonzalez, Attorney,
Masery & Vititoe*

hydrous oxides at neutral to alkaline pH values. Chromium (VI), or hexavalent chromium, is generally not known to be the predominant natural form of total chromium in groundwater, with some exceptions. Hexavalent chromium behavior at contaminated sites is complex. Dixon Oriola of the Los Angeles Regional Water Quality Control Board provided an overview of hexavalent chromium contamination in the San Fernando Valley, where the Board has recently launched a comprehensive investigation concentrating

on hexavalent chromium sources associated with industrial activities between the 1940's and 1980's.

The second session focused on risk, toxicology, and testing for hexavalent chromium.

Dr. Bruce Macler, a toxicologist with USEPA, Region 9 opened the session with the USEPA's risk management approach that established Maximum Contaminant

Level (MCL) set by the USEPA for total chromium of 100 ug/l. USEPA recognizes hexavalent chromium as a

known human carcinogen by inhalation, but not by oral ingestion. In contrast, Dr. Robert Howd of Cal/EPA's Office of Environmental Health Hazard Assessment (OEHHA) explained that OEHHA considers hexavalent chromium an oral carcinogen based on cancer evidence via the oral route and has developed a Public Health Goal (PHG) of 2.5 ug/l for total chromium. Dr. David Spath, California Department of Health Services, then described DHS's current reevaluation of the existing MCL for total chromium and consideration of a new MCL for hexavalent chromium triggered by the new PHG. DHS must consider the feasibility of setting MCLs as close to the PHG as feasible while also reviewing the technical and economical feasibility for water purveyors to achieve such MCLs. In January 2001, an emergency regulation was released that requires vulnerable water systems to monitor for hexavalent chromium so that DHS can develop a database on chromium's distribution. Dr. Bart Simmons with Department of Toxic Substances Control's Hazardous Materials Laboratory discussed the analytical methods used for hexavalent chromium analysis of soil and groundwater. Some of the key considerations with regard to DOHS' specified method for analysis of hexavalent chromium in drinking water (EPA 218.6) is the detection limit for reporting (1 ug/l), the short holding time (24 hours), and the low number of laboratories certified in California for the analysis.

A tale of two cities was provided by the two lunchtime speakers, Don Froelich, City

of Glendale, and Fred Lantz, Burbank Water and Power. Both speakers highlighted the political and technical communication challenges of the hexavalent chromium controversy, which has produced a high number of concerned calls from citizens about the quality of water since the chromium issue has appeared in numerous press articles. The cost to treat to the hexavalent chromium public health goal (PHG) would be in the millions of dollar range. A common challenge the cities are faced with on all levels is how to communicate the technical issues related to hexavalent chromium, such as the difference between the total chromium PHG of OEHHA, the maximum contaminant limit goal and maximum contaminant limit of US EPA, the different MCLs of California, and how the total chromium values relate to hexavalent chromium.

The third session focused on the social, political and legal issues associated with hexavalent chromium in groundwater, and featured presentations from three prominent environmental attorneys and a speaker from the California League of Conservation Voters (CLCV). Dr. Joe Lyou

"Let real science work out these issues and not work it out in a fit of hysteria."

*Steven L. Hoch, Attorney,
Hatch and Parent*

of the CLCV opened the session by providing the perspective of the citizen and environmental groups, and described the public's general unwillingness to tolerate any level of industrial contamination in their water supply, irrespective of the "safe" levels mandated by Federal or State government. He stressed that hexavalent chromium was just the latest symptom of a bigger problem: the failure to recognize contamination problems and take action until after the damage has been done. The second speaker was Joe Gonzalez, an environmental attorney with Masry and Vititoe, the plaintiff law firm featured in the movie "Erin Brockovich" on the Hinkley case. Mr. Gonzalez gave an impassioned plea to polluters, regulators and the impacted parties to resolve these issues without involving lawyers and expressed disappointment that the regulatory system had not been able to

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Hexavalent Chromium in Groundwater Summit

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protect the State's water resources from contamination. Steve Hoch with Hatch and Parent (and former lead counsel for PG&E in the Hinkley

case) rejected some of the preceding opinions, noting that in many instances contingency law firms do not take on cases to "save the planet" but rather to win big financial judgments. He also focused on the position of public and private water utilities caught in the middle between the polluter and the public. The final presenter was Tom Meador with the law firm of Weston, Benshoof, Rochefort, Rubalcava and MacCuish. He presented the view of the "accidental discharger" and indicated that most large corporations will take action to address their contamination problems; however, they must be held to a reasonable standard. He also highlighted that many of the sources of hexavalent chromium are small "mom and pop" plating operations that do not have the financial resources to clean-up large, regional contamination problems and he suggested that a State fund might be needed to implement these clean-ups.

The final session on regulatory approach and remediation expanded on the problems described by the lunch-time speakers, and

In reference to property underlain with contaminated groundwater, *"Real estate property does not devalue. It is the lawsuits which allege that property values have been devalued when the real estate gets devalued."*

Tom Meador, Attorney, Weston, Benshoof, Rubalcava & MacCuish

with the Human and Ecological Risk Division (HERD) of Cal/EPA DTSC then presented the current implementation of PHGs for contaminated soils. DTSC is faced with selecting clean up levels for soil based on (1) direct cancer toxicity values, and (2) potential impact from soil to groundwater. Dr. Klein also mentioned the current debate on whether the PHG should be considered an Applicable, Relevant or Appropriate Requirement (ARAR) in feasibility studies. Dr. Carl Palmer of INEEL summarized six current remediation techniques for sites contaminated with hexavalent chromium: "pump and treat", electrokinetics (electromigration), reduction, bioremediation (microbes), permeable reactive barriers (PRBs), and natural attenuation. These technologies have the potential for promising applications, with the underlying requirement for a detailed

understanding of the complex geochemical conditions of a contaminated site.

GRA wishes to thank our cooperating agencies: the International Association of Hydrogeologists (IAH), California Groundwater Association (CGA), American Groundwater Trust (AGWT), Water Education Foundation (WEF), National Ground Water Association (NGWA), Professional Environmental Marketing Association (PEMA), and Association of California Groundwater Agencies (ACWA). We also wish to thank our co-sponsors Best Sulfur Products, Calscience Environmental Laboratories, Inc., CH2M HILL, Earth


discharges to surface drainage areas. Mr. Blevins has also been asked to participate in the request from cities looking to obtain compensation for dealing with chromium-related impacts to water distribution, including the city of Glendale, which is currently choosing not to use large amounts of water that currently meets health standards. Dr. Kimiko Klein

Tech, Hatch & Parent, Montgomery Watson, and Pat-Chem Laboratories. GRA also thanks the speakers, break and lunch sponsors, and the GRA organizing committee led by Jim Carter. The CrVI issue is evolving rapidly, and GRA plans an update symposium within a year.

The next symposium in GRA's Groundwater Contaminant Series will focus on the Characterization and Remediation of Recalcitrant and Emerging

"Public Health Goals [for hexavalent chromium]...really thought it was flawed."

Mel Blevins, Upper Los Angeles River Area Watermaster

Contaminants (including MtBE and solvent stabilizers such as 1,4-dioxane), and will be cosponsored by the Santa Clara Valley Water District and Northern California MTBE & Fuel Oxygenates Committee. This symposium will be held at the Santa Clara Valley Water District campus on June 14 and 15, 2001. Future symposia in the series are planned for arsenic and perchlorate. Visit GRA's web page (www.grac.org) for updates and to offer suggestions or help. 

With respect to industries responses to environmental cleanups, *"...reactive rather than proactive, ...reactive system does not work, need to be more proactive."*

Dr. Joseph K. Lyou, Director of Programs, California League of Conservation Voters Education Fund, Communities for a Better Environment, Legal Issues for Citizen and Environmental Groups

"If there really is a problem with hexavalent chromium at low levels, then why haven't we set up a fund like we did with petroleum?"

Tom Meador, Attorney, Weston, Benshoof, Rubalcava & MacCuish

addressed consequences of the concerns resulting from the very low PHGs developed by OEHHA. Mel Blevins, the Court-appointed Upper Los Angeles River Area (ULARA) Watermaster since 1979, has been asked repeatedly to give updates to the Los Angeles City Council on the chromium issue, including past historical



2001 DIRECTOR ELECTION RESULTS

Abbott and Dorey Re-elected;
Steinpress starts as new Director

The election for 2001 Directors has been officially completed. Incumbents David Abbott and Paul Dorey retained their Board seats, and Martin Steinpress was newly elected. The Board is looking forward to an active and successful year with its current slate of Directors, and welcomes Mr. Steinpress to the Board.

GRA greatly appreciates the time and effort the membership took to vote and return their ballots.

BY-LAW AMENDMENT PASSAGE ALLOWS INCREASE IN NUMBER OF BOARD SEATS

The GRA membership overwhelmingly approved the proposed By-law amendment to allow the Board of Directors to expand to a maximum of 15 Directors. Having additional Board seats will provide an opportunity for more members and industry representatives to provide leadership in carrying out the Association's mission and objectives.

GRA greatly appreciates the time and effort the membership took to vote and return their ballots by the initial (and extended) deadlines.

GRA sincerely thanks its Program Co-sponsors, Co-operators, Exhibitors, Lunch Co-sponsor, Reception Sponsor and Refreshment Co-sponsors for their generous support of the GRA Symposium "Hexavalent Chromium in Groundwater".

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Committees Reviewed

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information contact Michael Fife at (805) 882-1453 or mfife@hatchparent.com.

Technical Advisory Committee:

Jim Jacobs, Chair, Martin Steinpress, Terry Foreman, and Paul Parmentier

The technical advisory committee was formed to evaluate new technical challenges as they arise. Last year, the focus was MTBE, and the committee developed a white paper regarding MTBE, which was published in HydroVisions and the completed paper will reside on the GRA web site. This year, Chromium 6+ will be evaluated, as will other technical issues as they relate to protecting groundwater resources. Other topics include solvent stabilizers and other recalcitrant compounds.

Awards Committee:

Tony Ward, Chair, Scott Slater, and Brian Lewis

Work with Branch Officers to have members recognized for their contributions to GRA or to California's Groundwater. Current project include having nominees at the August Board meeting for "Kevin Neese Memorial Award" and "Lifetime Achievement Award."

Electronic Communications Committee:

The committee members include Martin Steinpress (Chair), Paul Dorey, Vicki Kretsinger Grabert, Kevin Blatt, and Kathy Snelson.

A new committee has been formed to promote and implement improved electronic communication in GRA. The committee will build on the already great GRA web page that Kevin Blatt has developed. If you haven't yet visited it, please do so (www.grac.org). The Electronic Communication Committee's goals are to:

* Maintain and continue to improve GRA's Web Page for members and the public

* Develop an electronic newsletter to provide members with brief timely updates on new legislation, regulations, committee actions, meeting announcements, etc.

* Enhance the Web Page to support member, board, branch, and committee collaboration (such as discussion forums and work areas)

Affiliates Committee:

Vicki Kretsinger Grabert, Chair, Tony Ward, David Abbott, and Gene Luhdorff

Work with other organizations to support groundwater issues within California. Current projects include developing criteria for affiliation, cooperating with other committees to develop strategic alliances, and coordinating activities with allied organizations. 💧

enviro-tech
pick up

Hydrophilics Anonymous

BY BART SIMMONS

Chemist's Corner

Ironically, the compounds most likely to contaminate groundwater are not likely to be detected by the usual test methods. Conventional organic test methods are: "VOCs," Volatile Organic Compounds (e.g., EPA 8260), and SVOCs - Semi-volatile Organic Compounds (e.g., EPA 8270). When used together, the two methods would appear to be comprehensive in scope. However, the methods are actually quite limited in the number of compounds which can be detected and even more limited in the number of compounds which can be quantitated using the normal techniques. As normally practiced, EPA 8260 measures purgable organics, that is, compounds which can be purged from water, trapped on a solid sorbent, thermally desorbed, chromatographed, and detected by a mass spectrometer. Several other techniques are included in 8260, such as direct injection of a water sample and cryogenic

concentration. EPA 8270, on the other hand, normally only detects compounds which can be extracted by dichloromethane (methylene chloride) under the specified conditions, chromatographed, and detected by a mass spectrometer.

Of particular interest are hydrophilic compounds, that is, water-loving compounds. If they have a strong preference for water over air, they may not be purgable. A low Henry's Law coefficient, the ratio of a compound's vapor pressure to its water solubility, indicates compounds which may not be purgable. Similarly, if a compound is also more soluble in water than dichloromethane, it may not be detectable by normal 8270 extraction and analysis. Needless to say, hydrophilic compounds, particularly those resistant to biodegradation, are of concern for groundwater contamination. In large part, the usual analytical techniques do not measure the

compounds with the highest potential for groundwater contamination.

As an example, the major organic contaminant at the Stringfellow Site in Riverside County was not detected by either 8260 or 8270. The compound, first identified by the EPA National Environmental Investigations Center Laboratory in Denver, was p-chlorobenzene sulfonic acid (p-CBSA), which is non-purgable and not extractable by dichloromethane in 8270. p-CBSA is a by-product of DDT manufacture, and has also been found at other sites which received DDT wastewater.

Another source of hydrophilic compounds is solvent stabilizers. These compounds are present in industrial solvent formulations to scavenge free radicals, act as antioxidants, or react with acids. Tom Mohr of the Santa Clara Valley Water District (TomMohr@scvwd.dst.ca.us) has accumulated the following list of solvent stabilizers.

Solvent:	1,1,1-Trichloroethane	Trichloroethylene
Stabilizers:	1,4 - Dioxane 1,3 -Dioxalane Nitromethane 1,2 - Butylene Oxide sec- Butanol	1, 4 - Dioxane Acetone Butylene Oxide Propylene Oxide Tetrahydrofuran Epichlorohydrin Triethylamine Diisopropylamine Pyridine Pyrrole Alkyl Pyrroles 2-Methylphenyl cresol

Of these stabilizers, identified groundwater contaminants include 1,4-Dioxane and Tetrahydrofuran (THF). (1,4 - Dioxane should not be confused with the unrelated

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Navigating the New Clean Water Act: Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers and Federal Regulation of Groundwater Pollution

BY JUSTIN J. LUCKE
HATCH AND PARENT

INTRODUCTION

Recently, the United States Supreme Court decided a case that will have wide-ranging impact on federal environmental regulation. In *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers*, no. 99-1178 (January 9, 2000), the Court sought to answer two questions: (1) can the language of Clean Water Act §404 (a), regulating filling in of wetlands, extend to isolated ponds in an abandoned strip mine? And (2) If so, is that exercise of authority within the scope of the commerce power? In its decision, the Court not only curtailed the Army Corps of Engineers' jurisdiction, it charted a new, limited, and ultimately unclear course for future actions under the Clean Water Act.

BACKGROUND

Solid Waste Agency of Northern Cook County (SWANCC), a consortium of Chicago-area cities, bought a 533-acre sand and gravel mine, abandoned since 1960, to use as a disposal site for baled, non-hazardous solid waste. The site had largely returned to nature, with forest covering the mining scars and the trenches turned to seasonal and permanent ponds. SWANCC obtained state and local approval, and also sought a permit from the Army Corps of Engineers (Corps), to fill in some of the ponds on the site - an action ostensibly within the Corps' jurisdiction under section 404(a) of the Clean Water Act (CWA).

Initially, the Corps told SWANCC that no permit was required because the ponds were isolated and not within the Corps' jurisdiction. Subsequently, based on information from a local conservation group, the Corps identified more than 121 migratory bird species at the site. As a result, the Corps required SWANCC to file for a permit under section 404(a). Despite a reduction in the scope of the project and SWANCC's compliance with state and local regulations, the Corps denied the permit.

SWANCC filed suit in the Illinois District Court challenging the denial under both the Administrative Procedure Act (APA), 5 United States Code sections 701, *et seq.*, and on jurisdictional grounds. The district court granted summary judgment to the Corps on the jurisdictional issue, and SWANCC chose to abandon its APA claim and immediately appeal.

On appeal, the Seventh Circuit affirmed the District Court's grant of summary judgment and held that the Corps' regulation was within the commerce power because, in the aggregate, impacts on migratory birds would have an impact on commerce. Then, according to the court, since the CWA reaches as far as the commerce clause allows, this extension of jurisdiction was constitutional. SWANCC sought review in the Supreme Court, which granted *certiorari*.

THE DECISION

The Court, with Justice Rehnquist writing for the majority,¹ held that jurisdiction under section 404 is limited to waters that have some connection to waters that are actually navigable, and reversed the Seventh Circuit. The Court did not reach the question of whether or not it was

permissible for the Corps to regulate in this matter based on the presence of migratory birds, instead holding that the CWA did not apply to isolated wetlands. Thus any regulation, the migratory bird rule included, that applied to isolated water would be invalid.

The CWA gives the Corps the power to regulate all "discharge of dredge or fill material into the navigable waters." (§404(a).) In turn, the CWA defines "navigable waters" as "the waters of the United States." (§502(7); 33 U.S.C. §1362(7).) Currently, the Corps' regulations define "waters of the United States" as:

waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce

(33 C.F.R. §328.3(a)(3) (1999).) In turn, the controversy at the heart of this case centers on the Corps' "clarification" that section §328.3(a)(3) applies to waters:

a. Which are or would be used as habitat by birds protected by Migratory Bird Treaties; or b. Which are or would be used as habitat by other migratory birds which cross state lines; or c. Which are or would be used as

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A Review of the GRA Technical Committee

BY JIM JACOBS, FAST-TEK ENGINEERING SUPPORT SERVICES

Over the past year, GRA's technical committee with Paul Parmentier, as Chair and Jim Jacobs as Board Liaison developed a white paper or statement about MTBE. MTBE is a controversial issue critical to the protection of groundwater resources. The controversy has been in the media for some time, culminating with the airing of the "60 Minutes" television program early last year. As many Americans had not been familiar with the problem of MTBE until the broadcast last year, the GRA Board of Directors made a statement shortly after the television broadcast stating that MTBE is one of the most serious environmental problems facing the nation's water supply.

The facts of MTBE were reviewed and some of the concerns were listed. Other committee members include Terry Foreman of CH2Mhill, Michael Burke of Fugro, Dan Detmer of United Water Conservation District, and Jim Steele of Tetra Tech. The statement, which was published in HydroVisions, Fall 2000 will be added to the GRA web site and used in press releases. Technical issues for the year 2001 include a statement about Chromium 6. Other controversial environmental issues will be evaluated. If you are interested in joining the committee or have suggestions on topics, please contact Paul Parmentier of IT Corp. at (949) 660-7510 or Jim Jacobs of FAST-TEK Engineering Support Services at (510) 232-2728; ext. 222 or augerpro@jps.net.

Early Warning System Takes Aim at Leaking Underground Storage Tanks

BY GARY M. KVISTAD, HATCH AND PARENT

For the past five years, the South Tahoe Public Utility District has been engaged in a high profile battle over leaking gasoline storage tanks that have contaminated groundwater. South Lake Tahoe grabbed national newspaper headlines when it became the first and most affected communities stricken with MTBE contamination in the nation. Aside from posing a threat to the legendary pristine water quality of the area, the contamination problem presented real and dramatic health risks to the area residents. The District's sole source of water is underlying groundwater supplies.

In South Lake Tahoe, groundwater contamination has caused the closure of about one-third of the District's 34 wells and severely limited its ability to supply clean water to its customers. The very life-blood of the region's water supply was being threatened. In response to the Herculean challenge of remedy and managing the contamination in an uncertain regulatory environment, the District has adopted a unique Groundwater Management Plan designed to elevate the information base and keep this type of problem from ever happening again.

MTBE was promoted by the petroleum industry as enabling gasoline to burn cleaner, which in turn reduces air pollution. However, petroleum, like other chemicals spills and leaks through leaky pipelines, facilities and human error. When gasoline-containing MTBE is released into the groundwater, it dissolves and moves with the groundwater rather than attaching to soil particles, as do most gasoline components. The result, MTBE is transported along with groundwater and drawn into wells. MTBE is recognized as a suspected carcinogen and is detectable (taste and odor) at levels as low as 5 parts per billion or less and unfortunately, the District has encountered groundwater containing multi-times this amount of MTBE.

MTBE was not suspected to be a health risk until after it was detected in wells. By then it was too late. MTBE had spread into large underground plumes contaminating vast quantities of groundwater. In the District's case, MTBE contamination was so widespread that one-third of its wells have been contaminated or were severely threatened if the wells continued operating. The Board of Directors of the District refused to put the public at risk by delivering water to its

customers that contained any detectable MTBE.

The District has been fighting this problem for four years and spent over \$3 Million to keep its water system in limited operation. This figure does not include the clean-up cost of the contaminated groundwater, which could take decades and tens of millions of dollars. Although MTBE is no longer sold in the Tahoe Basin as a result of Governor Gray Davis' Executive Order, the District wants to be pro-active in attempting to better manage its water resources and minimize risks of further contamination.

The District opted to pursue a first-of-its-kind management program, utilizing the authority granted by that includes an early warning system. Under the plan, the District will install or use existing monitoring wells at underground storage tank sites that are located near wells. The monitoring wells will be sampled at various intervals, depending on proximity to the wells, to determine if a tank is leaking. If a leak is detected, the monitoring wells double as interim extraction wells until a full-scale remediation and clean-up plan is

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habitat for endangered species; or d. Used to irrigate crops sold in interstate commerce.

(51 Fed. Reg. 41217.) This is the so-called “migratory bird rule.”²

The Court first distinguished its prior decision in *United States v. Riverside Bayview Homes, Inc.*, 474 U.S. 121 (1985). In *Riverside*, the Court approved the Corps’ extension of section 404(a) jurisdiction over wetlands adjacent to waters navigable in fact. The Court said that the term “navigable” is of “limited import” because Congress intended to “regulate at least some water that would not be deemed ‘navigable’ under the classical understanding of that term.” (*Riverside*, 474 U.S. at 133.) Congress had expressly acquiesced in this interpretation in 1977 amendments to the CWA. According to the Court, *Riverside* was based on “the significant nexus between the wetlands and ‘navigable waters’” that caused the Court to uphold the regulation. (*SWANCC*, slip. op. at 5.) The *Riverside* Court expressed no opinion on waters that were not “adjacent to bodies of open water.” (*Riverside*, 474 U.S. at 131 n.8.)

The Corps claimed that the same 1977 amendments showed acquiescence in all of the Corps’ then existing regulations. However, unlike the same Congress’ explicit acquiescence in the wetlands provision, the Court noted only two arguments in favor of acquiescence.

First, a failed bill that would have limited jurisdiction to waters actually used in transport that the Court held was, without specific guidance, unreliable evidence of congressional intent. Second, the Court held that a 1977 amendment to section 404(g), which expanded jurisdiction over waters “other than” navigable waters, did not include by inference the Corps’ then existing definition of “waters of the United States.”

The Court notes that even if the statute were ambiguous, the doctrine of deference to agency interpretations would have to give way to the prudential doctrine that serious constitutional issues should be

avoided. (*Chevron U. S. A., Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837 (1984).) Without a clear statement from Congress that regulation of these waters was intended, the Court refuses to reach the issue of whether the regulation would have been constitutional.

ANALYSIS

The result of the case is that the Corps may not regulate discharge of dredge or fill material into isolated waters solely because those waters are used by migratory birds. The Court describes *Riverside* and *SWANCC*, respectively, as examples of acceptable and unacceptable extension of jurisdiction. The best way to visualize this dichotomy is to place the two cases on a line, symbolizing the range of CWA jurisdiction:



The region to the left of *Riverside* contains cases that clearly fall under the CWA; specifically cases that involve waters navigable in fact or waters connected thereto, and thus also squarely within the commerce power. The area to the right of *SWANCC* contains cases that involve water without any connection to waters navigable in fact. The middle area is where the CWA might allow for jurisdiction that could extend outside of the commerce power.

To establish jurisdiction, the Corps must return to *Riverside* and gradually work outward: first, establish proximity to waters navigable in fact; second, find some proximate ecological link to the waters, but not necessarily hydrological. Without these elements, there does not appear to be a basis

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for section 404(a) jurisdiction. Thus, a mud puddle on a farmer's land upon which a bird happened to alight would not, for that reason alone, be subject to Corps jurisdiction, falling to the right of SWANCC.

The majority relies heavily on the terms "navigable" in "navigable waters." As Justice Stevens points out in his dissent, the CWA was never intended to regulate navigability; that is, to protect the ability of ships to pass through water ways. While the phrase "navigable water," and the concomitant belief that federal regulation was limited to such narrow confines, arose in 19th Century and early 20th Century statutes regulating navigability, there is no evidence that Congress intended to follow this trend in the CWA.

The Court argues, however, that an early Corps interpretation of the CWA that expressly referred to protection of navigability as the sole reason for regulation should be viewed as the "real" expression of congressional intent. According to Court, the fact that the Corps failed to counteract this determination shows that it was correct at the outset. The Court also argues that the Corps is trying to write "navigability" out of the CWA.

According to Justice Stevens, both of these contentions are misleading. By the time Congress amended the Federal Water Pollution Control Act in 1972 (which became the CWA), the focus had shifted from navigability to protection of water quality. The Corps initially believed that its jurisdiction was the same as it had been under the prior Rivers and Harbors Act of 1899, which was intended to regulate navigability. The Corps' initial interpretation was roundly criticized by federal courts, Congress and the EPA, resulting in a new regulation that remains substantially unchanged.

Justice Stevens also notes that the word "navigable" does not appear in the definition of "navigable waters." Congress, and not the Corps, appears to have written the word out of the statute. The initial reference to "navigable waters" was a throwback to the original legislation, and

bore no relation to the purpose of the CWA. (See 101 ("[R]estore and maintain the chemical, physical, and biological integrity of the Nation's waters.")).

Essentially, the majority limits the CWA based on a common law definition of the word "navigable," ignoring the stated definition that excludes all reference to the term. This, Justice Stevens notes, is contrary to prior cases where the Court had refused to be guided by a common law definition when the statute itself provided the operative definition. (SWANCC, Stevens, J., dissenting, slip. op. at 11, citing *Babbitt v. Sweet Home Chapter, Communities for a Greater Ore.*, 515 U.S. 687, 697-98 n.10 (1995).)

IMPACT ON CWA JURISDICTION OVER GROUNDWATER

The Court's decision is facially limited to section 404(a). However, the term "navigable water" in that section is the same term used to define the scope of jurisdiction for the EPA in section 301 ("Discharge of any pollutant by any person shall be unlawful") and section 502(12) (a "discharge" is the "addition of any pollutant to navigable waters from any point source"). Based on SWANCC, the EPA's jurisdiction will also be limited to waters that are in some way linked to waters navigable in fact.

Thus the Court's answer to the long-standing question of whether the EPA could regulate isolated groundwater would be an emphatic no. SWANCC seems to mark the end of attempts to regulate waters that are not intimately bound up with a navigable water source such as a river or lake. Thus, isolated groundwater would clearly fall outside of CWA jurisdiction.

While isolated groundwater is not covered, SWANCC may have paradoxically answered another question about CWA jurisdiction over groundwater. There is some question as to whether the CWA applies to any groundwater, even if it is hydrologically linked to a major navigable in fact river or lake. Some people claim that the CWA was intended to apply only to surface water. Whatever the merits of that argument, the majority may have given to environmental regulation an unintended windfall.

The Court's case lives or dies based on the "navigable water" language used in the CWA. The Court, in drawing a line

between *Riverside* and SWANCC, gives great weight to the connection between the wetlands in *Riverside* and a lake navigable in fact, and the absence of this fact in SWANCC. Turning again to the CWA jurisdiction chart:

According to the Court, as long as the facts mimic *Riverside* (e.g., proximity to or hydrologic connection with a water navigable in fact), jurisdiction will be established. As long as waters navigable



in fact are impacted, the CWA will have jurisdiction. This must mean that a case to the left of *Riverside* would be within the commerce power because the regulation in *Riverside* was within the commerce power.

Consider, for example, a pesticide manufacturer, say XXX Corporation, situated on land overlying an aquifer that flows into a nearby river, which is navigable in fact. XXX Corp. allows pollutants to leak into the groundwater, where they then flow into the river. Before SWANCC, this act would have been a questionable exercise of jurisdiction, because it would have been unclear whether the groundwater into which XXX Corp. was discharging a pollutant qualified as "navigable water." However, because of the Court's heavy reliance on the link to waters navigable in fact, that once questionable regulation has now become certain. Since the groundwater is directly linked to and impacts water navigable in fact, the very bellwether of the CWA, XXX Corp.'s discharge should be subject to CWA regulation.

The hydrologic connection to navigable in fact waters may be a stronger element after SWANCC, but the other component relied upon in *Riverside* - proximity - remains unclear. The area in the chart marked "jurisdiction unclear," where CWA regulation is on uncertain constitutional grounds, could be entered by potential regulation of polluted groundwater, admittedly hydrologically linked to a navigable river, but more distant than the wetland was in *Riverside*. While the court in *Riverside* relied on the wetland's

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proximity to the affected river, the court in *SWANCC* seemed to limit the strength of that element. Thus, it seems likely that the next test case to come before the court will be groundwater, relatively distant from a navigable river, but nevertheless maintaining some hydrologic link.

The end result for those who own, use or

(2000); *United States v. Lopez*, 514 U. S. 549 (1995).) Just as section 404(a) is facially limited to “navigable waters,” so too is it limited to the “discharge of dredge or fill material.” Thus, without this underlying act - discharge of fill into water - there would be no basis for jurisdiction.

The economic rationale, however, does not stop there. The regulation in *SWANCC* concerns a classic case of an interstate externality. Regulation of migratory birds directly impacts an activity that affects commerce. The benefit from the fill is almost entirely local, while the harm is distributed across the country. This is a case of diffuse harm weighed against a concentrated local benefit. Predictably, the concentrated benefit prevails. In contrast, the impact leads to fewer birds across the nation and thus fewer people to take advantage of bird-related activities.

CONCLUSION

SWANCC is a precedent that will limit future expansion of CWA jurisdiction, and calls into question any CWA regulation that is not intimately linked to navigable water.

The question for future legislation is: Where in between *Riverside* and *SWANCC* is the appropriate limit? How close and connected does the regulated water have to be to water navigable in fact? By limiting the decision to section 404(a) and one regulatory interpretation of that section, however, the court minimized the harm to federal environmental regulation. In the end, this case might very well be known as the Court’s inadvertent gift to those who depend on a clean supply of groundwater.▲



otherwise are involved with groundwater is twofold. On the one hand, pollution of isolated groundwater clearly falls outside CWA jurisdiction. Thus, if a water provider is faced with contamination in wells in a contained aquifer, the CWA, will provide no recourse. On the other hand, since most groundwater can be shown to bear some link to waters navigable in fact, there is little that a polluter could do, faced with the strong language of *SWANCC*, to thwart a CWA enforcement action or an EPA requirement for, and subsequent denial of, a permit.

IMPACT ON ENVIRONMENTAL REGULATION

SWANCC will have less of an impact environmental laws other than the CWA. Since the court in *SWANCC* avoids the Commerce Clause, and limits the decision to the text of the CWA, the impact on other regulations is limited. The hook that the court hangs its hat on is the “navigable” limitation. Were it not for this language, the court implies that the regulation would probably have been valid. In that case, the court likely would have reached the commerce issue, and would have had to reconcile *Riverside* with the present case on those terms.

Justice Stevens argues in his dissent that the activity being regulated is the discharge of fill material into waters used by migratory birds. The economic activity takes place on several levels. First, discharge of fill material is almost always economic activity, unlike gender motivated crimes or possession of firearms in school zones. (See *United States v. Morrison*, 529 U. S. 598

- ¹ He was joined by Justices O’Connor, Scalia, Kennedy and Thomas. Justice Stevens filed a dissent, joined by Justices Souter, Ginsburg and Breyer.
- ² Since the “rule” appeared only as a clarification in the federal register, it was never formally promulgated as a regulation.

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EARLY WARNING SYSTEM

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implemented. Consequently, the plan enables the District to quickly detect leaks, provide early warning, and require the operator/owner to immediately start clean-up of the contamination rather than waiting for the plume to grow unabated.

The plan provides a mechanism for the District to actively protect and limit damage to its groundwater supplies and give the gasoline tank operator/owner an opportunity to clean-up the contamination early and save millions of dollars that would otherwise be spent to clean-up large plumes. A win-win for everyone. The plan was adopted in cooperation with and the support of the Regional Water Quality Control Board, Lahontan Region, and the County of El Dorado.

Former GRA Board member, the late Kevin J. Neese, spawned the Groundwater Management Plan idea. The District's staff and Board of Directors have championed the effort through its ultimate adoption. ▲ Gary M. Kvistad
Hatch and Parent
1-805-963-7000
gkvistad@hatchparent.com.

Chemist's Corner

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"Dioxin," 2,3,7,8-tetrachlorodibenzo p-dioxin), 1,4-Dioxane, as well as t-Butyl alcohol (TBA), share properties with the notorious MTBE; namely, they all have high water solubility and low Henry's Law coefficients.

EPA Methods 8260 and 8270 can be modified to measure some hydrophilic compounds, including 1,4-Dioxane. 8270 can be modified to include a 24 hour extraction; 8260 can be used, but the laboratory must know it is a target compound, and it must demonstrate in initial and continuing demonstration of proficiency.

High Performance Liquid Chromatography - Mass Spectroscopy (LC-MS) combines the separation power of LC with the identification power of MS. However, because of the huge range of polar organics, LC-MS is much more limited in scope than GC-MS. Polar organics will continue to pose challenges for identification of potential and existing groundwater contamination. ▲

Bart Simmons is Chief of the Department of Toxic Substances Control's Hazardous Materials Laboratory. Bart can be reached at bsimmons@dtsc.ca.gov.

New members who have joined GRA between 11/1/00 and 1/3/01

Welcome!

Alfred Andrade	Campbell Geo, Inc.	CC
Marc Ashcroft	Fast-Tek Engineering Support Services	SFB
Eileen Baliff	Geomatrix Consultants, Inc.	SC
David Bean	Geomatrix Consultants, Inc.	SAC
Charlie Blumenstein	CH2M Hill	SC
Michael Bower	Camp Dresser & McKee, Inc.	SC
Les Chau	Geomatrix Consultants, Inc.	SFB
Tony Choi	Geomatrix Consultants, Inc.	SFB
Aubrey Cool	Cambria Environmental Technology, Inc.	SFB
Steve Cusenza	City of Pleasanton	SFB
David Danks	Conor Pacific	SFB
Rebecca Dell Sheehan	California Farm Bureau Federation	SAC
Paul Dinkmeyer	IT Corporation	SC
Leslie Driver	Geomatrix Consultants, Inc.	SC
Tracy Drouin	Wallace-Kuhl & Associates, Inc.	SAC
Penny Fottrell	Geomatrix Consultants, Inc.	SFB
Corey Fulton	ENSR International	SAC
Marie Graham	City of Davis Public Works	SAC
Bruce Graves	Best Sulfur Products	SAC
Lisa Hall	Montgomery Watson	SC
Calvin Hardcastle	Geomatrix Consultants, Inc.	SC
Roy Hardison	Best Sulfur Products	SAC
Steven Hoch	Hatch & Parent	SC
Don Holbrook	Best Sulfur Products	SAC
Ann Holbrow	Geomatrix Consultants, Inc.	SFB
Kim Holland	Geomatrix Consultants, Inc.	SC
Jim Honniball	Geomatrix Consultants, Inc.	SFB
Jackie House	ENSR International	SAC
Jim Ingle	Alameda County Water District	SFB
Margaret Irish	Hatch & Parent	CC
Glenn Jaffe	Montgomery Watson	SC
Barbara Jakub	Cambria Environmental Technology, Inc.	SFB
Jacquelyn Jones	Cambria Environmental Technology, Inc.	SFB
Kasey Jones	Apex Envirotech, Inc.	SAC
Allen Just	Gannett Fleming, Inc.	SC
Mike Koza	Sacramento County Waste Management & Recycling	SAC

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New members continued from page 14

Welcome!

Gary Kramer	Geomatrix Consultants, Inc.	SAC
Ron Liebert	California Farm Bureau Federation	SAC
Brad Loewen	Geomatrix Consultants, Inc.	SAC
David Lunn	Zone 7 Water Agency	SFB
Carol Mahoney	Zone 7 Water Agency	SFB
Chin Man Mok	Geomatrix Consultants, Inc.	SFB
Christian Marsh	Washburn, Briscoe & Mccarthy	SFB
Russell McGlothlin	Hatch & Parent	CC
Glenn McPherson	Saracino-Kirby, Inc.	SAC
Dale Myers	Zone 7 Water Agency	SFB
Mike Ng	ZyMaX Envirotechnology, Inc.	CC
Adam Norris	Montgomery Watson	SC
Charlie O'Neill	Camp Dresser & McKee, Inc.	SFB
Susan Panttaja	Harding ESE	SFB
Duane Paul	Geomatrix Consultants, Inc.	SC
Bill Pipes	Geomatrix Consultants, Inc.	SAC
Jeff Pyle	Geomatrix Consultants, Inc.	SAC
Ramkishore Rao	LFR Levine Fricke	SFB
Phil Ross	Geomatrix Consultants, Inc.	SAC
Todd Royer	Holland Horizon International	OS
Robert Ruscitto	IT Corporation	SC
Mike Sgourakis	Apex Envirotech, Inc.	SAC
Mark Smolley	Conor Pacific	SFB
Kathy Snelson	Groundwater Resources Association	SAC
Marty Spongberg	Geomatrix Consultants, Inc.	SAC
Christy Swindling	LFR Levine Fricke	SFB
Grace Tang	LFR Levine Fricke	SFB
Rick Thompson	City of Davis Public Works	SAC
Carolyn Trokey	Hatch & Parent - Los Angeles Office	SC
Thomas Vandenberg	Hatch & Parent	CC
Tom Vercoutere	Conor Pacific	SFB
Peter Weiler	LFR Levine Fricke	SFB
Jennifer Wiley	Montgomery Watson	SC
Donald Winglewich	Precision Sampling, Inc.	SFB
Howard Young	Camp Dresser & McKee, Inc.	SFB

Michael Schlehuber Joins Cadiz Water Resources Team

Santa Monica, CA – Cadiz Inc. (Nasdaq: CLCI) is pleased to announce Michael Schlehuber has joined the firm as a vice president, specializing in strategic planning and water resource development.

Formerly, Mr. Schlehuber served as a senior vice president at Vidler Water Company, Inc., a private sector water company focused on the development and transfer of water rights and the establishment of groundwater banking or storage programs. In this capacity, he was charged with identifying and developing water assets throughout the western United States, including California, Arizona, Nevada and Colorado. Focusing on a variety of public/private partnerships, Mr. Schlehuber successfully completed transactions with the Semitropic Water Storage District, Kern Water Bank and U.S Bureau of Reclamation.

“Michael is a solid addition to the Cadiz team, bringing a sound understanding of environmental and permitting issues,” said Fiona Hutton, vice president of corporate communications for Cadiz Inc. “In addition to advancing the development of the company’s current water-related assets, he will also focus on seeking future market opportunities in California and elsewhere.”

Previously, Mr. Schlehuber was employed by California-based Spelman & Company, underwriting local government bonds for a variety of infrastructure projects including water and sewer, flood control and transportation. In addition, Mr. Schlehuber served as a hydrogeologist for Geocon Environmental, a private environmental consulting firm, and as a groundwater analyst for one of southern California’s largest municipal water districts.

Mr. Schlehuber completed a bachelor’s degree in Geology at the University of Notre Dame and a master’s degree in Geological Sciences at the University of California/Riverside. In addition, he received a master’s in business administration from Duke University’s Fuqua School of Business. Founded in 1983, Cadiz Inc., is a publicly held water resource management and agricultural firm. With its subsidiary, Sun World International, Inc., Cadiz is one of the largest vertically integrated agricultural companies in California. The Company owns significant landholdings with substantial water resources throughout California. Further information on the Company can be obtained by visiting its corporate web site at www.cadizinc.com.

CCGO Makes Great Progress during Board of Directors' Meeting in November.

The California Council of Geoscience Organizations (CCGO) recently conducted a Board of Directors Meeting on Saturday, November 4, 2000. The meeting was held at Exponent Failure Analysis Associates office in Oakland, California. CCGO President Betsy Mathieson (AEG-San Francisco) ran the meeting. Other attendees included Jim Jacobs (AIPG), Anne Cavazos (President Elect, AWG-NC), Randy Kirby (President Elect, NCGS), Chris Sexton (AEG-SC), Sue Jagoda (CESTA) and David Bernal (CCGO new Executive Director). Selected highlights from the meeting are listed below:

2001 OFFICERS NOMINATED: During the meeting, officers for 2001 were nominated: President- Jim Jacobs (AIPG), VP- Chris Sexton (Southern California AEG), Secretary- Sue Jagoda (CESTA), Treasurer- Anne Cavazos (AWG-Northern California) and Past President, Betsy Mathieson (AEG-San Francisco). An e-mail confirmation vote before end of year will occur.

EXECUTIVE DIRECTOR'S REPORT: David Bernal set the CCGO priorities on three areas: increase income, focus on new business members and search for grant and fund raising to support project specific activities. The Executive Director suggested developing CCGO resources by providing opportunities for student internships, retirees, or volunteers to increase member involvement.

The Executive Director suggests making assignments to identify bills of potential concern, participate in CCGO booths at trade shows, and maintain the CCGO web page. CCGO had a successful booth at the September, 2000 National AEG-GRA convention meeting in San Jose, California. Discussion on fundraising was made for project specific activities, internships, solicit donations of air miles for travel, and legislative analysis of particular legislation.

FREE MEMBERSHIP SERVICES: CCGO has agreed on free services to be offered to

business and organizational members, including employment job postings and business and organizational profiles. A business member "Help Wanted Section" is important in a time of short labor supply. Many of the CCGO business members have hiring needs this coming year. A job posting form is in the process of being developed and will be on the CCGO web site shortly. Business members will be able to have free job postings. Business or organizational members should send their web site addresses to kblatt@ihappi.com for a free link from the CCGO member page to their web site.

WORKPLAN COMMITTEE: A committee was established to develop a workplan for 2001. The committee consists of Jim Jacobs, Chris Sexton, and David Bernal. These members will review CCGO's Strategic Plan and will coordinate the development of a 2001 Work Plan.

PUBLIC OUTREACH COMMITTEE REPORT: CCGO Executive Director David Bernal will speak at the Central Coast Geological Society (CCGS) Monthly Meeting on November 14, 2000 regarding the importance of CCGO and the value of CCGO membership. Sue Jagoda is looking for volunteers from the organizational members to help judge earth science exhibits at statewide science fairs. Member organizations are encouraged to provide contributions for the science fair prizes to both students and teachers. Advanced Placement Geology courses are being evaluated.

LEGISLATIVE ACTIVITIES

David Bernal met with Judy Woolen, the AEG lobbyist in Sacramento and AEG late last year to review legislative issues for 2001. Early this year David will summarize the legislative process to the Board. For the year 2001, the main focus will be on the Geologists and Geophysicists Act, which has not been updated since 1969.

The updated legislation will bring the act into a more current standards and policies. CCGO will be following this legislation carefully. In addition, as the bills are proposed in January through February, 2001, CCGO will continue to monitor legislation that may affect geologists.

CODE DEVELOPMENT COMMITTEE UPDATE

Betsy Mathieson would like to hear from CCGO members interested in carrying on the group's work on building code monitoring and development

2001 CCGO CALENDAR:

The CCGO Board announced the 2001 Calendar: February 3 the CCGO meeting will be in Southern California. Jan Woerner will host at Cal State San Bernardino and will meet fly-in attendees at Ontario airport. The Second Annual Sacramento Drive-in will occur on March 1, 2001. At this event, CCGO hopes to schedule meetings with legislators, the State Geologist and others at the California Division of Mines and Geology, as well as the Executive Director of the Board for the State Board of Registration for Geologists and Geophysicists (BRGG). On May 5, 2001, CCGO will meet in Oakland for the quarterly board meeting. On August 4, 2001, the CCGO board will meet in Sacramento. On October 27, 2001, the CCGO board will meet in Oakland and hold new elections for officers for 2002.

QUESTIONS OR COMMENTS: For more information about CCGO, please contact Jim Jacobs, CCGO Vice President, Tel: 510-232-2728; ext. 222 or augerpro@jps.net. Although he is representing AIPG for the CCGO, he is also a Director on the Board of GRA. 💧

Sacramento Branch Highlights

BY DAVE ZUBER
SECRETARY

In December, we held our annual holiday joint meeting and raffle give-away with the Sacramento Chapter of AEG. The meeting was well attended with generous gifts from member companies. Our presenter was Dr. Figuers, the Principal Geologic Engineer of Norfleet Consultants in Livermore, California, where his firm performs groundwater resources studies, landslide hazards studies, seismic hazard analyses, and forensic investigations. Mr. Figuers talk focused on historical proposals to dam the Carquinez Strait and how the politics of the delta and the various special interest parties have battled many times over the destiny and character of this unique geomorphic location, known as the "Delta Gateway." As fresh water rights in California become increasingly contentious and valuable to the many water use camps, the colorful picture painted by Dr. Figuers demonstrated how technical prowess is not always the key to success in water management issues.

In January, the Sacramento Branch began the new year with a bang with dual presentations from Bruce Macler, a Drinking Water Toxicologist for the U.S. Environmental Protection Agency and Alexis Melia, a Sanitary Engineer with the California Department of Health Services. Mr. Macler provides advice on drinking water public health issues and serves on EPA's drinking water regulatory workgroups. He also serves as EPA's National Expert for microbial risk assessment. Ms. Melea develops drinking water quality regulations and oversees adoption and implementation for the DHS. Mr. Macler and Ms. Melia reviewed the Safe Drinking Water Act and how it prescribes a regulatory process for drinking water protection and control. They went on to describe how Federal regulations and subsequent California law and regulations detail the compliance standards to be followed by all public water suppliers.

Mr. Macler and Ms. Melia presented on a number of new federal and state drinking water regulations have been recently promulgated or are nearing completion. For the Federal side, MCLs for radon and several radionuclides have been finalized with a new limit for uranium, a new MCL for arsenic is on the way, and criteria to protect groundwater systems from microbial contamination are in final administrative review. In addition, new regulations for surface water system disinfection and disinfection byproducts are in preparation. USEPA is also considering whether to regulate a dozen more waterborne contaminants. At the state level, the California Department of Health Services must implement the federal drinking water regulations. Recent regulations include: UCMR, primary MCL for MTBE, recycling, recharge, MCL revisions, lead/copper rule revisions, consumer confidence report, operator certification, secondary MCL revisions, and public notification revisions.

In December, our branch also elected officers to take us through 2001. We welcome new president Richard Shatz of Law/Crandall, and new Vice President Kelly Tilford, of Duke Engineering. Continuing as Branch and Statewide Treasurer will be David Von Aspern, of Wallace-Kuhl & Associates, and our secretary will be Dave Zuber of Brown and Caldwell. We will have two members-at-large who continue to provide valuable assistance: Steve Phillips, of US Geological Services and Pat Dunn, of Jacobson Helgoth Consultants. The entire Sacramento Branch would also like to extend another heartfelt thanks to our outgoing president, Barbara Heinsch, for her outstanding service and hard work over the past years - Thanks Barbara!

Our upcoming events include our February meeting when we will receive a CalFed update from Mr. Mark Cowin. Mr. Cowin is the Assistant Director for the CALFED Bay-Delta Program, and manages the organization's Water Management Planning Branch. In March our presentation topic will be trihalomethanes, and in April we will have a talk and field trip on the Iron Mountain Mine.

S.F. Branch Highlights

BY J.C. ISHAM

Our January 2001 meeting was held in Oakland. This was our annual regulatory review meeting, which was presented by Stephen Hill. Mr. Hill is the San Francisco Bay RWQCB's Toxics Cleanup Division Chief. With over 120 attendees GRA would like to thank Mr. Hill for making his presentation one of most highly attended meeting that our branch has given.

In December 2000, we held our meeting in San Jose. We were fortunate to have Tom Mohr, one of our founding members, from the Santa Clara Valley Water District as our speaker. Tom gave an excellent presentation on the use of stable isotopes for groundwater investigations. Many thanks to Mark Wheeler, our South Bay Coordinator for arranging this pre-holiday meeting! 💧

Central Coast Branch Highlights

BY TERRY FOREMAN
PRESIDENT

I hope everyone enjoyed their holidays as much as I did and that your New Year is off to a good start. The Central Coast Branch has had a great set of programs since our last report and we have a great line-up for 2001. We are also holding elections for officers for 2001 at our February meeting (we took January off due to the holiday). It looks like most of the officers will return for another term based on the nominations to date, except for Michael Burke of Fugro, who has decided to retire as Branch Secretary and let someone else have some fun. Many kudos to Michael for a job well done and his contributions to the success of Branch!

Speakers since our last report have included Scott Slater, Dr. Lowell Preston, and Robert Almy.

Scott Slater, Partner in the law firm of Hatch and Parent, and our GRA Board Representative, gave us a primer on groundwater rights and a summary of the Mojave Decision handed down by the California Supreme Court. It seems this Decision may have clarified some issues, but it may also have raised as many questions as it has answered. We will want to continue to follow the Mojave groundwater adjudication as it unfolds in the coming months and years. We will have Scott come back to explain the evolution of the Mojave adjudication and what it potentially means to other groundwater basins in the State.

The next HYDROVISIONS due date for articles is April 7, 2001. We WELCOME your ARTICLES and PHOTOS. Articles may be emailed to editor@grac.org

Dr. Lowell Preston, Manager of Water Resources for Ventura County and Fox Canyon Groundwater Management Agency Coordinator made a presentation entitled: Water Resources in Ventura County - What's Next? Dr. Preston gave an overview of groundwater in Ventura County, status of selected basins, and ongoing projects to improve the quantity and quality of water resources in the County.

Robert Almy, Manager, Santa Barbara County Water Agency gave a presentation entitled: Water Supply Overview, Santa Barbara County, California. The Santa Barbara County Water Agency has completed a study of water demand and supply for the County through ultimate build out. It seems that with the recent (1998) importation of State Water Project water and conjunctive use of surface water and groundwater basins in the County that the County is in pretty good shape. Hooray for the groundwater basins! Rob also says stay tuned to the adjudication under way in the Santa Maria groundwater basin, in the northern part of the County.

We have a number of good speakers lined up so far for 2001, including the following: Mel Blevins, Upper Los Angeles River Area Watermaster, will talk about the hexavalent chromium problem in groundwater in the San Fernando Valley. Craig Cooper, Regional Project Manager for Region IX of the US Environmental Protection Agency, will talk about the Casmalia Landfill Superfund Site. Ken Ortega, Water Department Manager, City of Oxnard will present the City's proposed Groundwater Recovery Enhancement and Treatment (GREAT) Program. And finally, Dr. Jordan Clark, Professor at the University of California-Santa Barbara, will talk about the use of tracers in groundwater investigations. 💧

Southern California Branch Highlights

BY PAUL PARMENTIER

In November the Southern California Branch elected the officials for the year 2001. The Branch team maintained most previous assignments, with the exception of the vice president position. Kirby Brill has assumed a new position with the Mojave Water Agency which will require a lot of his time.

He will be replaced by Tony Maggio.

The Southern Branch members are currently actively preparing for the January 25th Chromium VI seminar, and because of this schedule, the bimonthly meetings will be re-scheduled for 2001 to "even months", starting in February. In April, we are planning an update to our annual regulatory panel, and our summer meeting will again consist of a late afternoon field trip. The following is a summary of our November meeting.

Application of Forensic Techniques for Contaminant Age Dating and Source Identification-Presentation by Robert Morrison, November 2000

A multitude of forensic techniques are available for age dating and source identification, including aerial photography interpretation, corrosion models, the commercial availability of a chemical, chemical associations with discrete types of equipment, chemical profiling, degradation models and contaminant transport models. The success of these techniques in environmental litigation and their applicability to a particular situation is rarely discussed in the literature. When these techniques are introduced as scientific evidence, their governing assumptions and the adequacy of the underlying data are rigorously scrutinized and often, successfully challenged. In the context of environmental litigation, the results from each technique should be coupled with other groups of evidence but not configured so as to jeopardize other lines of evidence, in the event that contradictory information becomes

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available. The results of the forensic techniques should be able to withstand intense scientific scrutiny relative to the purpose for which the data was collected. Technical arguments and associated evidence should be built as individual “pillars”, not as inter-dependent “dominoes”.

Multiple techniques were presented by Robert Morrison, illustrated by spectacular graphics that reflect the level of sophistication required in these litigations.



President Tim Parker, left, and Branch President, Paul Parmentier, right, present Robert Ruscitto an award for his contributions to the Southern California Branch Activities.

Aerial photography is still a basic tool that needs to be thoroughly researched and is often used in combined 3-D graphics, such as multiple-angle “aerial” viewing, and superposition of data.

Corrosion models (e.g. “how long would this tank last in the ground before it would rust and leak?”) are occasionally used, but are often easily challenged.

Chemical fingerprinting includes alkyl lead/EDB ratios, dyes (which are known to degrade and adsorb, and therefore are of limited validity), paraffins and other petroleum compound ratios (used for example to distinguish crude oil spills such as the Exxon Valdez from natural oil seeps), and sulfur analyses for diesel.

An example of an emerging area of forensic analysis is the use of isotope ratios to (1) distinguish between different contaminant sources and/or (2) to demonstrate that

biodegradation is occurring. Research indicates that for chlorinated solvents, large and reproducible carbon isotope frae in the ratio of heavy to light isotopes because differences in mass between isotopes result in slight differences in the activation energies during reactions. An advantage of isotopic analysis versus concentration data is that changes in concentration from physical processes such as dilution and sorption are frequently difficult to quantify and can complicate data interpretation.

A common area of inquiry is the application of isotopes to distinguish between manufacturers of chlorinated solvents, especially for discrimination between sources in a co-mingled groundwater plume. Isotopes used for this purpose are ^{13}C and ^{37}Cl . An example of the application of this technique is the identification of multiple sources of TCE.

Potential challenges to the use of isotopic interpretations for source identification

include the identification of a qualified laboratory capable of performing precise GC-IRMS measurements and identifying a qualified expert witness. Data interpretation may also be biased due to the potential for isotopic fractionation in the environment. Researchers have studied the effects of isotopic fractionation due to volatilization on the isotopic composition of phase separate and dissolved TCE at different concentrations. The review of stable carbon isotope concentrations indicates that volatilization and dissolution of the TCE did not result in isotopic fractionation but that fractionation occurred due to abiotic dechlorination. Other researchers have measured some fractionation that occurred during solvent volatilization. Field data from a PCE spill impacted by biodegradation indicates that a small carbon isotope fraction appears to occur during the transformation of PCE to

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waterloo

San Francisco Bay Branch
e-mail: sf.branch@grac.org

President: Linda Spencer
San Francisco Bay Regional Water Quality
Control Board
(510) 622-2420
lindageo@earthlink.net

Vice-President: Gary Foote
Geomatrix Consultants
(510) 663-4260
gfoote@geomatrix.com

Secretary: J.C. Isham
The IT Group
(925) 288-2381
julian.isham@theitgroup.com

Treasurer: David Abbott
Todd Engineers
(510) 595-2120
jorsue@msn.com

Membership: Bill Molnar
Hydro-Environment
(510) 521-2684
billm@hydroenvironmental.com

Technical Chair: Jim Ulrick
Ulrick & Associates
(510) 848-3721
julrick@ulrick.com

South Bay Coordinator:
Mark Wheeler
Crawford Consulting
(408) 287-9934
mark@crawfordconsulting.com

Past President: Clifton Davenport
Waterstone Environmental
(510) 533-6710
cdavenport@waterstone-env.com

Central Coast Branch
e-mail: cc.branch@grac.org

President: Terry Foreman
CH2MHill
(805) 371-7817, x 207
tforeman@ch2m.com

Vice President:
Stephanie Osler Hastings
Hatch and Parent
(805) 963-7000, x 415
shastings@hatchparent.com

Secretary: Michael Burke
Furgo West, Inc.
(805) 650-7000
mburke@fugro.com

Treasurer: Jennifer Harting
Tetra Tech, Inc.
(805) 681-3100, x 415
jennifer.harting@tetratech.com

Southern California Branch
e-mail: socal.branch@grac.org

President: Paul Parmentier
IT Corp
(949) 660-7510

Vice President: Tont Maggio
(562) 857-1684
amaggio@scseng.com

Treasurer: Robert Ruscitto
IT Corp
(949) 660-7510

Secretary: Carmen Guzman
ARCADIS Geraghty & Miller
(714) 278-0992
e-mail: cguzman@gmgw.com

Member At Large: Steve Zigan
Environmental Resolutions
(949) 457-8952

Sacramento Branch
e-mail: sac.branch@grac.org

President: Richard Shatz
LAW Engineering & Environmental Services
(916) 979-7871
rshatz@lawco.com

Vice President: Kelly Tilford
Duke Engineering
(916) 561-4598
krtilford@dukeengineering.com

Secretary: Dave Zuber
Brown & Caldwell
(916) 444-0123
dzuber@brwncald.com

Treasurer: David Von Aspern
Wallace-Kuhl & Associates, Inc.
(916) 372-1434
dvonaspern@wallace-kuhl.com

Member At Large: Steve Phillips
USGS
(916) 278-3002
sphillip@usgs.gov

Member At Large: Pat Dunn
Jacobson Helgoth Consultants
(916) 987-1658
pdunn@jhcinc.com

South San Joaquin Valley Branch
e-mail: ssjv.branch@grac.org

Gary Corbell
Welenco, Inc.
(805) 834-8100

Department of Toxics Substances Control Exams

The Department of Toxic Substances Control is offering continuous filing for the following exams (the title in parenthesis is the civil service classification):

- Geologist/hydrogeologist/engineering geologist (Hazardous Substances Engineering Geologists [HSEG])
- Engineer (Hazardous Substances Engineer [HSE])
- Environmental Scientist (Hazardous Substances Scientist [HSS])

The HSEG exam may be offered in April or May, but you need to apply now. For more information and an application, visit DTSC's web page at www.dtsc.ca.gov. If you would like to know more contact Brian Lewis (916)323-3632 or via email: blewis@dtsc.ca.gov.

Southern California Branch

Continued from page 21

TCE and cis-1, 2 DCE. The impact of biodegradation on the isotopic composition of the chlorinated solvent must be assessed when evaluating isotopic data so that interpretations regarding potential sources and age dating are not misinterpreted.

In the area of fate and transport modeling, Robert emphasized the areas of wide uncertainties with estimating migration rates. The most important estimated parameter, hydraulic conductivity, is critical in all interpretation, and Robert showed spectacular photo of worm holes illustrating the wide variations in soil characteristics that would quickly cast potential doubt on groundwater models. Transport models sensitivity is clearly dependent on estimates of hydraulic conductivity, total organic carbon, and contaminant degradation rates.

Robert Morrison's convincing presentation clarified for all GRA attendees the level of preparation needed to support groundwater litigation cases. 💧

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Dates & Details



GRA Offers Lapel Pins

If you would like to buy a lapel pin, attend your nearest branch meeting or order a pin now. Pins cost \$7.00 at a branch meeting or \$8.00 thru the mail. Send your checks to: GRA, P.O. Box 1446, Sacramento, CA 95812. ♪

2001 BOARD OF DIRECTORS' MEETING DATE AND OTHER KEY DATES

ALL MEMBERS WELCOME

Board Meeting,	April 7, 2001 Montgomery-Watson, Pasadena, April 7, 2001
Symposium	June 14-15, 2001 Santa Clara Valley Water District, San Jose
Board Meeting,	August 11, 2001 FAST-TEK, Point Richmond
Board Meeting,	November 3, 2001 Wallace-Kuhl, Sacramento
Seminars	Spring or Summer 2001 Environmental Statistics, Location to be determined
	Fall 2001 Groundwater Modeling, Location to be determined
Annual Meeting	November 1 & 2 2001 Joint with Biennial Groundwater Conference, Sacramento.

GRA Announces Symposium

Continued from page 1

Treatment Technology Case Studies in the San Francisco Bay Area; (4) Hydrostratigraphy and Site Characterization; and (5) a round table policy discussion on the health risk of contaminants and the establishment of drinking water standards by US EPA and Cal EPA.

Recently 1,4-dioxane has become an issue at several sites in California. 1,4-dioxane is used in **1,1,1-TCA** as a solvent stabilizer, so most TCA plumes will also have a 1,4-dioxane plume. Until now, this compound has gone undetected because it is at low

levels, but testing methods are now in place to see the 1,4-dioxane that is present at these sites. In addition to being considerably more mobile than its host solvent, this compound is not amenable to carbon adsorption or air stripping. Dioxane is a probable human carcinogen with a drinking water action level of 3 micro grams/litre.

Tom Mohr, Associate Engineering Geologist in the Underground Storage Tank Program and a past branch president of GRA, is coordinating the event and he can be reached at 408-265-2607 ext. 2626. For information on sponsoring the event or exhibiting, please contact Jim Carter GRA Seminar Chair at 310-618-8889.

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