

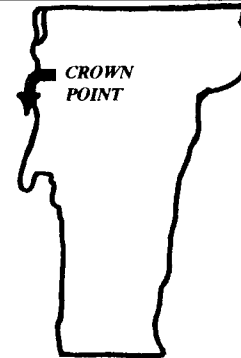
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THE GREEN MOUNTAIN GEOLOGIST



QUARTERLY NEWSLETTER OF THE VERMONT
 GEOLOGICAL SOCIETY

SUMMER 1994

VOLUME 21

NUMBER 2

*The Vermont Geological Society
 Summer Meeting and Field Trip:
 DEPOSITIONAL ENVIRONMENTS
 in the MID-ORDOVICIAN SECTION
 at CROWN POINT, New York
 SATURDAY JULY 9, 1994, 9:30 AM
 See Inside For Details.*

The **GREEN MOUNTAIN GEOLOGIST**

is published quarterly by the Vermont Geological Society, a non-profit, educational corporation, dedicated to the advancement of the study of geological science in Vermont and its locale.

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PRESIDENT'S LETTER

June 1, 1994

Dear Members:

I realized after our Spring Meeting on April 23, that 1994 is our 20th anniversary year. The Society officially came into being on February 23, 1974 at the Tavern Motor Inn in Montpelier. Happy Birthday to us!! I find it a very happy birthday because our society is so healthy and vibrant.

On April 27, 1974, the VGS held its first regular meeting, which was also its first student presentations meeting. Fifteen student papers were presented and the Summer GMG following that meeting reported that "...everyone was impressed by the reports." The same is just as true today. All those attending at Middlebury College to hear the presentations at this year's Spring Meeting heard, and viewed, twelve excellent student presentations. Congratulations to all the student presenters! The VGS appreciates your efforts and wishes you good luck in your future endeavors.

Particular recognition goes to the winner of the Doll Award for the best undergraduate presentation, Matthew K. Bingham (Middlebury College). Matthew's presentation was also judged the best overall. Kenneth Mansfield (Middlebury College) earned the second place award, and Scott D. Thompson (Middlebury College) the third place.

"1994 is our 20th anniversary year. The Society officially came into being on February 23, 1974 at the Tavern Motor Inn in Montpelier."

VGS Executive Committee continues to work on revising the VGS Constitution and Bylaws for a vote at this Fall's annual meeting. The Nominating Committee, Bruce Cox, Bill Norland, and Gene Volmer, is seeking VGS members willing to serve as officers, directors, and permanent committee chairpersons for next year. Call any one of them to volunteer. Stephen Wright welcomes members as guest editors for future GMGs, or if you'd like to lead a field trip, tell anyone on the Executive Committee. We also need a guest speaker for the Fall Banquet. Call Helen Mango at Castleton State College if you'd like to volunteer or if you have a good suggestion for a speaker.

The VGS Research Grant Program coordinators, Rolfe Stanley and Kent Koptiuch, are processing grant applications submitted in May. Their selections will have been made by the time this letter appears, but grant applications can be submitted again in November. If you'd like to help them in the evaluation process for the new applications, let them know.

Our continued health and vigor as a society depends on your involvement in VGS affairs. Commit to a bright future for the VGS. You won't regret it!

Sincerely,
Larry Gatto



GUEST EDITORIAL

This issue of the GMG revisits the theme of applied environmental geology in Vermont. The environmental consulting industry, particularly that segment targeting the investigation and remediation of hazardous waste sites, has undergone a dramatic growth and maturation cycle over the past twenty years. Geologists and hydrogeologists have often assumed leading roles in guiding the development of this industry.

As the American public has become educated to the needs of our Earth's environmental health, the regulatory mechanisms have been defined, and refined, to promote the sound management of our resources. On a national level, some of the more important of these mechanisms include:

- the *Clean Water Act* (CWA) amendments of 1972 and 1975,
- the *Safe Drinking Water Act* (SDWA) of 1974,
- the *Resource Conservation and Recovery Act* (RCRA) of 1976,
- the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) of 1980,
- the *SDWA Amendments* of 1986,
- the *Superfund Amendments and Reauthorization Act* (SARA) of 1986, and
- the *RCRA Hazardous and Solid Waste Amendments* of 1984.

As general industry strives to comply with the requirements imposed by these, and other federal regulations, the market for knowledgeable professionals in the management of groundwater and surficial materials has expanded correspondingly. Because many commercial and industrial enterprises do not require a full-time staff of environmental experts, environmental consultants fill a vital service niche in an efficient and cost-effective manner while minimizing a customer's long-term investment in personnel and their associated benefits.

Perhaps due to our innate Yankee characteristic of clinging to individuality, and it's associated freedoms, Vermont is fortunate to boast a proliferation of small to mid-sized environmental consulting firms that provide a wide variety of services to the state's varied industries. As a result, many geologists and hydrogeologists have become multidisciplinary scientists, while simultaneously becoming proficient business operators.

A bonus factor associated with this development is that we have finally gained recognition; the business community has come to realize that scientists have a place outside of government and multi-national corporate think-tanks. Hand in hand with this recognition lies the responsibility of professional accountability. As professional scientists, we have always lived in accord with a strict code of ethics. Unfortunately, the state legislature does not recognize geologists or hydrogeologists in the same way that engineers are recognized. This is an issue which often results in the need to hire a Professional Engineer just to put his stamp on a report. Furthermore, up until very recently, most of us could recognize almost any other practicing geologist or hydrogeologist in the state by name, if not by face. With the continuing expansion of our scientific community, however, there arises the need to establish a stan-

(Continued on page 4)

(Guest Editorial: Continued from page 3)

dard of qualifications, experience, and testing that will place members of our profession on level equivalent to that of a Professional Engineer.

"The VGS can be much more than an information forum; we can be both a sounding board and a tool to further strengthen the economic ties between our scientific community and Vermont's business community."

I am asking all members of the Vermont Geological Society to use the GMG as a sounding board for your viewpoints. Send your ideas relative to this issue to me in care of our mailbox at UVM's Department of Geology. Jefferson Hoffer, CPG, is currently putting together an evaluation of testing and licensing requirements set forth by other states; we will present this information in the next issue of the GMG along with a summary of your viewpoints.

If the membership so desires, the VGS could become instrumental in making this an issue before the legislature. Remember, this is your organization. The VGS can be much more than an information forum; we can be both a sounding board and a tool to further strengthen the economic ties between our scientific community and Vermont's business community. Let me know what you think!

Sincerely,
Kent Koptiuch

INDUSTRY & COMMUNITY NEWS

- The American Association for the Advancement of Science (AAAS) recently presented Nancy Bazilchuk, investigative reporter for the Burlington Free Press, with the **AAAS-Westinghouse Science Journalism Award** in the small newspaper category for an investigative series for her in-depth Pine Street Barge Canal series, "Superfund: The Road To Nowhere,"
- The Montshire Museum of Science in Norwich is offering a graduate level course for elementary teachers and others interested in science education August 1 - 5, 9 am - 4 PM. **Teaching and Learning Inquiry Science** will use the museum as a laboratory for participants to develop and pilot their own activities. Participants will earn three graduate credits through Trinity College (Burlington, VT). Pre-registration is required; call Trinity at (802) 658-0337.
 - The **Vermont Public Interest Research Education Fund** has received an EPA grant of \$50,000.00 to provide remedial oversight activities at the BFI-Rockingham Landfill Superfund site in Rockingham, Vermont.

(Continued on page 5)

(Industry & Community: Continued from page 4)

- The Vermont Department of Health (DOH) Radiological and Occupational Program is providing the Montshire Museum, and also the Fairbanks Museum of St. Johnsbury, with funding assistance through an EPA grant program, in conducting a **residential radon testing program**. The Montshire is distributing coupons for "free" radon samplers, with analysis included, to Girl Scout Troops as they visit the museum over the Summer. The Fairbanks will be instituting a similar program through local elementary schools in the Fall. The DOH instituted a similar initiative this past Spring by distributing coupons at the Vermont Home Show in Essex. The results are tabulated in the state data base by postal zip code.
- The Soil & Water Conservation Society (SWCS), in cooperation with the USDA Soil Conservation Service, will coordinate a series of public forums and events in coming months on natural resource issues to be addressed in the 1995 farm bill. **Agriculture and the Environment: Listening to the Grassroots** will give state & local level constituencies an opportunity to present their views on natural resource management issues. Burlington was chosen as one of 16 sites for public forums. Contact Max Schnepf, SWCS, 1-800-THE SOIL, ext. 14.
- The SWCS also has some great elementary level educational materials available at very reasonable prices. Their **Environmental Adventures** program includes some great lesson plans, and enjoyable reading for 8-12 year olds with an emphasis on resource management and conservation. Call 1-800-THE SOIL, ext. 19.
- In March, New Hampshire Congressmen Bill Zeliff and Bob Smith introduced a comprehensive **Superfund reform bill** that strives to eliminate retroactive liability. This is an effort to direct federal dollars towards hazardous waste cleanup and safeguarding public health, rather than towards litigation and bureaucratic overhead, as is currently the case. Opposition to passage of this bill is expected to be strong.
- Dupont's third place 1994 **Plunkett Student Award for Innovation with Teflon** went to a University of Michigan team working on coating the insides of drinking water intake pipes with a Teflon coating to eliminate zebra mussel infestations. This methodology could have important ramifications in Vermont as the zebra mussel continues to encroach on Lake Champlain via boat traffic from the Richelieu River and the Champlain Canal. Zebra mussels deplete dissolved oxygen levels in water bodies. They are also notorious as colonizers of water intake pipes causing severe flow reduction problems.
- The National Ground Water Association (NGWA) will be holding their annual **Focus Conference on Eastern Regional Groundwater Issues** at the Radisson in Burlington, October 3-5. The Focus Conference is a forum for the latest developments in applied hydrogeology and remedial technology. For information call the NGWA at 1-(800) 551-7379.

EPA SIDEBAR
New EPA rules require solid waste landfills to screen incoming loads for PCB-containing materials and hazardous waste.

STORM WATER PERMITTING UPDATE

(excerpted from Pollution Engineering, June, 1994, pp 64-66)

The EPA deadline to file a Notice of Intent (NOI) for the National Pollutant Discharge Elimination System (NPDES) permits for storm water discharges under the Clean Water Act (CWA) passed in October, 1993. As of February, however, no NOIs have been filed from source owners in Vermont. The EPA anticipates permitting approximately 500 individual facilities here in the state. Non-compliance with EPA permit requirements can subject violators to fines of up to \$25,000.00 per day. Many facility owners are not even aware of the requirement to file.

"As of February...no NOIs have been filed from source owners in Vermont...Non-compliance with EPA permit requirements can subject violators to fines of up to \$25,000.00 per day."

Lean regulatory staffing in Vermont, and in most other states, appears to be a major contributor to non-compliance; public education regarding the program is practically non-existent. To address this issue, the EPA has prepared a draft guidance strategy for administering the program from a compliance monitoring and enforcement perspective. This strategy is expected to focus heavily on outreach and public awareness. In addition, regulators will begin to collect annual permitting fees, thereby increasing their resources to the enforcement program.

GUEST EDITOR'S NOTE:

Individual facilities discharging storm waters to ANY public waterbody or watercourse were required to have developed a Storm Water Pollution Prevention Plan (SW3P) by February 1, 1994. This plan is to be implemented by August 1, 1994. The SW3P must be prominently displayed in the work space, and be readily available for regulatory inspection. The SW3P must be reviewed annually, and updated as required to remain in compliance. There is no actual fee to obtain the permit, however, annual renewal is \$50.00.

MEMBER NEWS

- **Anne Volmer, Bill Norland, and Bruce Cox** have agreed to serve on this year's VGS Nominating Committee for 1995 Executive Committee officers. Thanks for volunteering!
- **Rolfe Stanley**, Advancement of Science Committee Chair, has offered to present a Winter meeting workshop on systems dynamics through hands-on implementation of the *STELLA* software program. More information will be made available at the annual Fall Meeting.
- VGS Research Grants have been awarded to: **Lars C. Cherichetti**, UVM Graduate student for field expenses in preparation of "*The Development of the Quebec Reentrant by Both Upper Plate (Quebec) and Lower Plate (Vermont) Asymmetric Rifting as*

(Continued on page 7)

LEGISLATIVE UPDATE

- The Petroleum *Cleanup Fund* (PCF), administered by the Sites Management Section of the DEC's Hazardous Materials Management Division, has been given a new life. Originally due to sunset on June 30, 1994, the PCF has been extended another five years by the State Legislature and is awaiting Governor Dean's signature. PCF monies are used to fund remedial activities at leaking underground storage tank (LUST) sites for uninsured operators. The PCF is self-supporting through revenues accrued from underground storage tank registration and use fees.
- Legislators could not come to terms with proposed changes designed to simplify and reform the *ACT 250* permit review process.
- Vermont's *low-level radioactive wastes* will be shipped to a yet-to-be built disposal site in Texas. Vermont Yankee ratepayers will be footing the bulk of the \$27.5 million in costs. The decision will bring about the dismantling of the Low-level Radioactive Waste Authority and their million dollars per year budget. One of the Authority's final acts was to win a suit against Battelle Memorial Institute in Ohio for repayment of more than one million dollars spent to identify the Vermont Yankee site in Vernon as a wetland.
- Bennington will receive \$500,000 to help pay the legal bills associated with the *Town of Bennington Landfill Superfund Site*.



(Member News: Continued from page 6)

- Recorded by the Distribution and Facies in the Pinnacle Formation,"* and to: **Jonathan L. Goldberg**, also a UVM Graduate student, for thin-section expenses in preparation of "*Sequence Stratigraphy and Provenance of the Lower Cambrian, Lower Monkton Quartzite, Western Vermont.*" Both students will present their work at the VGS' Spring Meeting in 1995. **CONGRATULATIONS!**
- **Ronald W. Miller**, Hydrogeologist II, has been promoted to Regional Manager at Ground Water of Vermont in Burlington.
 - **Ronald L. Parker**, former Regional Manager and Hydrogeologist II for Ground Water of Vermont in Burlington, has recently gone out on his own to create Lone Rock Geoscience in Burlington.
 - **Kent S. Koptiuch**, former Northeast Operations Manager and Senior Geologist for Matrix Environmental Technologies Inc. of Essex Junction, has recently incorporated as KENT S. KOPTIUCH, Inc. Geo-Environmental Services (KSKGeoS) in Essex Junction. Koptiuch is a Certified Ground Water Professional through the Association of Ground Water Scientists and Engineers.

SEND US YOUR
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DEPOSITIONAL ENVIRONMENTS in the MID-ORDOVICIAN SECTION at CROWN POINT, NEW YORK

B. Baldwin & L.E. Harding

FIELD TRIP DESCRIPTION:

We will meet at the entrance to New York's Crown Point State Park, approximately ¼ mile west of the Champlain Bridge on New York Route 8. Our first stop will be in the rocks exposed just south of this intersection. The VGS Executive Committee will hold an annual meeting on-site after the field trip.

Members wishing to carpool from the UVM Geology Department should meet in the parking lot outside the Perkins Geology Building by 8:20 AM. If the group is large enough we can take a Geology Department van. Distance from Burlington is approximately 40 miles. All members are welcome to attend.

Equipment and Background Information: Bring a lunch and water. A Visitor's Information Center is located on the site and will be open. Absolutely no collecting or rock hammers are allowed in Crown Point State Historic Site. Its pristine condition is maintained because the many geologists who have visited the site over the years have honored this rule. It is useful to circle fossils with chalk for the aid of others.

Introduction: The Crown Point section, exposed at the Crown Point State Historic Site, is a wonderful place for using fossils, sedimentary textures and structures, and lithologies to interpret changing environments of deposition. Formations exposed in the 120 meter (400 feet) thick section include the *Crown Point*, *Valcour*, *Orwell*, and *Glens Falls Limestones*, deposited between about 458-444 million years ago on the eastern margin of North America. The rocks record the onset of continent-arc collision known as the *Taconic Orogeny*. The lower half of the section records deposition on a slowly subsiding, passive continental margin. The upper half records a swift transition to deeper water environments as the continental margin entered the subduction zone. At Crown Point these rocks comprise a homoclinal section dipping about 8 degrees to the west-northwest.

(Continued on page 9)

The full text, with figures, for this field excursion is found in *Vermont Geology*, Volume 7. The Vermont Geological Society, Burlington, Vermont, March, 1993, pp. 29-42. Copies can be obtained by writing with your check or money order for \$8.00 (\$10.00 for non-members) to:

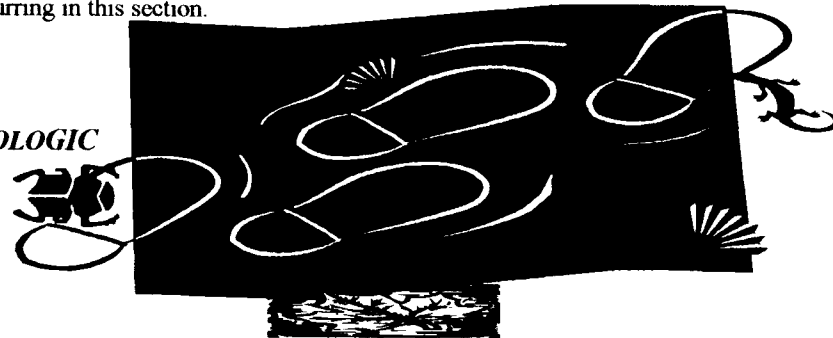
Treasurer,
Vermont Geological Society
c/o Dept. of Geology
UVM
Burlington,
Vermont 05405

A limited number of copies will be available for sale at the meeting place

(Crown Point: Continued from page 8)

The Middlebury College geology department uses the Crown Point section as a field exercise for both first- and second-year geology students. Their field trip, as well as yours, consists of a walking tour beginning about 500 meters southeast of Fort Crown Point, heading towards and through the Fort, and then continuing west for about 200 meters along the Lake Champlain Shoreline. We will visit most of the lettered stations shown on the index and air photo maps (Figures 1 & 2). The lettered stations are also shown on the detailed columnar section (Figure 3) and the student columnar section (Figure 4). For historical purposes, Figure 3 also shows Raymond's (1902) sections B and C; he listed a large number of fossils from these sections. Appendix A (reprinted from Baldwin and Mehtens, 1985) diagrams the fossils occurring in this section.

THE GEOLOGIC TRAIL



VERMONT GEOLOGICAL SOCIETY BUSINESS AND NEWS

New Members

We are pleased to welcome the following new members who have joined the VGS since the Spring GMG was published:

- Edward Hasenhohr, Fair Haven, Vermont, and
- Kristen Underwood, Underhill, Vermont.

Treasurer's Report

As of June 14, 1994, the Society's membership stands at 131 members. Our financial condition is excellent, and continued tight cost controls will ensure that it remains so for the foreseeable future. As I indicated in a previous report, I anticipate no increase in dues for 1995, despite rising postal costs.

I would like to congratulate **Lars Cherichetti** and **Jonathan Goldberg**, both of whom were awarded Student Research Grants. The Society remains committed to this important program and looks forward to new applications for the November 15th deadline.

The membership directory is nearing completion and should be in the hands of every VGS member in the next few weeks.

Respectfully submitted,
Stephen S. Howe

(Continued on page 10)

(VGS Business & News: Continued from page 9)

Executive Committee Minutes - April 23, 1994

The Executive Committee of the Vermont Geological Society was called to order at 1:25 PM on April 23, 1994 at the Twilight Auditorium, Middlebury College, Middlebury, Vermont. Members present included Larry Gatto, Kent Koptiuch, Steve Howe, Helen Mango, Ron Parker, Rolfe Stanley, Stephen Wright, and Ed Hasenohr. Stephen Wright volunteered to substitute as Secretary in Nancy Keller's absence.

Treasurer's Report: Steve Howe reported a balance of \$3,909.14 in the Society's account. Dues have been collected from 128 members and the mailing list appropriately reduced to 128. Two new applications for membership were approved: Kristen Underwood and Ed Hasenohr.

Membership Directory: Steve Howe has reviewed the membership information collected on the dues statements. 25% of members have an electronic mailing address (E-mail), and 43% have access to facsimile machines. Steve has compiled membership information in a spreadsheet program and will put together the membership directory in June. He envisions that the directory will be approximately 10 pages long. This will be a separate mailing to members as opposed to a centerfold in the Summer GMG.

Reciprocal Agreements: Stephen Wright confirmed with Jean Detenbeck that we currently have a reciprocal agreement with the Maine Geological Society. Stephen has yet to initiate contact with the New Hampshire Geological Society.

Summer Green Mountain Geologist: Stephen Wright suggested that the deadline for material to be included in the Summer GMG be the first week of June. Kent Koptiuch is the guest editor for the Summer GMG and he is trying to gather short articles focused on environmental geology. The Summer Field Trip will be led by Lucy Harding to Crown Point. The field trip guide for this trip was first published in Vermont Geology #7. Stephen will advertise this in the GMG, and Steve Howe will bring along copies to sell to members at the field trip.

Vermont Geology: Vermont Geology #8 will be a guide to field trips in the Stowe area. The executive committee suggested the Stephen publish these as separate field trips (e.g. Field Trip to the Lake Mansfield Area, and Field Trip to Smuggler's Notch) rather than wait until all of the field trips were prepared. Stephen concurred with this and suggested that the Lake Mansfield and Smuggler's Notch field trip guides could realistically be published this summer.

Fall Field Trip, Banquet, Annual Meeting, and Guest Speaker: Greg and Nancy McHone have agreed to lead a trip in the Rutland area to look at Cretaceous igneous intrusions on the 24th of September. Helen agreed to check out restaurants capable of hosting 20 to 30 people. Stephen noted that the executive committee needs to find a guest speaker.

Advancement of Science Committee: Rolfe briefly outlined some of the systems dynamics work he has been doing, and then offered to hold a hands-on workshop for the Society's members during the Winter Meeting in February. The executive committee accepted Rolfe's offer. Rolfe suggested that Middlebury College might be a place with the computers necessary for the workshop.

(Continued on page 11)

(VGS Business & News: Continued from page 10)

Nominating Committee: Larry announced that he had found three members willing to serve on the Nominating Committee: *Bruce Cox, William Norland, and Anne Volmer*. Open and potentially open Executive Committee positions were briefly reviewed. Kent has agreed to run for *President* next year. Larry, Helen, and Ron are all willing to serve on the *Board of Directors*. Stephen is willing to continue as *Editor*. Steve Howe will tentatively continue as *Treasurer*. The Nominating Committee will need to find candidates for *Vice-President, Secretary, and Public Issues Committee Chair*. Stephen suggested that Nancy Keller might be interested in running for VP, or continuing as Secretary.

Vermont Geological Society Research Grants: Steve Howe announced that the Society is financially able to fund two awards this year at a minimum \$400.00 level, and perhaps for more. There will be two deadlines for applications this year: May 15 and November 15. Steve has mailed applications to approximately 15 colleges and universities around Vermont. Rolfe and Kent will review applications and seek other qualified review as necessary. Rolfe and Kent hope to complete the review process and award checks within a few weeks of the deadlines.

The winners will be announced in the *Summer* and the *Winter GMG's*. Stephen suggested that more flexibility be given recipients of the Grants concerning when they present their results to the Society. He noted that most UVM graduate students will need two years from receipt of the award to finish their thesis and have significant results to present. Steve Howe disagreed and suggested that the one-year deadline be retained. No decision was reached.

Outside contributions to the VGS research fund will be solicited in the GMG. Steve Howe relayed Brad Jordan's suggestion that a check-off box for contributions be put on membership renewal forms.

Constitution and Bylaw Changes: Larry Gatto has made substantial revisions to the bylaws; mostly to improve their clarity and to bring them up to date. Steve Howe and Shelley Snyder will review these changes along with their own. Their proposed changes will be circulated among the members of the Executive Committee prior to publication of one revised version in the Summer GMG for membership review. Members will then have the opportunity to vote on the acceptance of the revisions during the Annual Meeting in the Fall.

Next Meeting: The Executive Committee will next meet for a short, informal gathering after the Crown Point field trip on Saturday, July 9.

Meeting adjourned at 2:45 PM.

Respectfully Submitted,

Stephen Wright, with minor additions by Stephen Howe

April 25, 1994

*Need to vent
some geo-
internal energy?
The VGS always
welcomes
member input
and assistance.*

SEMINARS, MEETINGS, and FIELD TRIPS

- **July 9, 1994:** Vermont Geological Society Summer Field Trip: *"Depositional Environments in the Mid-Ordovician Section at Crown Point, New York."* Lucy Harding will lead.
- **August 12-13, w/field trip August 14-19, 1994:** *New Perspectives in the Appalachian-Caledonian Orogen: A Symposium in Honour of Hank Williams*, Corner Brook, Newfoundland, Canada. For information contact: J. Hibbard, MEAS, Box 8208, NCSU, Raleigh, NC 27695. (919)515-7242, fax (919)515-7802. E-Mail: hibbard@meavax.nrrc.ncsu.edu.

At only \$15.00 per year the VGS offers one of the best bargains in Professional Association dues around. Do you know a "rock head" in your depositional environment who hasn't settled in? Let's get their mudcast today!

- **September 24, 1994:** Vermont Geological Society Fall Field Trip: *"Cretaceous Intrusions in the Rutland Area."* Greg and Nancy McHone will lead.
- **September 24-25, 1994:** *Geomorphology and Natural Hazards*, 25th Annual Binghamton Geomorphology Symposium, Binghamton, NY. For details, contact Marie Morisawa, Dept. of Geological Sciences and Environmental Studies, SUNY Binghamton, NY 13902-6000. (607)777-2837, fax (607)777-2288, E-Mail: maricem@bingvmb.cc.binghamton.edu.

- **October 3-5, 1994:** *Focus Conference on Eastern Regional Groundwater Issues* at the Radisson in Burlington, VT. For information call the National Ground Water Association at 1-(800) 551-7379.

- **October 7-9, 1994:** New York State Geological Association Annual Meeting. *"Geology of the Rochester Area, New York; Fairchild's Genesee Valley Geology Revisited."* For details, send a postcard with name and address to Dr. Carlton E. Brett, Department of Earth & Environmental Sciences, University of Rochester, Rochester, NY 14627.

- **October 16-18, 1994:** *Ninth Annual Conference on Hydrogeology and Engineering Geology of Karst Terranes*, Nashville, Tennessee. For information contact: James F. Quinlan, Box 110539, Nashville, TN 37222. (615)833-4324.
- **October 17-20, 1994:** *Ninth Annual Conference on Contaminated Soils*, Amherst, Massachusetts. For details contact Paul Kostecki, Environmental Health & Sciences, N344 Morrill, University of Massachusetts, Amherst, MA 01003. (413)545-2934, fax (413)545-4692.
- **October 24-27, 1994:** Annual Meeting, *Geological Society of America*, Washington State Convention & Trade Center, Seattle Sheraton Hotel, Seattle, WA. For details call the GSA Meetings Department at 1-800-472-1988.
- **March 20-22, 1995:** Northeastern Section Meeting, *Geological Society of America*, Radisson Hotel, Hartford, CT. For details call the GSA Meetings Department at 1-800-472-1988.

(Continued on page 13)

DRINKING WATER UPDATE

K.S. Koptiuch

RADON WARS: There has been a lot of talk lately concerning radon in drinking water. The EPA has recently completed a cost-benefit analyses of the federal program designed to meet *Safe Drinking Water Act (SDWA)* standards for Radon. Their findings:

- EPA estimates that approximately 19 million people are routinely exposed to radon in drinking water at levels above the proposed SDWA standards.
- Total annual costs of regulating radon in water - \$2.72 Million Annually.
- Meeting SDWA standards would prevent 84 cancer deaths per year - cost per life saved - \$3.2 Million.
- Average increase in single-family municipal water costs: \$242.00 Annually.

By comparison, full compliance with the EPA's voluntary indoor-air radon reduction program would:

- Prevent up to 2,200 cancer deaths per year - cost per life saved - \$700,000.00.

15 million people are routinely exposed to radon in indoor-air at levels above the voluntary standards. (Source: *U.S. Water News, June, 1994*)

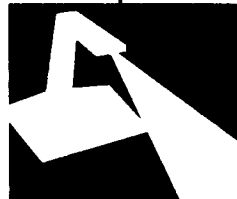
LEAD HEADS: The EPA's recent warning concerning submersible pumps containing brass or bronze components less than one year old has raised a major outcry among pump manufacturers and installers. The EPA issued their warning based solely on the limited results of two environmental groups, the Environmental Defense Fund, and the Natural Resources Defense Council. These groups are suing four prominent pump manufacturers with the claim that the brass and bronze components in their pumps leach lead into drinking water, during their first two years of operation, in excess of California State standards. The EPA has recommended that any well owners with pumps meeting this description have their water tested for lead content; in the interim, bottled drinking water should be employed. Pipes and pipe fittings, including pump components, may not contain more than 8% lead under a lead rule passed by Congress in 1986. Private wells are not, however, required to meet federal laws pertaining to lead components.

This is brash action on EPA's part compared to their normal "Let's study it for a few years and spend a few million tax dollars before we decide to do nothing (*author's opinion only*)." Particularly since the EPA has acknowledged that they do not

(Continued on page 14)

(Seminars, Meetings & Field Trips: Continued from page 12)

- **April 2-5, 1995:** *Fifth Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst*, Gatlinburg, TN. Abstracts deadline: September 2, 1994. Contact P.E. LaMoreaux & Associates, Inc., Box 4412, Oak Ridge, TN 37831-4412.



(Drinking Water Update: Continued from page 13)

"... have sufficient data to determine how long the high lead leaching would continue, or how much lead would appear at the water tap (*Water Well Journal, June 1994*)."

The NGWA has stepped in with and offered to assist the EPA in determining whether these claims are substantive or not. Let us hope that level heads and sound science will prevail.

Have you got an article or information that you'd like to see in the Green Mountain Geologist? We want to hear from you!

LOCAL LEAD: Closer to home we find the Champlain Water District (CWD) cautioning its customers to run their water approximately 20 seconds if they haven't used it for more than six hours. Although CWD water is not impacted by lead, the precaution was issued because the solder used in the pipeworks of many pre-1988 homes could contain lead. There is potential for leaching to occur when water sits in the pipes for prolonged periods.

HOW CLEAN WAS MY WATER? *June 13, 1994:* The EPA released proposed rules to protect public drinking water supplies from "disinfection by-products," with additional safeguards against disease-causing micro-organisms. As an initial step, the EPA has requested that potable water suppliers fund a joint, five-year research program on said disinfection by-products and micro-organisms at an estimated cost of \$50 million.

The use of chlorine, chloramine, chlorine dioxide, and ozone, the EPA purports, can create by-products that may cause liver and kidney damage, cancer, heart and neurological effects, and may affect unborn children. Full implementation of the proposed rules could cost billions of dollars annually if applied to all 80,000 public water supply systems in the country.

SALARY SURVEY: A recent survey, conducted by **Environmental Protection** magazine (April, 1994), listed average salaries for professionals in water management in the \$100,000.00 range for the Northeastern United States. GMG would like to know if this is a realistic figure. Was anyone in Vermont surveyed? Let us know.

EPA GRANTS totaling \$318,000 for 23 environmental education projects in the New England Region, conducted by schools, local governments, and not-for-profit corporations have recently been awarded. To receive announcements for the 1995 fiscal year grant program, contact:

US EPA Environmental Education Div.,
(a-107),
401 M Street, SW



**THE INVESTIGATION EXPRESSWAY -
A NEW ROAD FOR
HAZARDOUS WASTE SITE
INVESTIGATIONS**

L. Wedderspoon

The State of Vermont, Department of Environmental Conservation, Hazardous Materials Management Division (HMMD), Sites Management Section (SMS), has recently introduced a new method of performing site investigations at hazardous waste sites. This new method has been termed "**The Site Investigation Expressway**." The Expressway is intended to significantly reduce the time it takes to evaluate hazardous waste sites. Since the majority of Vermont's hazardous waste sites result from leaking underground storage tanks (LUSTs), the Expressway focuses on these petroleum sites.

"One advantage of using the Expressway model for the site owner and the SMS is that an investigation can begin almost immediately once the site is identified."

In the past, the SMS has required that all site investigation work be pre-approved by the SMS prior to its initiation. Although this pre-approval process is an important step in ensuring that site investigation work meets all the requirements of the SMS, it typically causes delays and adds to the overall site costs. The Expressway, on the other hand, does not require SMS pre-approval; this is anticipated to be a major time saver. To "*ride the Expressway*," the SMS does require that:

- The SMS is pre-notified that a site is "*taking the ride*," and
- All work scope activities must be completed in accordance with the SMS's "**Site Investigation Guidance**" document that was distributed in May, 1994.

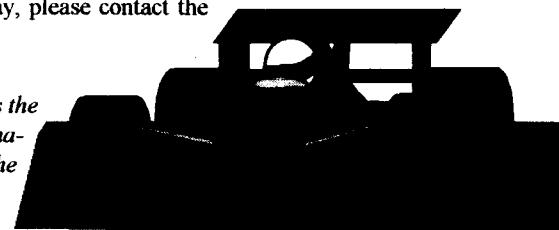
The SMS expects that the Expressway will reduce the time elapsed between the initial site referral to the completion of site investigation from 200 days to approximately 45 days. One advantage of using the Expressway model for the site owner and the SMS is that an investigation can begin almost immediately once the site is identified. A quick response to sites where a release has occurred or threatened sensitive receptors, where present, not only saves time and money, but will help to "*catch contamination*" before it has severely contaminated groundwater, surface water, and soils.

The Expressway process has the potential to assist in preserving and protecting some of Vermont's precious natural resources. This should be reason enough to utilize this streamlined, improved site investigation process.

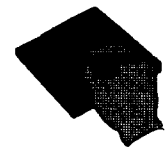
For a copy of the SMS's "**Site Investigation Guidance**," document, which includes more detailed information about the Expressway, please contact the HMMD at (802)241-3888.



Lynda Wedderspoon is the "Expressway" information coordinator for the SMS.



INVESTIGATOR'S



FIELDBOOK

FIELD & BENCH SCALE COMPARISON OF PHOTOIONIZATION DETECTORS

J.P. Hoffer, K.S. Koptiuch, & R.L. Parker

INTRODUCTION

Portable photoionization detectors (PIDs) are widely used in site contamination investigations to measure vapor concentrations of volatile organic compounds (VOCs). These measurements are conducted to comply with health and safety regulations requiring air monitoring of worker air space, as well as to determine the relative concentration of contaminants. PIDs provide real-time detection of the most frequently encountered VOCs at many hazardous waste sites.

The State of Vermont Sites Management Section (SMS) of the Hazardous Materials Management Division (HMMD) has developed guidelines for discriminating petroleum contaminated soil from soil that may be backfilled during underground storage tank (UST) closures. These guidelines are based on a PID response threshold of 20 parts per million (ppm) for gasoline, and 10 ppm for diesel, kerosene, and #2 fuel oil. While the Vermont guidelines recognize that instrument responses and sensitivities vary according to PID model and manufacturer, the type of PID to be used for field screening activities is not specified.

The authors will present the complete text, with results and graphical interpretation, of this study in a poster session at the 1994 NGWA Focus Conference on Eastern Regional Ground Water Issues, October 3-5 at the Radisson Hotel in Burlington.

This study was conducted to define whether or not a linear correlation between the response factor for PIDs of different manufacture can be identified. This information could then be applied interpretively when reviewing investigative results from different petroleum hydrocarbon hazardous waste sites.

METHODOLOGY

Two commonly used PIDs were chosen for this study: a Photovac MicroTip HL-2000 (10.6 eV) and a HNU PI-101 (10.2 eV). Each unit was calibrated with 100% isobutylene to respond to benzene in parts per million (ppm) of calibration gas equivalents (CGE).

Bench scale measurements of fresh diesel, kerosene, and gasoline samples were evaluated by closed-loop, head-space methodology to prevent product loss through volatilization. Each sample consisted of one (1)-ounce of pure product injected into a sealed and sanitized, eight (8)-ounce, glass sample jar containing three (3)-ounces of washed, #2 Whitehead sand. The Teflon-lined jar lids were modified with two (2) 1/4" diameter, threaded Teflon bulkhead fittings. Each fitting was controlled with a Teflon needle valve. A method blank, identical to

(Continued on page 17)

(PIDs: Continued from page 16)

the other samples in construction, was prepared; no product was injected in the blank. The samples were agitated by shaking for five (5)-seconds each prior to running through the test.

Each product sample was tested a total of five times with each PID; the instruments were allowed to return to zero, or to stabilize if zero could not be achieved, between each sampling event. The method blank was tested before and after each product series with each PID.

Field headspace determinations were made on samples collected from a gasoline contaminated soil stockpile under normal field screening conditions.

Results were tabulated and graphed using QuattroPro and Freelance Graphics. Linear correlations were defined through slope determination of lines of best fit.

RESULTS

Bench scale measurements of diesel, kerosene, and gasoline headspace samples ranged from 122 to 1800 ppm on the MicroTip, and from 78 to 450 ppm on the HNU. The data from all three (3) petroleum hydrocarbon products was tabulated together. A strong linear correlation exists for the data and can be expressed as:

$$\text{HNU} = (\text{MicroTip} \times 0.23) + 72$$

In addition, the data for gasoline was tabulated separately. The linear correlation for gasoline alone can be expressed as:

$$\text{HNU} = (\text{MicroTip} \times 0.18) + 120$$

Field headspace measurements from the gasoline contaminated soil stockpile ranged from 8.8 to 929 ppm on the MicroTip, and from 2.0 to 240 ppm on the HNU. Two distinct linear correlations were defined. For HNU readings below 200 ppm the linear correlation can be expressed as:

$$\text{HNU} = (\text{MicroTip} \times 0.35) + 8.8$$

For HNU readings below 20 ppm, the linear correlation is expressed as:

$$\text{HNU} = (\text{MicroTip} \times 0.40) - 0.22$$

CONCLUSIONS

The results of this study are not intended to be authoritative in nature. By conducting this experiment, the authors hope to make field investigators and regulatory personnel aware that, although response from instruments of different manufacture will vary, relative correlations can be defined and applied to compare these responses. The logi

(Continued on page 18)

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cal extension of this experiment is to conduct similar comparisons with additional PIDs of different manufacture, and to compare the results to those yielded through laboratory chemical analyses of the same test media.

Consultants have long been aware of the intrinsic differences between PIDs of various manufacture. This information could theoretically be applied advantageously to limit, or to maximize, the quantity of soils segregated for hazardous waste disposal during subsurface investigations. As a result, field screening of soils by PID invokes an inherent level of mistrust.

The method offered here could be employed to define qualitative values and performance curves for various PIDs. This information could then be incorporated into the standards set forth by the SMS in their guidance documents for site investigations and UST closures.

Jefferson P. Hoffer is a consulting hydrogeologist based in Waterbury, VT. He received a B.S. in geology from Dickenson College, and a M.S. in environmental pollution control from Penn. State. Mr. Hoffer has over seven years experience in hydrogeologic investigations and groundwater supply development. He is a Certified Professional Geologist (AIPG).

Kent S. Koptiuch is President and Principal Geologist of KENT S. KOPTIUCH, Inc. Geo-Environmental Services (KSKGeoS) in Essex Jct., VT. He received a B.A. in geology, and a B.A. in geography from the University of Vermont. He has over ten years experience in hydrogeologic and environmental consulting with an emphasis in hazardous waste remedial design and implementation. Mr. Koptiuch is a Certified Ground Water Professional (AGWSE), and a Certified Environmental Inspector (EAA).

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