Climate Change Could Affect Ground Water Recharge

Elevated levels of carbon dioxide (CO₂) in the Earth’s atmosphere could seriously impact air, weather, and vegetation. Now, a scientist with the Agricultural Research Service (ARS) is taking a closer look at what could happen underground.

If atmospheric CO₂ levels double within this century, as many climate models predict, some areas could experience large increases in the rate of ground water recharge, the process by which water filters through the soil and enters aquifers. That is the conclusion on a recent study conducted by ARS scientist Tim Green, a hydrologist in the agency’s Agricultural Systems Research Unit at Fort Collins, Colorado.

Green worked with Australia’s Commonwealth Scientific and Industrial Research Organization to investigate how climate change impacts ground water and the vadose zone, the region between soil surface and water table. The rate at which water filters through the vadose zone is controlled by interaction between soil, water, and plant systems. Green and his colleagues found that this rate was increased by the changes in precipitation and temperature that elevated CO₂ levels are expected to bring about.

The scientist developed a method for simulating the effects of elevated CO₂ levels on plants, ground water, and the vadose zone. Then, they applied it to two locations in Australia—one subtropical and one Mediterranean—where eucalyptus, pine, and native perennial Australian grasses are grown. They found that the Mediterranean location responded more to temperature changes, whereas the subtropical climate was more influenced by the frequency and volume of precipitation.

In both locations, changes caused to soil, precipitation, and plant transpiration by simulated climates with twice the existing CO₂ led to significant changes in the rate of ground water recharge. Water recharged from 34% slower to 119% faster in the Mediterranean climate and from 74% to 500% faster for the subtropical climate.

While the opportunity for decreased recharge rate exists, the general trend is toward increase. Future research will...
Solinst Low Pressure Pneumatic Packers are available in two sizes, designed primarily for use in 2" to 5" monitoring wells (50 and 125 mm) as single or straddle packers. They can be inflated using a hand pump to a maximum of 50 psi (345 kPa).

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Data Logger Webinar is Available on Demand

Onset Computer Corp. has added a free, on-demand Webinar entitled “Critical Success Factors in Water Level Monitoring” to its Web site.

Aimed at hydrologists, ecologists, water works professionals, and others who need to record changing water levels, the Webinar examines a range of topics, including the following:

- Choosing the right water level monitoring product for your application.
- Demystifying water level logger accuracy specifications.
- Deploying water level loggers in the field: field-proven methods and techniques.

To access the Webinar, please visit http://www.onsetcomp.com.

ChemSW Releases Industry White Paper on How to Survive a Chemical Management Audit

ChemSW Inc. has released its fourth best practices industry white paper, this one detailing the best practices that can be leveraged to survive a chemical management audit. The white paper also examines the challenges inherent in chemical management audits.

The penalties for failing U.S. EPA and Occupational Safety and Health Association audits related to on-site chemical management can be severe. A best practices approach can ensure that the chemical management program that has been implemented works and that the related audits are successful.

“From lubricants to solvents, from flammable materials to corrosives, many organizations today handle and store a number of different chemicals that must be managed safely,” says Pat Spink, ChemSW vice president and author of the white paper. “It’s not enough to ensure that you know where chemicals are, provide training and information about correct handling procedures, and ensure that chemicals are stored and disposed appropriately.”

The white paper, “How to Survive a Chemical Management Audit,” is available free at www.ChemSW.com/audit.htm.

Court Decision Limits Residents’ to Challenge Water Bottler’s Pumping

The Michigan Supreme Court upheld Nestle Water’s right to pump spring water from four wells in Mecosta County and handed down a decision that could make it more difficult for citizens to raise challenges to any potential environmental hazard.

The court’s 4-3 ruling in July held that Michigan Citizens for Water Conservation, an environmental group, and the two families affected by the pumping, could challenge operations only on waterways that the groups own or use.

In this case, the court held that the families were affected by the pumping.
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The court also upheld previous Attorney General Anne Milgram's dissenting opinion that the state's licensing has been justly compensated for its losses. "Working closely with the Attorney General's office, we will aggressively pursue these claims through the court system until the public has been justly compensated for its losses." Attorney General Anne Milgram adds, "We are working with DEP to

damages polluters caused to
natural resources.

New Jersey has filed approximately 120 lawsuits that could result in hundreds of millions of dollars in compensation from polluters who have harmed New Jersey’s natural resources, including numerous manufacturers and marketers of the gasoline additive methyl tertiary-butyl ether (MTBE).

“We are committed to holding accountable those polluters whose actions have suffled our rivers, land and ground water, diminishing public enjoyment of these natural resources,” New Jersey Department of Environmental Protection (DEP) Commissioner, Lisa Jackson says. “Working closely with the Attorney General’s office, we will aggressively pursue these claims through the court system until the public has been justly compensated for its losses.”

continued from page 14

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continued from page 18
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ensure that contaminated properties are cleaned up and restored, and that, where appropriate, polluters compensate the residents of New Jersey for the loss of precious natural resources.”

The lawsuits, known as natural resource damage claims, seek compensation above and beyond cleanup costs and fines that the DEP levies against polluters. The DEP uses money from natural resource damage settlements on ecological restoration projects, typically in the same watershed or general area where resource damages occur.

One of the lawsuits specifically targets scores of designers and manufacturers of the gasoline additive MTBE as well as major-brand refiners and marketers of gasoline that used MTBE, including Amerada Hess, Atlantic Richfield Co., BP America, Chevron, ExxonMobil, Getty, Shell, Texaco, and Valero Energy.

With this particular lawsuit, New Jersey becomes the third state to file complaints seeking natural resource damages for the recovery of all past and future costs to investigate, remediate, and restore natural resources damaged by the discharge of MTBE.

Among other companies facing natural resource damage lawsuits are Ciba Geigy Specialty Chemicals in Dover, Ocean County; the Bayway refinery in Linden, Union County; Gloucester City Titanium in Gloucester City, Camden County; Landfill & Development Co. in Lumberton, Mount Holly, and Eastampton, Burlington County; as well as Dow/Union Carbide in Middlesex Borough and Piscataway Township, Middlesex County.

The state’s lawsuits take a special focus on polluters that have damaged river resources. Lawsuits have been filed against ISP Environmental Services and G-I Holdings Inc., located in Linden along Piles Creek near the Arthur Kill; Mallinckrodt Baker, located along the Delaware River in Phillipsburg, Warren County; Genstar Gypsum, located along the Delaware River in Camden, Camden County; and Rhone Poulenc, located along the Raritan River in Middlesex Borough.

“These companies have left a legacy of pollutants in sediments ranging from PCBs and pesticides to volatile chemicals and hydrocarbons.”

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missioner Jackson says. “Clean rivers are vital to a vibrant economy and a healthy environment.”

Since its inception in 1994, the DEP’s Natural Resource Damage program has recovered more than $51 million and preserved approximately 6000 acres of open space as wildlife habitat and ground water recharge areas as compensation for pollution resulting from 1500 contaminated sites and oil spills.

Under the DEP’s technical rules, all parties responsible for polluting a site must conduct a thorough analysis to determine the nature and extent of pollution. Once this remedial investigation is completed, the DEP has 5.5 years to file a lawsuit to recover damages to natural resources if the responsible party does not restore the injured resource before that.

The legislature recognized that remedial investigations were completed at some sites many years ago without the filing of natural resource damage lawsuits. Consequently, the legislature provided a mechanism that required filing of lawsuits within 5.5 years from January 1, 2002. The lawsuits include sites evaluated by the DEP and the Attorney General’s office as being affected by this deadline. The DEP and the Attorney General’s office continue to file new natural resource damage claims as remedial investigations are completed.

Water for People Plans to Expand into Five Countries

Water For People, a nonprofit international development organization that supports the development of safe drinking water resources and improved sanitation facilities in developing countries, plans to expand its international development program to five additional countries. The expansion will significantly increase Water For People’s impact in the developing world.

The countries targeted for expansion over the next 5 years are Ecuador, Nicaragua, Rwanda, Uganda, and the Dominican Republic. These new program locations will strategically complement existing work in Bolivia, Guatemala, Honduras, India, and Malawi. The adoption of these countries will double the number of countries served by Water For People and will position the organization to reach its target of directly benefiting 1000 new people per day by 2011.

The five countries were selected following a careful review of 10 countries identified in earlier desk studies. Each of the 10 countries was carefully evaluated by a team of World Water Corps volunteers, who conducted extensive scoping studies during April and May 2007. Volunteer teams visited each country to assess needs, meet with potential partner organizations, and evaluate the potential for the successful implementation of Water For People’s community-based model.

Water For People plans to launch work in Ecuador and Nicaragua in 2007, followed by Rwanda in 2008. Work in Uganda and the Dominican Republic will be initiated over the next 4 years, as resources allow.

Arizona Student to Represent United States in International Stockholm Junior Water Prize Competition

Jingyuan Luo of Chandler, Arizona, was named the U.S. winner of the 2007 Stockholm Junior Water Prize (SJWP)—the most prestigious international competition for water-related research.

continued on page 22
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The student’s work, “Toxicity and Bioaccumulation of Nanomaterials in Aquatic Species,” sought to learn more about the toxicity of nanoparticles by testing small carbon particles (fullerenes) and nanozinc oxide particles on two different aquatic species (green algae and water fleas). Luo’s project was selected from more than 40 state SJWP winners at the national competition held in Phoenix from June 21 to 23.

The Hamilton High School student was awarded $3000 and an all-expense paid trip to Stockholm, Sweden, where she will compete against national winners from more than 30 countries for the international honor during World Water Week, August 12 to 17, 2007.

In addition, the student’s school will receive a $1000 grant toward enhancing water science education and Luo will present her research to more than 16,000 water quality professionals at WEFTEC®.07—the Water Environment Federation’s 80th annual technical exhibition and conference—this October in San Diego, California.

Three U.S. finalists, Jordyn Wolfland of Bethesda, Maryland; Keely Goodgame of Logan, New Mexico; Yupeng Liu of Charleston, South Carolina; and Kelydra Welcker of Parkersburg, West Virginia, also received a $1000 award.

Company Uses Nanotechnology to Remove Perchlorate from Water

Dendritic Nanotechnologies Inc. (DNT), a subsidiary of Starpharma, will use its proprietary technology to purify water following the award of a contract with the U.S. Department of Defense (DoD).

The $1.3 million development contract with the DoD’s Strategic Environmental Research and Development Program was awarded to DNT and the Central Michigan University Research Corp. to develop water remediation technology using DNT’s Priostar™ dendrimer-based nanotechnology.

The initial water remediation target is perchlorate, a chemical that has contaminated the ground water in some U.S. regions.

Traditional methods of remediation such as reverse osmosis and filtration have been ineffective in recovering perchlorate from contaminated water. As perchlorate contamination has been associated with the discharge of waste water from military installations, the DoD is in critical need of more cost-effective and environmentally acceptable technologies capable of removing perchlorate from drinking water to less than 2 parts per billion (ppb).

Successful completion of this project, which was sponsored by U.S. Senator Carl Levin and Congressman David Camp, will provide DoD with a new generation of cost-effective, environmentally acceptable water remediation systems.

Using Sunn Hemp as a Cover Crop Could Reduce Ground Water Contamination

Within southern Florida, soil and water conditions indicate potential for leaching from the use of atrazine-based herbicides in corn crops. Scientists from USDA-ARS and the University of Florida conducted studies to evaluate the specific ground water risk from continued on page 24
The patented Geotech **Plume Eater** is a unique aggregation of five proven clean-up technologies: air stripping, air sparging, soil flushing, direct in-situ oxidation, and bioremediation.

The **Plume Eater** creates a circulation pattern in the aquifer by drawing contaminated water into the well and through the Plume Eater. The oxygenated water is re-introduced into the aquifer without ever being brought to the surface. The standard application is generally targeted toward contaminants such as hydrocarbons, where aerobic bacteria effectively degrade contaminants.

The introduction of oxygen strips away the VOCs while oxygenating the treated water before it is re-introduced deep into the formation. This process creates a convection flow where groundwater is pulled toward the recovery well rather than pushed away, as compared to other similar types of systems and processes.

*Patent 7007759, 7077208, other patents pending.*

In addition, the **Plume Eater** system enhances bioremediation in the vadose zone. Oxygen is supplied to both the saturated zone and vadose zone to promote and enhance the natural aerobic degradation processes. The **Plume Eater** can be used in confined or unconfined aquifers.

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atrazine use by focusing on a specific cover crop that seems to have the potential to greatly reduce that risk. The crop is called sunn hemp. It is a tall, herbaceous annual that grows rapidly to a height of 6 to 7 feet.

The region’s aquifer provides drinkable water for nearly all of the rapidly growing population. Agricultural practices that impair water quality may also stunt a massive project intended to restore the Florida Everglades ecosystem. Many investigations have shown that cover crops can reduce herbicide leaching; however, ground water quality has not been widely observed and the effectiveness of cover crops on water contamination has not been documented.

The studies revealed that atrazine and some of its products may seep into the ground water and impair water quality. Climate, cropping patterns, high dilution rates, and high chemical degradation rates limited the contamination levels. Measurements also showed that cover crops significantly reduced contamination in ground water. The studies focused on sweet corn production and included whether fields with a highly vigorous cover crop would reduce impacts. Sunn hemp planted during uncultivated summer periods was the most focused upon. Crops such as these can be effective in reducing weeds and leaching while enriching soil. Sunn hemp can be grown to prevent soil erosion and as high-protein forage; older plants can be used to make cloth, twine, and rope.

Results of this 4-year study, which has support from the South Florida Water Management District, were published in the September–October 2007 issue of the *Journal of Environmental Quality*. Levels of atrazine and three of its products were monitored in ground water directly beneath sweet corn plots treated annually with the herbicide. On plots maintained with the cover crop, all plant residues were chopped and turned into soil before planting the next corn crop. Growers are encouraged to plant cover crops since there are many other potential benefits, including reduced nutrient leaching, wind erosion, and improved soil quality. To promote adoption of the practice, further research is needed to identify more cover crops that behave similar to sunn hemp and the low-cost sources of its seed. High seed cost is a limiting factor to more widespread use of this effective cover crop.

Atrazine is also used globally, resulting in numerous studies that demonstrate its contamination of water supplies. Both the original compound and its subsequent products are being detected in surface water and shallow ground water. This highlights the need to determine the extent of water risks during atrazine use and to develop conservation practices to minimize negative affects.

Scientist Develops Simpler Method for Testing for Radium in Water

A simpler technique for testing public drinking water samples for the presence of the radioactive element radium can dramatically reduce the amount of time required to conduct the sampling required by federal regulations. The U.S. EPA has approved use of the new testing method.

The technique—developed by Bernd Kahn, director of the Georgia Tech Research Institute’s (GTRI) Environmental Radiation Center, and GTRI senior research scientist Robert Rosson—became advantageous when the EPA established new radionuclide drinking water standards in 2000. While radium is found at low concentrations in soil, water, plants, and...
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food, the greatest potential for human exposure to radium is through drinking water. Research shows that inhalation, injection, ingestion, or body exposure to relatively large amounts of radium can cause cancer and other disorders. Since radium is chemically similar to calcium, it has the potential to cause harm by replacing calcium in bones.

As a result, drinking water systems are now required to sample and report on the amounts of two isotopes, radium-226 and radium-228, that are sometimes found in drinking water supplies.

The new method developed at GTRI requires only two steps. First, hydrochloric acid and barium chloride are added to a sample of water and heated to boiling. Then, concentrated sulfuric acid is added and the radium precipitate is collected, dried, and weighed. The samples are then counted with a gamma ray spectrometry system to determine the content of radium-226 and radium-228.

“The old method took four hours for each type of radium you needed to test—totaling eight hours for radium-226 and radium-228,” says Rosson. “Our method does the two tests simultaneously and it takes about half an hour of actual technician time.”

Previously approved EPA methods for measuring radium required several isolation and purification steps involving sequential precipitations from large sample volumes and sometimes liquid-liquid extractions. They all ended with a complicated final preparation step before measurement with an alpha scintillation detection system. The scintillation detector detects and counts the flashes of light that are produced when a radioactive substance interacts with a special coating on the inside of the detection container.

The EPA’s December 2007 deadline requiring every water supply be tested for radium-228 and gross alpha radioactivity greatly increased the number of radium-228 measurements required, as well as the likelihood that both radium-226 and radium-228 must be measured in the same sample, also increasing the number of measurements required.

If the total radium concentration measured is greater than 5 picocuries per liter, then the water supply is out of compliance and radium-226 and radium-228 must be measured quarterly. This may require the water source to be replaced or treated to reduce the radium concentration. If the amount of radioactivity measured is less than 5 picocuries per liter, samples may be collected at 3-, 6-, or 9-year intervals.

Senator Introduces Trichloroethylene Reduction Bill

Senator Hillary Rodham Clinton (D-New York) announced that she has introduced the TCE Reduction Act to require the U.S. EPA to set tougher regulations to protect the public from exposure to the carcinogenic chemical trichloroethylene (TCE).

The legislation is cosponsored by Senators Elizabeth Dole (R-North Carolina), Barbara Boxer (D-California), Frank R. Lautenberg (D-New Jersey), and John F. Kerry (D-Massachusetts). Representatives

continued from page 24
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Hilda Solis and Maurice Hinchey plan to introduce companion legislation in the U.S. House of Representatives. “It is unacceptable that the EPA has failed to protect the public from TCE in the face of stronger scientific evidence that it causes cancer and growing exposure problems in New York and across the country. Numerous scientific studies make it clear that TCE has the potential to cause cancer, damage the nervous and immune systems, and cause developmental effects in children. Unfortunately, the EPA has ignored the science rather than taking action. As a result of EPA delays, communities across New York continue to be exposed to potentially toxic levels of TCE,” Senator Clinton says. “The TCE Reduction Act will force the EPA to protect children and other vulnerable populations from TCE in the water they drink and the air they breathe.” Senator Clinton says.

A draft EPA Risk Assessment in 2001 found TCE to be as much as 40 times more carcinogenic than previously thought, but rather than using EPA science to set a more protective standard for TCE in drinking water, the George W. Bush administration called for more study. The National Research Council (NRC) was directed to conduct an in-depth study of the health studies involving TCE. Far from repudiating the EPA’s 2001 findings, the final NRC report, issued in 2006, found that “the evidence on carcinogenic risk and other health hazards from exposure to trichloroethylene has strengthened since 2001.”

The report went on to say, “The committee recommends that federal agencies finalize their risk assessment with currently available data so that risk management decisions can be made expeditiously.”

Senator Clinton has previously pressed the EPA to set a standard based on the latest science, but the EPA has failed to act or set a timeline. According to the EPA’s Web site, the EPA does not plan to release a revised standard until the end of 2010.

The TCE Reduction Act would force the EPA’s hand, requiring the EPA to:

· Issue a revised health advisory for TCE within 6 months of enactment.
· Issue revised draft health standards for TCE in drinking water within 12 months of enactment and final drinking water standards within 18 months.
· Issue a health advisory standard for TCE vapor intrusion within 12 months of enactment.
· Establish an Integrated Risk Information System reference concentration of TCE vapor within 18 months of enactment.
· Ensure that all standards set under the bill fully protect susceptible...
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populations (including pregnant women, infants, and children) from the adverse health effects of TCE.

World-Touring Museum Exhibit Features Ground Water, Thanks to NGWREF Grant

Wells and ground water, thanks to a grant from the National Ground Water Research and Educational Foundation, will be an integral part of a traveling exhibit on water that will tour the world’s leading science museums. The Foundation is a charitable entity affiliated with the National Ground Water Association.

The 7000-square-foot exhibit, “Water: H₂O=Life,” opened November 3 at its first stop, the American Museum of Natural History (AMNH) in New York City. After New York, the exhibit travels to several more museums around the world over the next three years. The organizers of the exhibit, AMNH and SMM, expect more than three million people to see the exhibit during its several year run. Additional stops are still being explored by the exhibit’s organizers, as well.

The exhibit, which focuses on all sources of water, features live animals, hands-on exhibits, and immersive dioramas.

“We expect the exhibit to invite people of all ages to discover the beauty and wonder of water and explore the challenges to protecting Earth’s most precious life-giving resource,” says Patrick Hamilton, SMM’s director for this project.

The ground water portion of the exhibit features “Porous Stones,” an exhibit component intended to help dispel the common misperception that ground water occurs largely as underground lakes, rivers, and “veins” of water. Visitors are encouraged to trickle water onto various rock samples to observe that some have sufficient porosity and permeability to permit water to enter and flow through them.

Also featured is a component that shows what may happen when two wells access the same aquifer. When water is pumped from one of the wells (by turning a hand crank), the pressure in the aquifer drops as a cone of depression spreads out until it reaches the recharge area of the aquifer, the discharge area, or both.

A third ground water component is featured in the three-dimensional Geo-Wall animation. It shows how ground water underneath Tucson, Arizona, has fluctuated during the past several decades in response to ground water pumping and recharge.

“It is important for the ground water story to be told as often and as widely as possible,” says Foundation director Mark Husnik. “We’re delighted to be able to be a part of this comprehensive exhibit.”

EPA Reports to Congress on Underground Storage Tank Program in Indian Country

The U.S. EPA has issued a report to Congress on implementation and enforcement of the underground storage tank program in Indian Country. The report describes the progress that
EHC-M™ Bioremediation Technology:
Using Controlled-Release Carbon, ZVI and Sulfate to irreversibly precipitate and adsorb Trace Metals

Trace metals constitute a significant class of groundwater contaminants originating from mining effluents, industrial wastewater, landfill leachate, agricultural wastes, fertilizers and other sources. Adventus’ EHC-M redox compound is a technically superior ISCR technology—both in cost efficiency and effectiveness—over conventional enhanced bioremediation.

Not limited only to Hexavalent Chromium like competing offerings, EHC-M is field-proven to encourage the precipitation and adsorption of many dissolved metals such as antimony, arsenic, chromium, lead, mercury, nickel and zinc—limiting their movement downstream of a treatment zone.

EHC-M is a patented, specially formulated material containing controlled-release organic carbon, ZVI, a source of sulfate, and other additives designed for treatment of dissolved trace metals. It can be easily applied via a variety of construction methods providing in situ source area treatment or plume management (such as PRBs).

At US$2.25 / lb, cost factors for EHC-M are often 50% lower than other purportedly similar metals remediation compounds currently on the market. Volume discounts and performance warranties make Adventus a preferred partner for consultants, engineers, field contractors, site owners, and regulators around the world.

Summary of observed treatment efficiencies using EHC-M

| Compound | Influent (ppb) | Effluent (ppb) | Removal Efficiency |
|----------|----------------|----------------|--------------------|
| Antimony | 24,500         | 35             | >99%               |
| Arsenic  | 500            | 9              | 98%                |
| Chromium | 200            | <1             | >99%               |
| Lead     | 64,000         | 600            | >99%               |
| Mercury  | 1,020          | 29             | 97%                |
| Nickel   | 350            | 5              | >99%               |
| Zinc     | 50,400         | 3,900          | 92%                |

Field Report:
Washington Superfund Site
“Due to a combination of subsurface conditions and the limitations of pump and treat technology, our Washington Superfund client needed an in situ remedy to address recalcitrant Cr(VI) and TCE contamination in groundwater. Concentrations of Cr(VI) and TCE in the hot spot area were approximately 200 ppb and 8 ppb, respectively. EA evaluated a number of products capable of addressing these commingled contaminants, and chose Adventus Group’s EHC-M because it supports both chemical and biological reduction processes, resulting in greater longevity over other products due to the ZVI component. EHC-M was applied using direct push injection at depths of 80 to 90 feet below the surface and, within 3 months of the application, Cr(VI) and TCE concentrations were below detection limits.”

— Eric Marthafer, Project Engineer
EA Engineering, Science, and Technology, Inc.
tribes and the EPA have made working together to prevent and clean up releases from underground storage tanks and discusses future challenges facing the program. The EPA developed the report as required by the Energy Policy Act (EPACT) of 2005.

Of the more than 560 separate federally recognized tribal governments in the United States, approximately 200 have active or closed federally regulated underground storage tanks on their lands. There are approximately 2600 active underground storage tanks in Indian country.

The report can be found at http://epa.gov/oust/fedlaws/final_trtc.htm.

Congressional Water Caucus Formed

Drought, water supply, and water quality were among the reasons cited by founders of the congressional Water Caucus. Caucus founders include Representative John Linder (R-Georgia), Representative Jim Costa (D-California), Representative Bart Stupak (D-Michigan), Representative Grace Napolitano (D-California), and Representative George Radanovich (R-California). The Water Caucus joins more than 200 congressional caucuses, covering a wide range of issues.

In forming the Water Caucus, the cochairs announced “Twelve Principles of Water Policy,” which include ensuring an adequate supply of fresh water for urban and rural areas, capturing and storing excess water for future droughts, collecting and sharing data, and suggesting financing options for new public works water projects.

House Votes to Increase Leaking Underground Storage Tank Funding

The Leaking Underground Storage Tank (LUST) Trust Fund would receive $118 million in fiscal year (FY) 2008 under the June 28 House-passed Interior Appropriations bill, H.R. 2643. This level represents an increase of approximately $17 million more than 2007 and $26 million more than President George W. Bush’s 2008
MiniRAE 3000 PID Monitor

Introduced in June, 2007, RAE Systems has listened carefully to suggestions from working field technicians to produce this advanced portable handheld VOC Monitor. The innovations include:

Key Features:

• 3rd Generation PID Technology
• Humidity Compensation
• Large Display for Easy Viewing
• 3-second Response Time
• Extended Range: 0.1 to 15,000 ppm
• Instantaneous Data and Alarms

| Cat. No.       | Description                      | Price | Sale |
|---------------|----------------------------------|-------|------|
| RAE-059-B110-000 | Basic Monitor Only Kit          | $3825.00 | $3499.00 |
| RAE-059-B111-100 | Basic Monitor w/Calibration Kit | $4625.00 | $3899.00 |

Multi Parameter Water Quality Meter; HANNA HI 9828

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| Cat. No.       | Description                      | Price | SALE* |
|---------------|----------------------------------|-------|-------|
| HI 9828/4     | Multiparameter Water Quality meter with 4 m cable pH/EC/DD probe kit | $2417.00 | $2094.45 |
| HI 9828/10    | Multiparameter Water Quality meter with 10 mt pH/EC/DD probe kit | $2525.00 | $2146.25 |
| HI 9828/20    | Multiparameter Water Quality meter with 20 mt pH/EC/DD probe kit | $2675.00 | $2273.75 |
| HI 769828/4   | Spate DO/EC/T probe for HI 9828, with 4 m cable | $950.00 | $897.50 |
| HI 769828/10  | Spate DO/EC/T probe for HI 9828, with 10 m cable | $1050.00 | $982.50 |
| HI 769828/20  | Spate DO/EC/T probe for HI 9828, with 20 m cable | $1150.00 | $977.50 |
| HI 710045     | Cable for recharging HI 9828 batteries | $12.00 | $10.20 |

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NGWA actively promoted increased funding to address LUSTs, making it a 2007 NGWA Washington Fly-in issue and organizing collective efforts with other groups.

In addition to state resources, the LUST Trust Fund provides funding to remediate sites, enforce necessary corrective actions, and recover costs expended from the fund for cleanup activities. The EPACT of 2005 expanded the authorized fund uses to include contamination prevention activities such as mandated state tank inspections.

The Bush Administration’s budget requested change to the type and frequency of state tank inspections, in part to offset the lower Administration LUST funding request. With the increased funding in the bill, the House Interior Committee stated that they saw no reason to move forward on a change to the inspection program.

The federal trust fund is funded through a motor fuel tax of one-tenth of a cent per gallon. In FY 2005, $190.8 million in new federal LUST Trust Fund taxes were collected and an additional $77.7 million in interest was earned on the fund’s balance.

Overall, the House recommends $8 billion for the U.S. EPA in FY 2008, $892 million more than President Bush’s request. Drinking water and waste water infrastructure funding would receive an increase. The bill proposes $50 million for the Diesel Emission Reduction Program. The Diesel Emission Reduction Program’s goal is to encourage retrofitting or replacement of old diesel engines, including engines in construction equipment. The House bill would also direct more funding to Superfund: $600 million, $26 million more than 2007, and $15 million more than the budget request. Superfund enforcement would also get an additional $6 million more than in 2007, going to $170.6 million. Proposed funding to evaluate and remediate former industrial and commercial sites and brownfields would increase from $11 million in 2007 to $100 million. Additionally, $50 million is proposed for grants to states to administer brownfields programs.

The Senate Appropriations Committee reported its version of the 2008 funding bill, S. 1696, to the full
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Senate on June 26. The committee measure would provide $7.7 billion. The Diesel Emission Reduction Grants remained the same as the House, but funding for Superfund, LUSTs, and water infrastructure is less than in the House-passed version.

Raytheon Co. and U.S. Air Force Ordered to Clean Up Contaminated Ground Water

The U.S. EPA has ordered the Raytheon Co. and the U.S. Air Force to clean up a migrating plume of contaminated ground water at the Tucson International Airport Area Superfund Site.

Under the order, Raytheon, formerly Hughes Aircraft, and the U.S. Air Force are required to treat two solvents, TCE and 1,4-dioxane (DX), in ground water coming from the 1365-acre Air Force Plant 44 facility at the southern end of the Superfund site.

The extraction and treatment system at the Air Force Plant 44 is not effectively containing the contaminated ground water plume from the facility, allowing TCE and DX to

continued from page 34
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migrate north and into a drinking water treatment plant operated by the city of Tucson. The treatment plant, located at the northern end of the plume, serves approximately 50,000 Tucson residents. The EPA’s order requires Raytheon and the USAF to install and operate an advanced oxidation process system to treat the solvents in the plume. Currently, the city-operated drinking water plant treats TCE and is able to safely blend DX so that the water is safe to drink.

Sampling data from 2006 detected TCE in ground water was as high as 3400 ppb and DX up to 298 ppb. The company and the Air Force are required to treat contaminated ground water to less than 5 ppb for TCE and 3 ppb billion for DX.

Raytheon and the Air Force face penalties of up to $32,500 per day, per violation, if they fail to comply with the order.

The Tucson International Airport Area Superfund Site, listed in 1983, has a 50-year history of chemical contamination due to its aircraft and electronics facilities and unlined landfills. Raytheon used and disposed of metals, chlorinated solvents, and other substances at the Air Force Plant 44 facility since 1951.

The company used TCE in several degreasers and as a general-purpose solvent from the 1950s through the mid-1970s. As part of its operations, Raytheon used DX as a stabilizer to enhance the life of the solvent bath for degreasing manufactured parts.

The company collected waste solvents from the manufacturing area and disposed them in drums, which were then put into uncontrolled landfills, and also discharged liquid solvent wastes into unlined drainage channels and pits at the facility. The waste solvents and other substances migrated from disposal areas into ground water.

The EPA is currently working with several federal organizations, including the Air Force at Plant 44, to complete interagency agreements, also known as federal facility agreements, which establish federal Superfund cleanup and long-term operations and maintenance procedures at all National Priority List sites. To date, the agency has signed 135 of these enforceable agreements and seeks to establish enforceable arrangements for the remaining 16 sites without agreements.

The administrative order can be viewed online at http://www.epa.gov/region09/water/drinking/dw-enforcement.html.

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