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H-R ENDS THE 20TH CENTURY WITH ITS BEST YEAR EVER & HAS HIGH EXPECTATIONS FOR THE 21ST

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Message from the President

Don't even talk to me about the next millennium. I have enough trouble dealing with <u>any</u> new year. H-R turns sweet sixteen in 2000 — a pleasant thought.

It is satisfying, however, to end the 20th Century with our best year ever — and I mean "best year" in more than one way. First, and important to those hard-nosed business people, 1999 has been the best year for net revenues for H-R since our inception. Second, and equally important to the scientific-nosed, 1999 has been a stellar year for complex and challenging projects, requiring H-R to stretch into innovative geophysical solutions to help our clients. Third, and important for those who use their noses for smelling roses from time-to-time, 1999 has brought H-R its best total staff ever. H-R has always been fortunate to have excellent staff members, but in 1999, we have just a magical blend of exceptionally bright and happily compatible personalities that click. They produce phenomenal work and make coming into the office a pleasure every day. Yes, it's been a very good year.

Of course, the economy is bound to change, and that will affect business for everyone. But H-R has high expectations for the 21st Century. With our outstanding staff and clients like you who turn to us with questions about subsurface conditions, H-R is prepared to continue to grow scientifically, technically, and business-wise — all of which will help us to serve you and <u>your</u> clients better.

Cordially,

Dorothy Richter
President

H-R Service Areas

Remember our core service areas:

- Surface & Borehole Geophysics — Ground Penetrating Radar (GPR), Seismic Refraction & Reflection, Crosshole Seismic, Electromagnetic Induction (EM), Resistivity, Magnetics, VLF, Geophysical Borehole Logging, Borehole Video Logging.
- Geotechnical Support Services — Subsurface Investigations, Blast/vibration Monitoring, Rock Mechanics.
- Subsurface Utility Engineering Services (SUE) — Research, Designation, Mapping, Verification
- Non-Destructive Testing Services (NDT) — Piles and Foundations, Crosshole Sonic Logging, Rebar Detection.
- Dimension Stone Testing & Evaluation Services — ASTM Testing, Failure Analysis, Quarry Evaluations.
- Litigation Support Services — Document Review, Consulting, Expert Testimony.

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Been There, Done That, Glad to do More

It may simply be that having been a leading geophysical service firm for sixteen years has meant that H-R has performed geophysical surveys on a lot of sites in the region. But we were still puzzled this year that so many projects brought us back to sites where we had worked years ago — for the same clients in some instances, for different clients in other cases, and for a few clients who had not even known that we had worked at the site previously. The sites ranged from landfills to commercial properties to industrial sites to undeveloped land. There must be a good reason we are asked to do additional work at so many sites. Why don't you find out? ***Call us!***

Tips for Specifying a "Simple" Seismic Refraction Survey to Determine the Depth of Bedrock

We receive many inquiries from clients who need to learn the depth of bedrock at a site. There are several methods that can be used, but the most reliable method by far is seismic refraction. The seismic refraction method uses sound waves to determine the depth of bedrock by measuring the time they take to travel through the earth to a series of receivers (geophones) laid out in straight line segments. H-R uses a sophisticated 48-channel seismograph system, so our straight line segments are generally 470' or 940' long, depending on whether the spacing between geophones is 10' or 20'. To generate the sound waves, we generally use an accelerated weight drop towed behind an ATV. H-R almost never uses blasting. H-R processes the seismic refraction data to determine the depth of bedrock under each geophone (i.e., every 10' or 20' at most sites). It's important to remember that the depths determined by seismic refraction are accurate to about 10% or 2 feet, whichever is greater. We will ask you several questions when you call for a seismic refraction survey, such as —

- What is the expected depth of bedrock? Are there borings in the area of interest that intersect bedrock? Are there outcrops in the area? What is the type of bedrock? Do you expect a thick zone of weathered bedrock?
- What overlies the bedrock (i.e., what is the overburden)?
- What is the depth of the water table?
- What is the surface like? Is it paved or unpaved? If it's wooded, who will clear the lines?
- What is surface topography like? The accuracy of the seismic refraction method degrades in areas of steep surface topography. How will you provide us with surface elevations along the seismic lines?
- How will you arrange for access?
- Did you include traffic control in your cost planning if some of the survey is located along roadways?
- If it's winter, how thick is frozen ground at the site, and how deep is the snow cover?

The more you can tell us about a site before a survey is performed, the greater the chances for success. Let H-R help you look good to your clients by helping you to plan and execute a sensible "simple" geophysical program. ***Call us!***

More on H-R & Miss Liberty

In our spring newsletter, we reported that H-R had been awarded a contract by the National Park Service to perform multiple geophysical surveys across Liberty Island National Monument to search for areas possibly containing archeological artifacts. H-R conducted magnetic, EM, and GPR surveys across two-thirds of the island. Many of us got out there at some point during the field effort in April and May, and everyone who did felt a thrill at being a part of such an important site in the national landscape. No surprise — the data are complex. We've been told that the geophysical results will be used by the Park Service for planning archeological digs for years to come.

Getting the GISt of It

We had seen it coming for a long time, and H-R is now integrating our geophysical results into GIS formats. H-R's Mary Ann Glennon and Jeff Sullivan plunged headfirst into the world of ArcView® this year and have produced stunning new presentations that have been important as we have been involved in some large projects. For one project, H-R plotted all sorts of geophysical results on huge aerial photos. Why use a dry base plan when a photo base speaks a thousand words? Can we help you get the GISt of it, too? ***Call us!***

Our Mission

To fulfill our clients' needs in geoscience, using experienced professionals who enjoy their work and are totally committed to quality and professional development.

WBE Certifications

H-R is certified as a WBE or DBE by agencies in thirteen states — all six New England States, New York, New Jersey, Ohio, Indiana, Illinois, Minnesota (although Minnesota recently notified us that their DBE program has been placed on hold), and Texas. We added New Jersey Transit to the list of certifying agencies in 1999. ***Call us!***

Please Greet . . .

Jeffrey Sullivan, Geophysicist, joined H-R in the spring. Jeff completed his MS in Geophysics at Brown University and holds a BS in Hydrology from the University of New Hampshire. Jeff has been very adept at the GIS work that H-R has undertaken this year. Jeff is also

an accomplished videographer/photographer, so, as you might guess, he documents his field work very well. He was surprised to find himself back at Brown so soon doing a GPR survey in a railroad tunnel 45 feet under the campus, and he's made several trips to a nuclear power plant undergoing decommissioning.

Benoît Thierry, Geophysical Intern, arrived in Salem from the world-famous Institut de Physique du Globe de Paris one day, and two days later flew off for five weeks of field work in the midwest. Benoît holds masters degrees in Physics and Geophysics from Rennes University and is finishing a post-grad program in Applied Geophysics at IPGP. Benoît spent six months with H-R, especially enjoying travel to project sites. He returned to Paris in November to defend his degree, and we expect him to return (with wine) during the winter.

Other Staff Highlights

Since 1999 has been such a remarkable year for large and otherwise interesting projects, there are several in which practically everyone participated — the Statue of Liberty, a massive project in the midwest that included miles of seismic refraction and resistivity imaging surveys, work at former MGP sites in the northeast, EM surveys at large former industrial sites, etc. They're on everyone's highlight list. Pound for pound, the report for the midwest project probably set a H-R record.

Jeff Reid, P.G., Operations Manager, managed to manage more field crews in more states than he's had to in the past. Not surprising, he also managed himself out on many of the more interesting sites from Florida to the Midwest and all over the Northeast. Jeff loves new technology and test drives each new piece of equipment and software we acquire or lease. H-R's new Chevy Tahoe field vehicle, with its HR-JR plates, is named after Jeff.

Lyn Mercer, Office Administrator, copes with the demands of a far-flung staff and urgent calls from clients with her usual aplomb. Besides administering all the office functions, Lyn has helped out at some of H-R's exhibits, enjoying the opportunity to meet a few of the people she's spoken to on the phone for years. So far, she's not had to go into the field, 'tho it's been a close call a few times.

Bill Desmarais, CAD Operator/Draftsman, keeps producing clear plots even when everything seems chaotic around him. Bill loves H-R's new color laser printer and large format color plotter now at his disposal. He enjoyed his time in the midwest with the rest of the H-R crew, and was grateful that his field work was at a more pleasant time of year than last year when he braved winter winds for a survey on a frozen lake.

Carl Gruszczak, Geophysicist/Survey Specialist, remains dedicated to the massive Central Artery/Third Harbor Tunnel Project in Boston. He faced challenges neither we nor he anticipated, and has done so well at overcoming them that he is busier than ever in helping the Project's survey managers cope with tons of data. He brightens H-R's picnics and parties with his smile and tales of his adventures on the Big Dig.

Jim Coffman, Geophysicist, is a man on the go. Jim has probably covered more ground for H-R this year than anyone, driving back and forth from the midwest and being the field team leader out there for six weeks. He especially likes trips that take him through his home state of Pennsylvania. Jim flew off to other sites in Florida and the midwest, and is H-R's lead person in resistivity imaging field efforts.

Steve Grant, Geologist/Geophysicist, spearheads H-R's seismic refraction and crosshole projects, and has traveled almost as much as Jim this year. Steve nearly wore a hole in his boots from all the walking he did at certain large industrial sites, but he's been genuinely satisfied when the results revealed amazing detail about subsurface features.

Mary Ann Glennon, Geophysicist, has quickly become H-R's main GIS expert. That's in addition to processing copious quantities of geophysical field data and writing computer programs, proposals and reports. Mary Ann whips complicated geophysical results into plots that in turn highlight subsurface relationships not obvious beforehand, winning rave reviews from H-R's clients.

Garrick Marcoux, Geologist/Geophysicist (and proud new dad of Isaac, born on the 4th of July!) was sent off to the Statue of Liberty for his first field project with H-R. Now, that's a pretty hard act to follow, but Garrick swears he has had fun at other almost equally glamorous landfills and industrial/commercial sites since. He spent a portion of the fall dodging arrows and cows in the Catskills while conducting a VLF survey to help a small town find a possible new source of water. Garrick is also H-R's current webmaster.

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