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We will convene on Thursday, March 11 at 5:30 PM, at the Glen Loch Restaurant, 4626 North Street, Jamesville, NY (315-469-6969). Dinner starts at 6:15 PM. It will be a another full evening's program that you won't want to miss! We look forward to seeing you then!

Practical Considerations for Well Design, Installation, and Development

Mr. William Morrow, PG/CWD, of Parratt-Wolff, Inc. (East Syracuse, NY and Hillsborough, NC) will be our first presenter for the March CNYAPG meeting. As more and more site investigations have evolved into remedial design, small diameter monitoring wells are being replaced with remediation wells. These wells are typically larger in diameter, more costly to install and need to be located at precise locations and depths; thus, they are also expected to perform to a pre-determined efficiency, or to yield a specific capture zone or zone of influence. These wells may be used to extract water or they may be used to inject air or water into the subsurface. All in all, these wells have a very different function than the typical monitoring well.

However, given their difference in function, why is it that remedial wells are so often installed as if they were simply big monitoring wells.

Many of you have had (or will have) the opportunity to model an aquifer and, based on the aquifer characteristics, design remediation wells. Did the well yield match your expectations? Did the size of the zone of influence mimic your calculations? What about well spacing? Did the well(s) provide hydraulic capture on your site? During 29 years of experience, Parratt-Wolff has repeatedly seen successful remedial designs sabotaged by poor well design, installation, and development.

Mr. Morrow will use his 14 years of drilling and consulting experience to present simple, practical tips on designing, installing, and developing remediation wells, gleaned from successful projects, as well as a few we'd rather forget! With a focus on both rock and overburden wells, along with screened and unscreened completions, and using personal case studies, referenced literature, and an occasional opinion, Mr. Morrow promises an entertaining program, concluding with a roundtable discussion of your personal observations. Please join us and come ready to share your anecdotes!

Screening with Columbia Analytical's P450 RGS Biomarker

Dr. Jack Anderson, of Columbia Analytical Services, Inc. (Rochester, NY) will discuss development and application of Columbia's proprietary screening technique for dioxins, furans, coplaner PCBs and PAHs using the human liver cancer cell line (101L), developed by researchers at the University of California, San Diego. Because the human CYP1A1 gene is fused with the luciferase gene of a firefly, a toxic compound initiates the production of the luminescent enzyme, luciferase. Luciferase production provides an easy mechanism to measure the amount of CYP1A1 induction, an indication of the amount of carcinogen present in the extract of a sample. Environmental samples are extracted following standard SW-846 protocols using methylene chloride. Relative light units measured by a luminometer are compared to standard curves for known concentrations of either benzo(a)pyrene (B[a]P) or a standard mixture of dioxins/furans, and the data are reported as benzo(a)pyrene and/or dioxin (TEQ) equivalents.

Correlation coefficients (r squared values) for the relationship between mg/kg of B[a]P equivalents and high molecular weight PAHs have been between 0.7 and 0.9. The relationship between TEQs measured by USEPA 8290 and the RGS assay has also been very strong (r squared = 0.78-0.99).

The P450 RGS Biomarker has been accepted as SM 8070 and ASTM E 1853-1996 and is pending approval with the USEPA (draft SW Method 4425). Various state agencies, as well as the U.S. Air Force, USEPA, Army Corps of Engineers, and NOAA have approved the P450 RGS as a screening tool for specific projects. Learn more and ask questions about it at the March meeting!



PRESIDENT'S PAGE

After last month's topic of becoming involved professionally as a volunteer and mentor, I accepted two additional volunteer activities, including a new appointment as Director to the NYSCPG and as a technical advisor for a high school student developing a long term research project in phytoremediation. Although these opportunities are welcomed and rewarding, I cannot forget the issue of maintaining balance in life among career, professional growth, family, and personal time to just smell the herbs and dig through rock beds.

We are constantly faced with choices. Many professionals I know, including myself, have difficulty saying No to new professional opportunities, regardless of the time commitment. Knowing one's limits is an admirable trait worthy of respect. It can be disconcerting for all concerned when someone commits to be involved and then never makes the time. It seemed that the subject of time commitments and balance were issues for several professionals I spoke with this month. Particularly when it came to the subject of my call: volunteering for nomination to next seasons CNYAPG's Board of Directors.

CNYAPG is asking all members with some time and interest in maintaining and advancing the CNYAPG organization to consider a nomination as Director for the 1999/2000 season. What do Directors do? The CNYAPG By-Laws, Article 2, Section 9, indicates that a Director serve a two year elected term and shall function in a judicial and advisory capacity to the Officers. They shall perform all such other duties as are properly required of them by the Executive Board. What the responsibilities actually include, in reality, vary based on the individual. It can include ensuring the projector is functioning for the speaker each month, assisting with dinner collections at the door, helping coordinate special events like seminars and

field trips, and simply providing voting and idea support to the Officers. The point being, the position can be what You want to make it. Your volunteer contribution is welcomed and appreciated by all members of CNYAPG.

Just a few words on what CNYAPG involvement has meant and done for me professionally and personally. I have the opportunity to meet geologist working in a variety of professional arenas, providing me with a refreshing perspective, as my career has been focused in environmental consulting. Additionally, I have the opportunity to talk with other geologist working in consulting to gain a broadened perspective of the color of the grass on the other side of the fence (Note: it appears to all be varied shades of green). Often we tend to limit our associations to fellow geologists in our own work environment. I've been given the opportunity to present myself in a unbiased position, as a Director and Officer of CNYAPG, as opposed to my professional career title and firm name, which I've noticed has allowed for a "freer" exchange of ideas and conversations regarding geology in general. I discovered that most geologists share a similar passion for the science that goes beyond their job title. It has been this experience that has connected me back to the basic excitement of being a geologist.

Organizations like CNYAPG work to provide a venue for personal and professional exchange of ideas and foster the spirit of the geologic sciences. We hope to maintain a varied group on the board, representing geologists involved in career and research paths in the private and academic sectors.

CNYAPG is now ACCEPTING NOMINATIONS for DIRECTORS. Feel free to contact me and other members of the CNYAPG Board to discuss your potential role. I take it as a good sign that existing Directors are willing to step up their commitment and become Officers in the coming season.

Looking forward to seeing you at the next meeting

Vita DeMarchi, P.G.

E-Mail/FAX News from the Membership

Adjunct Instructors: Physical Sciences, Onondaga Community College. The Physical Sciences Department invites applications to increase the pool of adjunct professors for possible openings beginning August 1999. Teaching assignments include lecture and laboratory instruction in meteorology and/or astronomy. Geologists are encouraged to apply.

Minimum Requirements: Bachelors required, Masters preferred, in Earth Science or closely related field. Teaching experience or relevant work experience required. Must be available for day or evening assignments. **Salary:** \$833 per semester credit hour. **Application Deadline:** Review begins March 8, 1999 and continues until assignments are made. Send current resume; cover letter of application; names, addresses, and phone numbers of 3 references to: Office of Human Resources, Room 114 Service and Maintenance Building, Onondaga Community College, 4941 Onondaga Road, Syracuse, NY 13215-2099 (Attention: Physical Sciences Search).

For other job postings and opportunities, take a look at the Web site for the Association of Women Geoscientists News: <http://www.awg.org>. They have several very intriguing postings listed.

GEOLOGIC NEWS

In the Know...

with Jon S. Fox

To Report or Not Report?

The New York State Department of Environmental Conservation (NYSDEC) filed a complaint in May 1998 against an environmental consulting firm and one of its officers (Respondents) for allegedly failing to report petroleum contamination to NYSDEC within the 2-hour reporting limit required by 6 NYCRR Section 613.8. The incident in question involves installation of soil borings by a different consultant around a 3,000-gallon underground storage tank formerly located in Deer Park, New York. NYSDEC Region 1 staff are seeking imposition of a \$25,000.00 civil penalty against Respondents, jointly and severally, for violation of the reporting requirement. Respondents filed a motion requesting dismissal of the complaint essentially based on the defense that "any person" as defined in 6 NYCRR Section 613.8 is restricted to facility owners and operators, and that Respondents were not owners or operators of the facility. An administrative law judge (ALJ) agreed with the Respondent's position and dismissed the complaint in October 1998. NYSDEC staff appealed the ruling of the ALJ to the NYSDEC Commissioner. The Commissioner, citing a broad interpretation of the definition of "any person" listed in 6 NYCRR Section 613.8, rejected the ALJ's ruling and referred the matter for further action in a ruling on appeal dated December 31, 1998. The Commissioner also indicated that possible protections to Respondents which may be granted to professional engineers (Code of Ethics) and/or attorneys (attorney-client privilege) do not apply in this action. Additional information regarding this enforcement action is available over the Internet at <http://www.dec.state.ny.us/website/ohms/decis/middlecr.htm>.

Burgess Shale Revisited

A recent review by Peter Bowler (*American Scientist*, Vol. 86, No. 5, pp. 472-475) highlights a new book by Simon Conway Morris entitled "The Crucible of Creation: The Burgess Shale and the Rise of Animals" (1998, Oxford University Press). Conway brings to light the interesting interpretative conflict regarding the seemingly bizarre fauna contained in this classic Cambrian fossil location in the Canadian Rockies.

The Burgess Shale fauna was first described by Charles Doolittle Walcott, who grouped the apparently large variety of fauna into a few phyla, mostly arthropods. More recently, paleontologist Stephen Jay Gould proposed a markedly different interpretation highlighting and embracing the morphological variety observed in the formation. Gould suggested that Walcott's narrow grouping of the Cambrian Burgess Shale fauna was due to the prevailing view that faunal diversity should expand through time and so, paid too little attention to the apparent morphological diversity expressed in the fossils. Morris, citing other interpretations of the Burgess Shale fauna and recent discoveries from similar deposits in Greenland and China, apparently demonstrates that the diversity of forms in the Burgess Shale fauna is not as extensive as proposed by Gould. The central theme of Morris' book appears to be conflict between current schools of paleontological thought on the importance (or unimportance) of evolutionary convergence and, ultimately, the uniqueness (or commonality) of evolutionary processes on this planet.

Martian Geology Crude Oil?

A recent manuscript published in *American Scientist* (Vol. 87, No. 1, pp. 36-45) provides interesting results regarding geological evaluation of photographic and chemical data derived from the recent Mars Pathfinder mission. The landing site for Pathfinder was placed near the confluence of two large valleys which display erosional landforms very similar to landforms on Earth created by water (fluvial) action, in the hope that different rocks of various textures and compositions would be present due to erosion of the surrounding terrain by the apparently huge floods which modified the area. Currently, Martian stratigraphy is divided into three geologic periods (Noachian, Hesperian, and Amazonian), which are defined by concentrations of craters. Many astrogeologists believe the concentration of craters is correlatable with absolute age, with the oldest period (Noachian) having the highest concentration of craters per square area. Unfortunately, the resolution of photographs generated from the mission is insufficient to allow identification of individual mineral grains, making textural interpretations (and, therefore, classifications) difficult and ambiguous.

However, the resolution of the photographic data is sufficient to allow identification of pits in many of the rocks, suggesting possible volcanic origin (possible vesicles). Additionally, flute-like structures have been observed in many rocks with

the same directional orientation, suggesting erosive modification of the rocks by wind-blown particles. Linear features have been observed on some rocks which may represent bedding (sedimentary rock), banding (metamorphic rock), or fracturing (any rock!).

Previous data suggested that surficial Martian mineralogy is dominated by iron oxides. In addition to providing visible and ultraviolet light imaging data, the Pathfinder imager was also used to collect spectral data from sunlight reflected off rocks in an attempt to identify certain minerals. Curiously, the spectral data was unable to confirm the presence of pyroxenes, thought by many astrogeologists as probably being prevalent in Martian rocks. The authors suggest the absence of a pyroxene absorption band within the wavelength range determinable by the Pathfinder imager may be due to: 1) the rocks are glass-like; 2) opaque minerals are obstructing the pyroxene absorption band; and/or 3) the location of the absorption band has been shifted outside the range detectable by the Pathfinder imager due to an unusually-high iron and/or calcium concentration of Martian pyroxene. Curiously, a fourth possibility (namely, that pyroxene is not present in the rocks) was not mentioned. Spectral examination of dust which coats many rocks suggests the presence of the ferric iron oxides maghemite ($\gamma\text{-Fe}_2\text{O}_3$) and ferrihydrite ($5\text{Fe}_2\text{O}_3 \cdot 9\text{H}_2\text{O}$).

Chemical analyses of rocks encountered at the site suggest the mineralogical composition of rocks least affected by dust is comparable to andesite. This surprised many astrogeologists, who expected a basaltic composition based on that of suspected Martian meteorites identified on Earth. Additionally, all of the rocks analyzed at the site had nearly identical chemical composition, suggesting they are all of similar lithology. It should be noted, however, that only larger rocks at the landing site were analyzed due to difficulties in positioning the x-ray analytical device. All of the six Martian soil samples were rich in iron oxides and sulfur.

Confirmation of the P450 Reporter Gene System Results by the Atlanta, GA USEPA

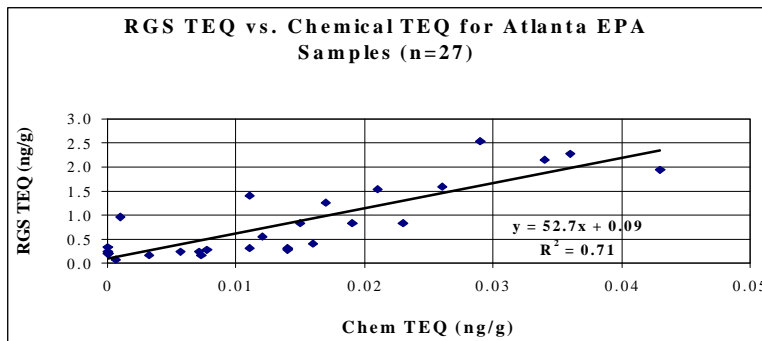
Dioxins, furans, coplanar PCBs, and some high molecular weight PAHs are known to bind to the Ah receptor (AhR) and subsequently mediate induction of the CYP1A gene, resulting in the production of cytochrome P4501A. This biochemical event is widely used as an indicator of exposure to potentially harmful contaminants. Using a transgenic human cell line (101L), the P450 Reporter Gene System (RGS) can detect the presence of CYP1A1-inducing compounds in solvent extracts of environmental samples, such as sediment, soil, and tissue. When contaminants are present, luciferase is produced by these cells, from a stably integrated plasmid containing the firefly luciferase gene linked to human CYP1A1 promoter sequences

Samples were submitted to the Kelso, WA laboratory of Columbia Analytical Services (CAS) for extraction, and these extracts were then tested at the Vista, CA lab of CAS. After completion of testing with the RGS assay (Standard Method 8070, and ASTM Standard Guide E1853), the data were submitted to EPA. The EPA office then provided the data to CAS from the High Resolution MS analyses (Method 8290) of the same samples. The figure below illustrates the comparison between the two methods that vary in cost by approximately an order of magnitude (RGS -\$150). In this investigation, as well as several other confirmation tests, the correlation coefficient was quite good, and the samples were ranked from low to high in agreement with the more expensive and time consuming HRMS method.

Testing with the RGS assay has been conducted on over 500 sediment samples from the three coasts for NOAA, and dioxin investigations have been conducted for EPA, the Corps of Engineers, the Air Force, and their contractors. For more information, including several recent publications and published methods, contact Dr. Jack W. Anderson (E-mail: jaanderson@kelso.caslab.com).

Cool News from the Chicago Tribune

The American Geophysical Union (AGU) issued a policy statement that despite uncertainties, evidence indicates that the release of human-produced chemicals will change climates. The AGU joins the American Meteorological Society, which issued a similar policy in 1990. The policy statement did not include recommended actions but rather recommended the



development and consideration of ways to reduce emissions; the government would set specific actions in the future. Such actions are pending in the Clinton administration including the Kyoto protocol -- an international agreement specifying reductions in carbon emissions. Conversely, critics argue that the uncertainties in the evidence do not link the release of human-produced chemicals to changing climates, and the climatic changes observed are within normal variability. More information can be found on AGU's web page www.agu.org.

New Mexico- Mars Connection

Scientists from the NASA Ames Research Center and the University of New Mexico are studying microbes living in Spider Cave, New Mexico. Despite no sunlight, little water, and few nutrients, microbes live using the iron, manganese, and sulfur in the cave rocks. By studying these microbes as well as similar microbes in other harsh environments (e.g., polar ice, ocean bottoms, mountain tops), scientists can develop theories of life on Mars. The field portion of this study is not for the claustrophobic couch potato. To get to the cave, scientists must hike down into a canyon, descend into the cave in a tight "belly crawl" passage, then hike another 4 miles through a maze of passages. Then do it again in reverse. Fortunately, trails are marked in the cave system. And all in the name of science! Information on caving in New Mexico can be found at www.nps.gov/cave (*Chicago Tribune*).

Arsenic Poisoning

Naturally occurring arsenic is contaminating water supplies in Bangladesh. Prior to the 1970s, Bangladesh villages relied on surface waters for their drinking water, which became contaminated by fertilizers and sewage. As a result, starting in the 1970s, UNICEF and other United Nations agencies installed drinking water wells in Bangladesh villages. Subsequently, villagers installed more wells resulting in a total of approximately 4 million

wells and starting using the well water, not only for drinking purposes, but also for irrigation. The increase in irrigation wells, the additional population as well as dry seasons caused the water table to drop, exposing naturally occurring arsenic from Himalayan rock-derived sediments to oxygen resulting

in the formation of water-soluble forms of arsenic. When the water table rose as a result of the monsoon seasons, the water-soluble forms of arsenic were drawn from the wells.

A Belgian study has found arsenic not only in the water supply but also in leaves, stems, roots, and cattle feed and possibly in the entire food chain. Another survey conducted by the World Bank evaluated 10 percent of the 4 million Bangladesh wells; approximately 40 percent were contaminated with arsenic. A World Bank representative estimates that 18 to 24 million Bangladesh villagers have been exposed to the arsenic and possibly another 6 million Indians in the same valley. Approximately 45 million dollars from the World Bank, the Bangladesh government, and the Swiss government will be used to continue testing for arsenic. Obviously, more money will be required to find alternative water supplies and/or to treat the existing well waters to remove the arsenic (*Chicago Tribune*).

Do you have any ideas for a CNYAPG sponsored Spring Field Trip or Seminar? Let us know at www.dreamscape.com/cnyapg.

Keep the newsletter input coming. Send ideas, articles of interest, requests, and questions for the newsletter to Vita DeMarchi at vdemarchi@secor.com.

* CONTRIBUTIONS TO THIS MONTH'S CNYAPG NEWSLETTER WERE MADE BY:

Vita DeMarchi Jon. S. Fox
Gerry Gould Meg Harris
Nancy Gensky Georgia Popoff

Friday, March 5, 1999

Professional Seminar: A Review of Geology for the Practicing Geologist and the Pennsylvania Professional Geologist Examination. Presented by Pennsylvania Council of Professional Geologists (PCPG) to serve the professional interests of geologists. Contact: PA PCPG, PG Review Course, 717 North Second Street, Suite 300; Harrisburg, PA 17102-3211; (717) 238-1222.

Thursday, March 11, 1999

CNYAPG Meeting: We have a full agenda, featuring two technical talks in one evening. Mr. Bill Morrow, with Parratt-Wolff Inc., will discuss, "Practical Considerations for Well Design, Installation, and Development". Dr. Jack Anderson, with Columbia Analytical Services, Inc., will be presenting the development and application of a new screening technique for dioxin, furans, PCBs, and PAHs. The evening will start earlier than usual to fit in a full agenda (see below).

Saturday & Sunday, March 20 - 21, 1999

Buffalo Geologic Society's 31st Annual GEM - MINERAL - FOSSIL SHOW at the Erie County Fairgrounds in Hamburg, NY.

Monday - Wednesday, March 22 - 24, 1999

Northeastern Section GSA Meeting, in Providence, Rhode Island. Contact O. Don Hermes, Department of Geology, University of Rhode Island; (410) 847-2192; e-mail: dhermes@uriacc.uri.edu. Call by February 12th for the pre-registration fee.

Tuesday, March 23, 1999

New York State Wetland Forum, Inc., 1999 Meeting; "Balancing Wetland Interests - Science, Policy, & Economics". In addition to a host of speakers discussing hydric soils, economic development, and regulatory information, this meeting includes exhibitors, poster sessions, and three local field trips. Kevin Bernstein, February's CNYAPG dinner speaker will talk about Recent Wetland Cases. The Hotel at Exit 37, 411 Electronics Parkway, Liverpool NY. For more info: (518) 783-1322.

Thursday, April 8, 1999

Back by popular demand...**An Update on Onondaga Lake Issues for CNYAPG.** Note: This evening will be hosted at the Marriott at Carrier Circle. Mr. Tim Mulvey with the Onondaga Lake Clean-Up Corp. will discuss the legal, political, and scientific aspects of lake remediation. Dr. John Ferrante, aquatic ecologist with the Atlantic States Legal Foundation, will brief us on the technical issues surrounding lake Superfund sites.

Thursday & Friday, April 15 & 16, 1999

Unified Watershed Assessment: *Where Do We Go From Here?* The American Water Resource Association Mid-Atlantic Conference to be held in Matamoras, PA. Unified watershed assessments, restoration priorities, and strategies are cornerstones to the Clean Water Action Plan. Join a multi-disciplinary group to reflect on key questions. For info, contact: Glenn Maurer at (717) 787-2666, or e-mail him at maurer.glenn@a1.dep.state.pa.us.

Thursday, April 29, 1999

ASCE & BAPG will cosponsor a seminar "**RBCA - Now or Never**" at the Chester F. Carlson Center for Imaging Science (Bldg. 76) at R.I.T. Registration at 5:45 PM, program from 6:15 - 9:30 PM. Speakers will address Site Characterization/Risk Assessment, Cleanup Requirements, Remediation Monitoring, and Qualification Requirements for RBCA Analysts. Contact Paul Micciche at (716) 381-2210, ext. 715, for further information.

Thursday, May 13, 1999

March CNYAPG Meeting: Return to the rustic setting at the Glen Loch. Pre-dinner hour features cash bar. Dinner will start by **6:15 PM**. Our guest speakers begin at **7:15 PM**. The cost is \$15 when reserved at least 24 hours in advance and \$17 that evening. Students with IDs enter for \$10. *Help us plan; reserve early* Contact Buck Gabriel at (315) 437-6100, ext. 2656.

Urban Geology Walking Tour with Mr. Bob Preyer of the MOST. Tour downtown Syracuse, reflecting on the geologic origins of local building materials and stone work. The tour will conclude with dinner and end-of-year party at a downtown pub location.

The Board Members would like to thank all of the corporate and individual supporters of CNYAPG throughout the past year. We would like to encourage you to continue your pledge of support throughout the upcoming year. Contact Steve Crook at (315) 437-1429 or (518) 827-5720 details.

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CNYAPG

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CNYAPG MISSION STATEMENT

The CNYAPG was founded in 1993 to strengthen and advance the geologic sciences as a profession and to provide an open forum for the exchange of ideas; to promote the protection of public welfare through the professional practice of geologic sciences; to inspire and maintain the highest standards of professional conduct, business ethics, and personal honor of the membership; to foster the spirit of scientific research throughout the membership; to publish and otherwise disseminate information related to the geologic sciences and associated technologies; to maintain and encourage intra- and inter-association activities, to enhance the association's programs, and to encourage the affiliation of individual members with other scientific and technical organizations.

