

AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS

Northeast Section **NEWSLETTER** *Spring 2020*

As published on 04/22/2020

Greetings In These Challenging Times!

We hope this finds you and yours safe and well!

As you continue to practice social distancing, it will not surprise you that plans for the NE/AIPG Spring Meeting are being reconsidered.

E-mail updates will follow.



www.ne-aipg.org



EXCELLENCE ON EVERY LEVEL™

CASCADe provides a full range of environmental and geotechnical drilling, site investigation and characterization, and environmental remediation technologies. Our vision is to integrate technology, safety, sustainability and human potential to tackle the challenging environmental and geotechnical issues facing our clients.

YOUR PARTNER FROM CONCEPT TO CLEAN UP

DRILLING

environmental, geotechnical, utility
clearance, IDW, sonic, auger, rotary, direct
push

SITE CHARACTERIZATION

high resolution site characterization,
sampling, data visualization, MHPT, UVOST,
CORE[®], WATERLOG[™], OIP[™]

REMEDIATION

in situ, ex situ, collaborative design,
thermal, chemical, biological,
emplacement

CONTACT

ADT

Environmental &
Geotechnical Drilling

Bill Poupis

516-616-6026 EXT 105
wpoupis@aquiferdrilling.com

CASCADe

Strategic Account Manager

Jay Boland

M: 413-329-7525
jboland@cascade-env.com

VISIT US TODAY AT WWW.CASCADE-ENV.COM TO LEARN MORE

With Cascade offices across the United States, subsidiaries and international partners, we deliver reliable services **nationwide.**

DRILEX

ENVIRONMENTAL



Drilex Environmental is one of New England's premier drilling companies

Drilex Environmental was established in 1995 and is one of New England's fastest growing, premier, full service Drilling and Environmental Construction companies. We are a quality drilling company, able to meet the ever changing needs of our clients.

www.drilexenv.com



**Hartwell Business Park • 127 Hartwell Street • West Bovlston. MA
508-835-6724 • Fax: 508-835-6734**

AIPG NORTHEAST SECTION NEWSLETTER

SPRING 2020 EDITION No. 160

PUBLISHED BY THE NORTHEAST SECTION OF THE AMERICAN
INSTITUTE OF PROFESSIONAL GEOLOGISTS

TABLE OF CONTENTS:

2020 NE/AIPG Executive Committee Directory	<u>5</u>
2020 Executive Committee Meeting Schedule	<u>7</u>
2020 Index of Advertisers.....	<u>8-9</u>
Presidential Ramblings	<u>11</u>
ATMG Scholarship 2019-2020 Awards.....	<u>12</u>
Great Barrier Reef on Brink of Coral Bleaching.....	<u>13</u>
Exoplanet Where it Rains Iron.....	<u>25</u>
Mineralogy and Stable Isotopes of Tetradymite	<u>31</u>
AIPG Mission Statement	<u>35</u>
Thank You Messages From Scholarship Recipients 2019-2020.....	<u>42</u>
Coming Full Circle: 34 Years of Scholarships & Something Unique	<u>47</u>
Piggybacking: Service Expanded	<u>82</u>
NE/AIPG 2020 Publication Schedule	<u>93</u>
ATMG Scholarship List of Contributors	<u>94</u>
ATMG Scholarship Overview	<u>96</u>
Angelo Tagliacozzo Scholarship Perpetual Trust Fund Contribution Form <i>(Please Contribute Now!)</i>	<u>Last Page</u>

NEWSLETTER EDITOR

Brandon Tufano
Integral Consulting Inc.
285 Century Place, Suite 190
Louisville, CO 80027
570-702-9992 (Cell)
btufano@integral-corp.co



PUBLISHER & ADVERTISING MANAGER

Dick Young
Consulting Geologists, LLC
179 Intervale Road
Parsippany, NJ 07054
973-335-2289 (Office)
973-335-9799 (Fax)
RYoungNJ@aol.com

The Newsletter of the Northeast Section of the American Institute of Professional Geologists is digitally published four times annually at www.issuu.com/neaipg/docs. Design and layout by Brandon Tufano and Dick Young. Section Members and Advertisers are alerted to each issue by e-mail. Many thanks are extended to all who helped in compiling this issue.

2020 NEAIPG EXECUTIVE COMMITTEE AND SUBCOMMITTEES

PRESIDENT

Michael G. Grifasi, CPG-11489
FPM Remediations, Inc.
181 Kenwood Ave
Oneida, NY 13421
Office: (315) 336-7721 X215
Fax: (917) 336-7722
Cell: (917) 767-2662
Email: m.grifasi@fpm-remediations.com

PRESIDENT ELECT

Jennifer Rhee, MEM-2805
HDR Inc.
1 International Blvd
Floor 10
Mahwah, NJ 07495
Work: (201)-335-9336
Cell: (845)-664-5218
jennifer.rhee@hdrinc.com

PAST PRESIDENT

Jessica McEachern, CPG-11869
37 Spencer Street W
Farmingdale, NY 11735
Office: (516) 694-5212
E-mail: geode78@verizon.net

SECRETARY

Adelina E Prentice, MEM-3075
FPM Remediations Inc.
181 Kenwood Ave
Oneida, NY 13421
Work: 315-336-7721 ext 228
Fax: (315) 336-7722
Email: a.prentice@fpm-remediations.com

TREASURER

Robert P. Blauvelt, CPG-06508
GEI Consultants
300 Broadacres Dr, Suite 100
Bloomfield, NJ 07003
Office: (973) 873-7127
Cell: (973) 803-0167
Fax: (973) 509-9625
rblauvelt@geiconsultants.com

MEMBERS

Christopher Brown, CPG-10599
PVE, LLC
108 W 39th Street, Suite 501
New York, NY 10018
Office: (646) 602-4999
Cell: (914) 475-2650
E-mail: cbrown@pve-llc.com

Brandon Tufano, MEM-2954
Integral Consulting Inc.
285 Century Place, Suite 190
Louisville, CO 80027
Cell: (570) 702-9992
E-mail: btufano@integral-corp.com

Member at Large

Jeff Frederick, CPG-10989
The Louis Berger Group, Inc.
565 Taxter Rd., Suite 510
Elmsford, NY 10523
Office: (914) 798-3762
Email: jfrederick@louisberger.com

Laurie Scheuing, CPG-09898
46 Homestead Rd
Saratoga Springs, NY 12866-5808
Office: (518) 695-9445
E-mail: lescheuing@aol.com

Luanne Whitbeck, CPG-07923
P.O. Box 637
Singerlands, NY 12159
Office: (518) 475-1008
E-mail: Luanne.whitbeck@gmail.com

Kelly A. Weyer, CPG-11826
Clean Globe Environmental LLC
PO BOX 1895, New City, NY 10956
Office: 1-888-454-5923, Ext. 700
kweyer@cg-env.com

SCREENING BOARD CHAIRMAN

Charles A. Rich, CPG-04433
CA Rich Consultants, Inc.
17 Dupont Street
Plainview, NY 11803-1602
Office: (516) 576-8844 Fax: (516) 576-0093
E-mail: crich@carichinc.com

NEWSLETTER EDITOR

Brandon Tufano, MEM-2954
Integral Consulting Inc.
285 Century Place, Suite 190
Louisville, CO 80027
Cell: (570) 702-9992
E-mail: btufano@integral-corp.com

DIRECTORY OF MEMBERS EDITOR

Curtis A. Kraemer, CPG-06019
111 Van Cedarfield Road
Colchester, CT 06415
Office: 860-861-4644
email: curtakraemer@comcast.net

PUBLISHER & ADVERTISING MANAGER

Richard H. Young, CPG-03356
Consulting Geologists, LLC
179 Intervale Road
Parsippany, NJ 07054
Office: 973-335-2289
Fax: 973-335-9799
E-mail: ryoungnj@aol.com

WEBMASTER

Jessica McEachern, CPG-11869
37 Spencer Street W
Farmingdale, NY 11735
Office: (516) 694-5212
E-mail: geode78@verizon.net

(Executive Committee continued on page 7)



Delta Well & Pump co., Inc.

WATER AND ENVIRONMENTAL DRILLING

97 Union Avenue PO Box 1309 Ronkonkoma, N.Y. 11779

Phone: (631) 981-2255

Fax: (631) 981-2369

Delta serves municipal and industrial customers

Providing a full range of drilling capabilities



2020 NORTHEAST SECTION SUBCOMMITTEES
(As updated 1/30/2020)

Advertising Sales: Dick Young

Advisory Board Delegate: Jeff Frederick

Financial Planning and Treasury: Bob Blauvelt, Dick Young

Legislative Liaison and Registration: Tom West (NY),
Russell Slayback (CT), Sam Gowan (NY), Tim Stone (NY),
Dorothy Richter (NH), Laurie Scheuing (NY)

Membership: Open

Mentoring: Dennis McGrath (Chairperson), Chris Brown

Nominating: Bob Blauvelt, Dennis McGrath

Public Affairs: Dennis McGrath (Chairperson)

Scholarship: Dennis McGrath (Co-Chairperson), Chris Brown
(Co-Chairperson), Sam Gowan, Dean Herrick, Craig Werle, Tom West,
Kelly Weyer

Section Directory: Curt Kraemer, Editor, Dick Young, Publisher

Section Meetings: Jessica McEachern, Bob Blauvelt, Chris Brown,
Jennifer Rhee

Section Newsletter: Brandon Tufano & Kim Burger, Editors;
Dick Young, Publisher

Screening Board: Charles Rich (Chairperson); Don Bruehl, Carol Graff,
William Penn, Daniel Toder, Andrew Tolman, William Prehoda

2020 EXECUTIVE COMMITTEE MEETING SCHEDULE:

January 6th

March 9th

May 15th (Subject to good sense and safety given
the COVID-19 pandemic)

July 13th

September 14th

October 9th (Fall Meeting)

December 7th

**Meetings are
typically held
from 4:00 to
6:00 pm via
teleconference.**

2020 INDEX OF ADVERTISERS

ENVIRONMENTAL CONSULTANTS

AECOM.....	23
Alpha Geoscience	19
Arcadis	36
Brinkerhoff Environmental Services, Inc	29
C.A. Rich Consultants, Inc.....	38
CHA	29
CSG Environmental Consultants.....	19
EAI, Inc.....	16
EWMA	34
FPM-Remediations.....	37
Gannett Fleming.....	24
GEI Consultants, Inc.....	28
GEOSPHERE Environmental Management, Inc.	27
Hager GeoScience, Inc.....	33
Hager-Richter Geoscience, Inc.....	33
Haley & Aldrich	34
Hatch Mott MacDonald.....	39
Lincoln Applied Geology, Inc	22
MC Environmental, LLC.....	22
McLane Environmental, LLC	27
PVE	35
Quantitative Hydrogeology, Inc	29
Regenesi.....	23
Richter Geology PLLC.....	24
Roux Associates, Inc.....	11
StoneHill Environmental, Inc	32
Tectonic Engineering	32
Terracon.....	26
TRC Environmental Corporation.....	28

DRILLING

AARCO Environmental Services Corp.....	51
Allegheny Instruments, Inc	43
Boyd Artesian Well Co., Inc	50
Cascade Drilling	<u>Inside Front Cover</u>
Connecticut Test Borings, LLC	43
Directional Technologies, Inc.....	58
Drilex Environmental, Inc.....	3

(Index of Advertisers continued on page 9)

2020 INDEX OF ADVERTISERS (Cont.)

DRILLING (Cont.)

Eastern Analytical, Inc.....	45
General Borings, Inc.....	62
Geophysical Applications, Inc.....	48
Maine Test Borings.....	52
New England Boring Contractors of CT, Inc.....	52
Pennsylvania Drilling Company.....	57
Probe Support Services.....	10
SGS Environmental Services, Inc.....	48
Soil Mechanics Drilling Corporation.....	59
Soiltesting, Inc.....	50
Stephen B. Church, Co.....	57
Summit Drilling Co., Inc.....	46
Zebra Environmental.....	49

ENVIRONMENTAL FIELD SERVICES

Alpha Analytical.....	63
Atlantic Screen & Mfg., Inc.....	72
Badger Injection Solutions.....	75
Complete Environmental Testing, Inc.....	72
ConeTec, Inc.....	82
Delta Well & Pump Co., Inc.....	6
EnviRent Corporation.....	83
Enviroscan.....	66
Envirosite Corporation.....	74
GEOD Corporation.....	65
Geologic Mapping and Resource Evaluation, Inc.....	73
Island Pump and Tank.....	83
Layne Christensen Company.....	68
Samuel Stothoff Company, Inc.....	72
SJB Services, Inc.....	78
X-ray Utility Locating Service.....	69

www.geoproberental.com

Geoprobe® Rentals

info@rentaprobe.com

Long Term
Rental
Discounts



TRAINING Available

7822DT TRACK • 7720DT TRACK
6620DT TRACK • 54LT Track
540MT & 420M Portable
54TR Tractor • Grout Pumps
Manual Slide Hammers • Trailers
Tooling • Liners • Mob/Demob

*Providing various direct push
Geoprobe® machines designed
for unique environmental
settings including wetlands,
shorelines, residential grounds,
inside buildings and basements
and more...*

888•215•4666

PROBE
SUPPORT SERVICES
www.geoproberentals.com

www.rentaprobe.com



Presidential Ramblings – Spring, 2020

Hello Northeast Section! I'd normally say something like "Happy Spring to you all!!" but, as you're well aware, there is nothing normal about these times. That said, I do hope each and every one of you is safe and healthy. And, despite the current circumstances, we do still have the opportunity to enjoy ourselves, our families, and the world around us. For me personally, I'm taking this time to slow down, to enjoy working from the comfort of my home, to explore math and science with my two children, to catch up on all of those books that have piled up over the years, to be useful to my community, to take long

(Ramblings continued on page 18)



ROUX

Environmental Consulting & Management

- Brownfield Redevelopment
- Phase I & Phase II ESAs
- Constructed Treatment Wetlands
- Wetland Delineations and T&E Evaluation/Permitting
- Petroleum Remediation
- Stormwater/Wastewater Management
- Remediation Designs
- Litigation Support

We Solve Our Clients' Most Challenging Environmental Problems

For more info: 1.800.322.7689 or www.rouxinc.com

California • Illinois • Massachusetts • New Jersey • New York • Texas

Angelo Tagliacozzo Memorial Geological Scholarship 2019—2020 Academic Year

Final Status Report

Dennis G McGrath, CPG

Co-Chair, Scholarship Committee

This year's scholarship committee (Christopher Brown, Jeff Frederick, Mike Grifasi, Sam Gowan, Dean Herrick, Adelina Prentice, Tom West, Kelly Weyer and I) completed a review and evaluation of 19 scholarship applications received in December 2019. Evaluation criteria include financial need, academic transcript and qualifications, career goals, achievements (e.g., awards, projects, publications, senior thesis, etc.), and the faculty recommendation letter. Financial need and academic qualifications were weighed more heavily than the other factors in accordance with the weighting scheme that has been used now for many years. The committee then convened via teleconference to discuss the overall ratings, recommend an award pool, and select the award recipients.

We received another outstanding group of student applicants. While academic achievement does not assure an applicant of receiving a scholarship, 16 of the 19 applicants maintained greater than a 3.0 (out of 4.0) overall cumulative grade point average (gpa); four applicants maintained a nearly perfect 4.0 gpa; 11 applicants maintained greater than a 3.4 gpa! The academic qualifications presented by the applicants were outstanding, and many of the financial needs were compelling. The results of the evaluations among the nine committee members were pretty consistent, and the composite ordinal scores reflected that consistency. The award amount for this year was chosen after considering quality of the applicants, performance of the trust fund over the past year, and the overall financial health of the NE Section. An award pool of \$20,000 was selected as an appropriate award amount; individual awards are shown below. During the Executive Committee meeting on March 9, 2020, and the Board of Trustees meeting several days later, the recommendation to award a total of \$20,000 to be distributed among nine applicants was approved.

(Continued on page 42)

GREAT BARRIER REEF ON BRINK OF THIRD MAJOR CORAL BLEACHING IN FIVE YEARS, SCIENTISTS

If ocean temperatures don't drop in the next two weeks, heat stress could tip reef over into another widespread event

By Graham Readfearn

@readfearn

Thu 20 Feb 2020

The Great Barrier Reef could be heading for a third major coral bleaching outbreak in the space of five years if high ocean temperatures in the region do not drop in the next two weeks, scientists and conservationists have warned.

Heat stress is already building across the world's biggest reef system, with reports of patchy bleaching already occurring. But a major widespread event is not currently taking place. The Great Barrier Reef Marine Park Authority is closely monitoring conditions. Areas of heat stress are spreading, particularly across the central and southern areas that are popular with tourists.

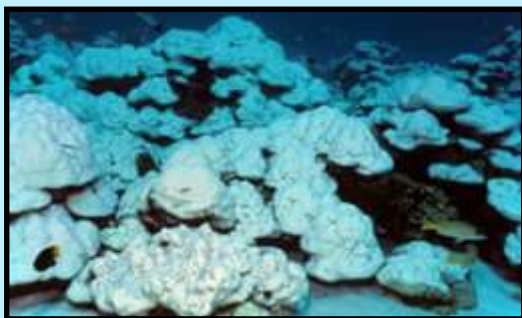
Sea surface temperatures (SST) are already more than 1.5C above average across large areas of the reef, with a month remaining until temperatures usually peak.

Across about two thirds of the reef – from Port Douglas south – SST were between 2C and 3C above average.

Coral bleaching is a stress reaction caused when corals spend long periods in warmer than average water. The algae that provides food and the coral's colour separates from the animal.

Severe bleaching can kill some corals, and weaken others. As well as bleaching, corals can die from more immediate heat stress if temperatures become extreme.

Rising ocean temperatures are caused by increasing levels of greenhouse gases in the atmosphere.



Photograph: Helmut Corneli/

(Great Barrier Reef continued on page 14)

Hughes told Guardian Australia: “We are worried about the level of heat that’s out there now, with four weeks still to go until we get the peak of summer temperatures. That’s usually around mid-March.

“We are down to the wire,” said Prof Terry Hughes, director of the ARC Centre of Excellence for Coral Reef Studies at James Cook University. “So with about a month to go, the pattern so far is following in the footsteps of 2016-17 and it’s already hotter than it was in the interim years.

“If it happens or not will depend on the vagaries of the weather for the next two weeks.” He said if current sea surface temperatures remained, “then we are likely to get bleaching and, if they get hotter still, we will get severe bleaching.”

Northern sections of the reef are forecast to cool, but Bureau of Meteorology forecasts do not suggest temperatures will fall across much of the central and southern regions.

Another major bleaching event would be a further blow to tourism in the reef region.

Hughes said it was predicted to get cooler in the northern parts of the reef over the next week, but for the rest of the reef it was “probably 10 days too early to be sure” of another widespread bleaching event.

Hughes has carried out extensive aerial surveys during previous bleaching events to record the scale and severity of bleaching.

“I’m on standby to do those aerial surveys if it’s needed, but hopefully it won’t be.”

About half the reef’s corals died in back-to-back bleaching events in the summers of 2016 and 2017.

In August 2019, the Great Barrier Reef Marine Park Authority downgraded the reef’s long-term outlook from “poor” to “very poor” for the first time. In December 2019, the Queensland and federal governments sent a report to Unesco on the reef’s status, admitting that climate change had already impacted the values that led to a world heritage listing in 1981.

The environment minister, Sussan Ley, said there were anecdotal reports of isolated bleaching but the “forecast weather pattern remains concerning.” She said she had spoken with the Great Barrier Reef Marine Park Authority’s chief scientist, Dr David Wachenfeld, about the concerns. In an update published on Thursday afternoon, Wachenfeld said the forecasts were “not good for bleaching conditions on the reef”.

Richard Leck, head of oceans at WWF-Australia, said: “The Great Barrier Reef is on a knife edge. We will know in the next couple of weeks whether we now have a mass coral bleaching event for the third time in only five years.

“Surely after this summer of bushfires, and this marine heatwave hitting the reef, we cannot keep burying our heads in the sand. We need a reef-safe climate policy that’s consistent with a 1.5C global warming target, or less. No more excuses will be tolerated.”

Shani Tager, the Australian Marine Conservation Society’s Great Barrier Reef campaigner, said: “The last thing our reef, and the coastal communities that it supports, needs right now is another summer of mass bleaching.

“Unfortunately we are a whisker away from bleaching disaster yet again because of global warming-driven marine heatwaves.”

The World Heritage Committee is scheduled to review the status of the Great Barrier Reef at a meeting in June in China, with the potential to place the reef on its “in danger” list.

The area in which Professor Terry Hughes at the ARC Centre of Excellence for Coral Reef Studies at James Cook University are studying.





EAI, Inc.

Environmental Management Services

Turnkey Solutions for Environmental Management



www.eaienviro.com



GRACE
Construction Products

CETCO

CARLISLE



AQUAFIN

Services:

- Vapor Barrier Installations
- Waterproofing
- Sub-slab Depressurization System Installation (SSDS)
- Venting/Monitoring System Installations
- Liquid Boot/GeoVent Installations
- Air Barrier Installations
- Tank Services
- Remediation
- Air Monitoring System Installations
- Asbestos/Lead Services
- Sandblasting
- Specialty Contracting Services

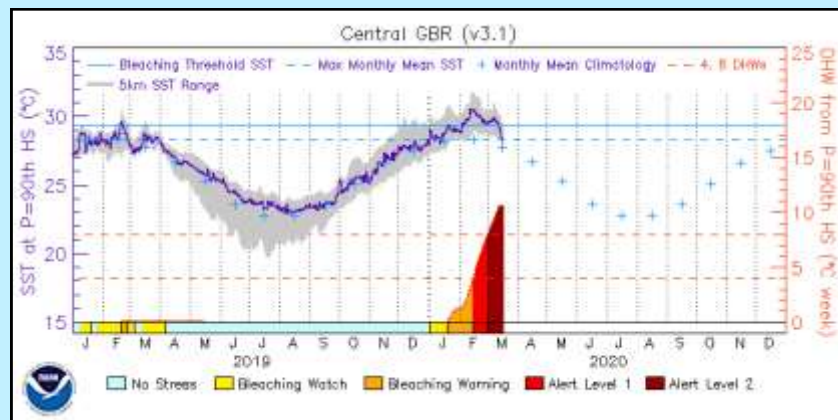
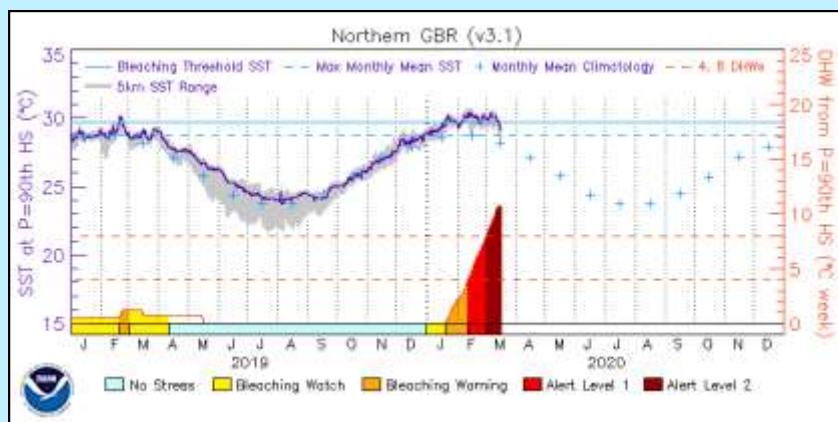
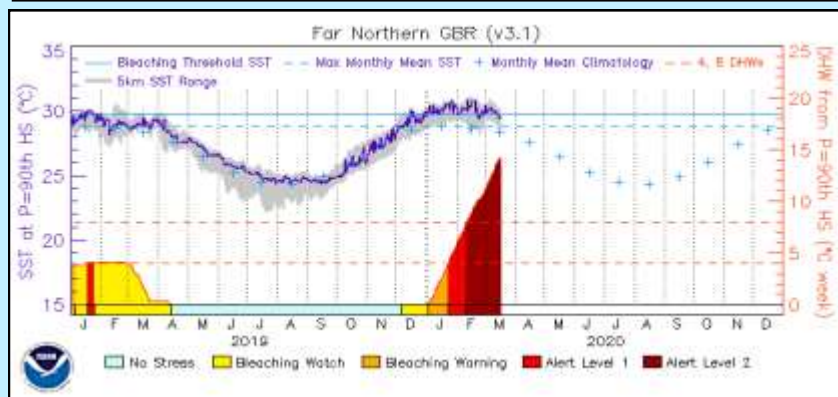
**Call EAI for All of Your
Environmental Needs**

50 Prescott Street
Jersey City, NJ 07304

Tel: (201) 395-0010

inforequest@eaienviro.com

The following time series graphs, provided by NOAA Satellite and Information Service, show the heat-stress levels from 2019 to currently (March 15, 2020) of each area of the Great Barrier Reef facing danger of bleaching.



(Ramblings continued from page 11)

walks with my wife and my dog. Really just enjoying all the good in life. I hope you all take this time to connect with the things that bring you joy in your life too.

Now, the Section was planning to host a half-day short course this April in New Jersey. You may have seen some advertising make its way into your inbox. Unfortunately, we're going to postpone that course until later this year. As for other Spring activities, it's too early to tell how those will play out. We are planning our Spring meeting with our friends at the HMPGA in Albany this May. As I'm writing this rambling, we're two months out from that event. I'll continue to hope for the best.

Let's shift a bit here. As I mentioned earlier, we've all probably got some extra time on our hands right now. What better time to break into a new trilogy? I recently finished a wonderful series written by N.K. Jemisin entitled "The Broken Earth" series. For those of you who follow fantasy and science fiction writing, these books won Hugo Awards for each in series as well as Nebula and Locus awards for the third in series. What makes this series worth mentioning in an AIPG newsletter is that it combines two of my favorite things—geology and fantasy writing—into a single space.

The story is set in a world that could be Earth in a far-off future or just another world like ours. What makes it difficult to tell is based on the fact that nothing lasts for long and that has everything to do with the "seasons". Imagine a world so tectonically and seismically active that massive extinction level, or at least extinction threatening, events occur on a regular basis. Were it not for the system that has been established throughout the years, things would be much worse. See, the magicians in this series are "orogens" – a small subset of humanity capable of "sensing" seismic disturbances in the Earth's subsurface, with the power to quell those disturbances or even exacerbate them. Orogens are taken from their families, who are, like all other "stills", taught to hate and even kill children born with the power to manipulate the Earth. Once taken, the children are schooled in Orogeny and given names like Alabaster and Syenite. They're ranked by the number of

(Ramblings continued on page 21)



Professional Geologic and Hydrogeologic Consulting

679 Plank Road, Clifton Park, NY 12065

www.alphageoscience.com

Mining Services

Hydrogeologic Investigation

- Impacts to surface and ground water
- Potential impacts from mine inflows
- Mitigation of mine inflows

Mineral Resources

- Resource and Reserve Analyses
- Aggregates, Sand, and Gravel
- Industrial Minerals, Metals and Salt
- Permitting

Independent Laboratory Data Validation

Emergent Contaminants

- PFOS, PFOA, and other PFAS
- 1,4-dioxane

Quality Assurance/Quality Control

- Validation of soil, water, and air data
- Preparation of SOPs, QAPPs, and EDDs

Contact: John Nadeau, PG, CPG
jnadeau@alphageoscience.com

Check out our Advertiser hotlinks wherever there is a website or email listed in an advertisement!

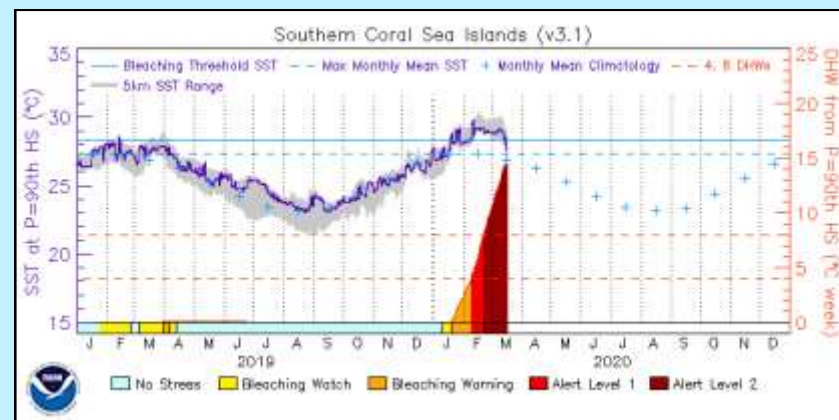
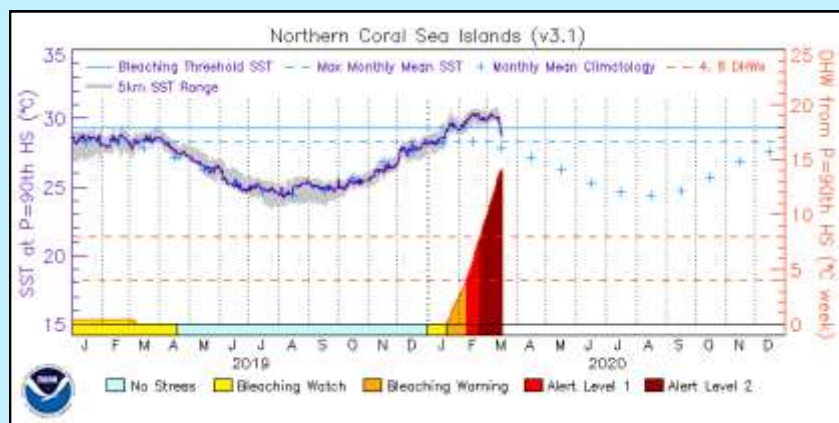
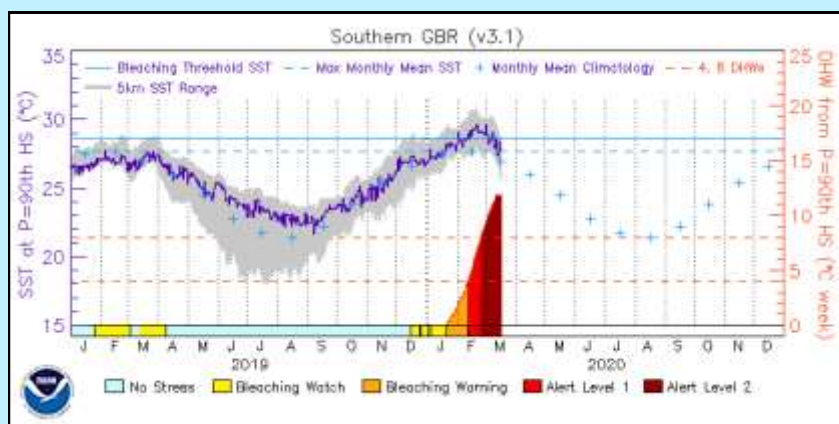


ENVIRONMENTAL CONSULTANTS

- ✓ property transfer site assessments
- ✓ groundwater development, management, protection, permitting
- ✓ UST closures and investigations
- ✓ litigation support

Carol S. Graff, CPG-06429
109 Renfrew Avenue
Trenton, NJ 08618-3335

Phone: 609-393-4442
FAX: 609-393-5999
E-mail: cgraff5297@aol.com



(Ramblings continued from page 18)

rings they've earned on a scale of zero to ten, ten being the most powerful of them. All Orogens are teamed with a Guardian, someone with the power to negate what Orogens can do. A source of power with mysterious origins (remember, nothing lasts long in this world, especially history). And then there are the Stone Eaters, a class of humanoids with an even more mysterious origin.

I'll say this: as a geologist, I found this series to be very compelling and interesting. I loved the way it wove elements of our practice into the story in a way that was both believable and unbelievable. When I started reading the first book, I was certain Jemisin was a geologist. Beyond the topic of geology, Jemisin worked in a solid narrative about racism and feminism that really humanized the story and tied it to current events. Take my word for it, buy the book or borrow it as an e-book or audio book on your Libby app. You won't regret it.



Signing off now. I hope for you all health and sanity in the coming weeks.

Until the next newsletter,

Michael

(End)



MC ENVIRONMENTAL, LLC



Innovative Environmental Services & Consulting

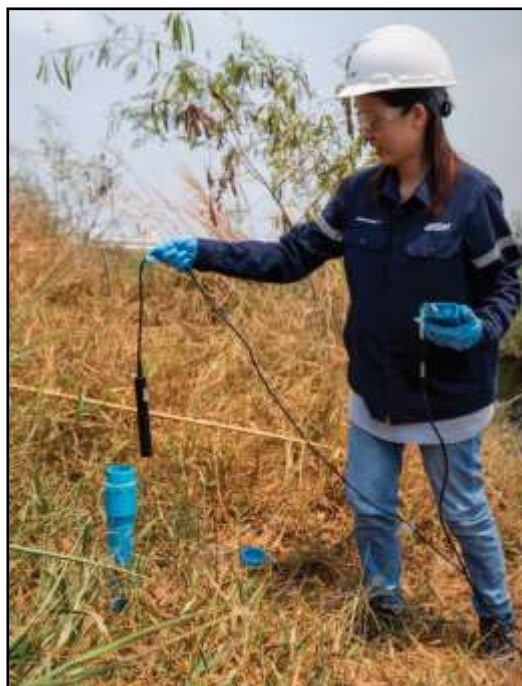
- Hydrogeology
- Water Resources
- Regulation Compliance
- Monitoring Programs
- Instrumentation
- Site Assessments
- Site Assessments
- Remediation
- Property Transactions
- UST, Spill Response
- Expert Testimony

26 Railroad Avenue #182, Babylon, NY 11702-2216
Phone 631 321 4500 Fax 631 321 0190
mike@mc-environmental.net



- Brownfields Evaluation, Cleanup Negotiations and Remediation
- ASTM Phase I and II Real Estate Assessments
- Facility Operations Environmental Audits
- Permit Status/Compliance Review
- Single and Multiple Lot Septic System Design and Permitting
- Water Supply Siting, Analysis, and Permitting
- Federal, State, and Local Development Permitting
- Boundary Surveying, ALTA/ACSM Land Title Surveys, Construction Layout, Construction Inspection

163 Revell Drive, Lincoln, VT 05443
802-453-4384 * 802-453-5399 (Fax) * 800-477-4384
Email: lagvt@lagvt.com



AECOM

Imagine it. Delivered.

As a fully integrated firm, AECOM connects knowledge and experience across our network of experts to help solve our client's most complex challenges. From high-performance buildings and transit systems, to resilient communities and environments, our work is transformative, differentiated and vital.

aecom.com

Concerned about Site Remediation Budgets, Timelines and Technology Performance?



REGENESIS
www.REGENESIS.com

We can help.

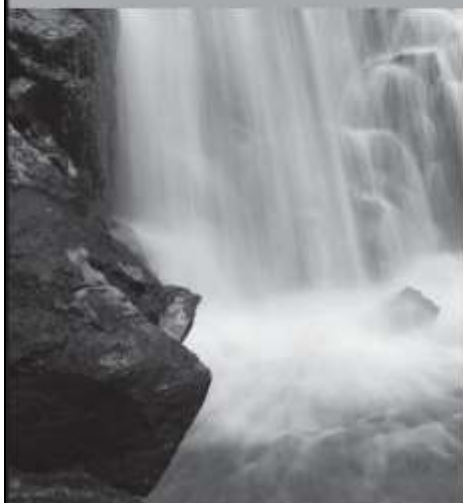
- Scalable site remediation solutions for almost any budget
- Expertise and experience to meet timeline expectations
- Proven remediation technologies on over 20,000 sites worldwide
- Combined remedy approaches to maximize performance and cost savings

www.regenesisis.com
(949) 366-8000



REGENESIS

DEFINING INNOVATION WITH SUSTAINABLE SOLUTIONS



Site Investigation and Remediation
Geotechnical/Earth Sciences
Sustainability
Brownfields Characterization and Redevelopment
Dams and Hydraulics
Environmental Infrastructure
Architecture
Civil
Transportation
Water/Wastewater
Structural
GIS/Information Technology
Construction Management/Design-Build



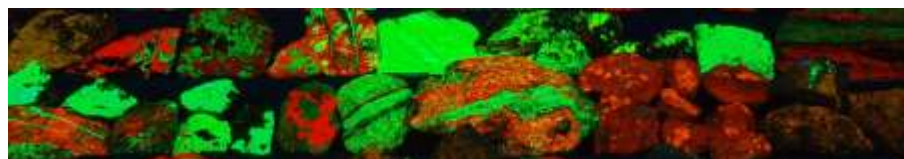
www.gannettfleming.com

James M. Barish, CPG, LSRP ■ Phone: (609) 584-9599 ■ Cell: (609) 385-5822

jbarish@gfnet.com ■ More than 55 offices worldwide

Suite 203, 3575 Quakerbridge Road, Hamilton, NJ 08619

**ISO 9001:2008
CERTIFIED**



RICHTER GEOLOGY PLLC

Dorothy Richter, P.G.

(NH, NY, PA, NC, KY, IL, MN)

President

603 231-7845

dorothy.richter@outlook.com

richtergeology.com

ESO Telescope Observes Exoplanet Where it Rains Iron



Researchers using ESO's Very Large Telescope (VLT) have observed an extreme planet where they suspect it rains iron. The ultra-hot giant exoplanet has a day side where temperatures climb above 2400 degrees Celsius, high enough to vaporize metals. Strong winds carry iron vapor to the cooler night side where it condenses into iron droplets.

ESO 2005—Science Release <https://www.eso.org/public/news/eso2005/>
March 11, 2020

“One could say that this planet gets rainy in the evening, except it rains iron,” says David Ehrenreich, a professor at the University of Geneva in Switzerland. He led a study, published today in the journal *Nature*, of this exotic exoplanet. Known as WASP-76b, it is located some 640 light-years away in the constellation of Pisces.

This strange phenomenon happens because the 'iron rain' planet only ever shows one face, its day side, to its parent star, its cooler night side remaining in perpetual darkness. Like the Moon on its orbit around the Earth, WASP-76b is ‘tidally locked’: it takes as long to rotate around its axis as it does to go around the star.

On its day side, it receives thousands of times more radiation from its parent star than the Earth does from the Sun. It's so hot that molecules separate into atoms, and metals like iron evaporate into the atmosphere. The extreme temperature difference between the day and night sides

(Iron Rain continued on page 30)



Reliable.

Convenient Responsive Innovative

Your business objectives are our top priority.
We deliver information on time so you avoid
delays, surprises and costly mistakes down
the road. For projects large and small,
single- or multi-site, you can rely on
consistent results nationwide.



Manchester, NH [603] 647 9700
Offices Nationwide terracon.com

Terracon

Geotechnical ■ Environmental ■ Construction Materials ■ Facilities

GEOSPHERE

ENVIRONMENTAL MANAGEMENT INC.

NEW HAMPSHIRE

MASSACHUSETTS

(603)-773-0075

(888)-838-6571

WWW.GEOSPHERENH.COM

GROUNDWATER SUPPLY

SITE ASSESSMENTS

LSP SERVICES

GEO THERMAL

WETLANDS

PROFESSIONAL CONSULTANTS PROVIDING
GROUNDWATER & ENVIRONMENTAL SOLUTIONS



McLANE ENVIRONMENTAL, LLC

Range of Services

Ground Water Modeling
Contaminant Fate
and Transport

Aquifer Characterization
Remediation Design
and Optimization

Exposure and
Risk Assessment

Water Resources
and Supply

Natural Resource
Damages

Coastal Zone
Modeling

Wastewater
Disposal Analyses

GIS and
Data Visualization

Litigation Support



Providing ground water consulting
services to clients nationwide,
including:

- industrial corporations,
- law firms,
- municipalities,
- DOD, DOE, and others.

Specializing in ground water
modeling, chemical fate and
transport, well field optimization,
and litigation support services.

Visit our web site at
www.McLaneEnv.com

E-mail: info@McLaneEnv.com

707 Alexander Road, Suite 206
Princeton, NJ 08540

Ph. 609.987.1400 Fax 609.987.8488

50 Years of Environmental Solutions in New Jersey

- Ground Water Investigation and Remediation
- Soil Investigation and Remediation
- Ground Water Supply Development
- Underground Storage Tank Investigation
- ISRA Compliance
- Environmental Site Inspections and Audits
- Brownfields Investigation and Permits
- Litigation Support and Expert Testimony
- LSRP Services



41 Spring Street, Suite 102
New Providence, NJ 07974
T: 908.988.1700 F: 908.464.3712
www.trcsolutions.com

GEI provides geotechnical, environmental, water resources and ecological consulting and engineering services. We provide these services from planning and design through construction and operations. Our clients include government agencies, institutions, industries, developers, utilities and professional service firms.



For more information
contact Bob Blauevelt at
973.873.7127
www.geiconsultants.com

GEI Consultants, Inc.
300 Broadacres Drive, Suite 100
Bloomfield, NJ 07003





**QUANTITATIVE
HYDROGEOLOGY
INC.**

- Aquifer Characterization & Conceptualization • Modeling •
- Aquifer Tests → Design, Implementation, & Analyses •
- Flow & Transport Analyses/Evaluations • Environmental Litigation •

Michael A. De Cillis, CPG-6986,

*providing Hydrogeologic & Environmental-Consulting Services, and
Technical & Logistical Support within the Ground-Water Profession since 1976.*

42 Marc Ct, Bay Shore, NY 11706-7351 ~ (631) 859-3507 ~ E-mail: madedcillis@optonline.net

BRINKERHOFF



ENVIRONMENTAL SERVICES, INC.

Geologists • Hydrogeologists • Environmental Scientists

**Environmental Consulting • Environmental Permitting
Site Investigation • Soil and Groundwater Remediation**

1805 Atlantic Ave. • Manasquan, NJ 08736

Tel: 732-223-2225 • Fax: 732-223-3666 • www.brinkenv.com



*Providing Full Service Engineering, Planning and
Construction Expertise to Our Clients for Over 50 Years*

Imagine

What We Can Do for You!

CHA
www.chacompanies.com
800.836.0817

results in vigorous winds that bring the iron vapour from the ultra-hot day side to the cooler night side, where temperatures decrease to around 1500 degrees Celsius.

Not only does WASP-76b have different day-night temperatures, it also has distinct day-night chemistry, according to the new study. Using the new ESPRESSO instrument on ESO's VLT in the Chilean Atacama Desert, the astronomers identified for the first time chemical variations on an ultra-hot gas giant planet. They detected a strong signature of iron vapour at the evening border that separates the planet's day side from its night side. *"Surprisingly, however, we do not see the iron vapour in the morning,"* says Ehrenreich. The reason, he says, is that *"it is raining iron on the night side of this extreme exoplanet."*

"The observations show that iron vapour is abundant in the atmosphere of the hot day side of WASP-76b," adds María Rosa Zapatero Osorio, an astrophysicist at the Centre for Astrobiology in Madrid, Spain, and the chair of the ESPRESSO science team. *"A fraction of this iron is injected into the night side owing to the planet's rotation and atmospheric winds. There, the iron encounters much cooler environments, condenses and rains down."*

This result was obtained from the very first science observations done with ESPRESSO, in September 2018, by the scientific consortium who built the instrument: a team from Portugal, Italy, Switzerland, Spain and ESO.

ESPRESSO — the Echelle SPectrograph for Rocky Exoplanets and Stable Spectroscopic Observations — was originally designed to hunt for Earth-like planets around Sun-like stars. However, it has proven to be much more versatile. *"We soon realised that the remarkable collecting power of the VLT and the extreme stability of ESPRESSO made it a prime machine to study exoplanet atmospheres,"* says Pedro Figueira, ESPRESSO instrument scientist at ESO in Chile.

"What we have now is a whole new way to trace the climate of the most extreme exoplanets," concludes Ehrenreich.

This research was presented in a paper to appear in *Nature*.

ESO, the European Southern Observatory, is the foremost intergovernmental astronomy organization in Europe, and the world's most productive astronomical observatory. Visit <https://www.eso.org/public/>

(End)

Mineralogy and Stable Isotopes of Tetradymite from the Dashuigou Tellurium Deposit, Tibet Plateau, Southwest China

Abstract

Due to the very limited quantity of associated tetradymite, both mineralogical and geochemical research on tetradymite is scarce and incomplete. By taking advantage of the discovery of the Dashuigou tellurium deposit in Tibet Plateau, the authors conducted mineralogical studies on tetradymite. The authors present new mineralogical data including reflectance, micro-pressure hardness, chemical compositions focusing on its chemical formula $\text{Bi}_{2.00}\text{Te}_{1.89}\text{S}_{0.95\sim 1.00}$, unit cell parameters ($a = 4.239 \text{ \AA}$, $c = 29.595 \text{ \AA}$) and lattice parameters ($a = 10.172 \text{ \AA}$, $v = 154.391 \text{ \AA}^3$), pyroelectricity (N type), and stable isotopes including sulfur and lead. The authors find that: $\delta^{34}\text{S}\text{‰}$ of tetradymite varies between $-0.5\sim 2.1$ with a 15-sample average of 0.56, similar to that of meteorites and rocks from the mantle, indicating that the sulfur is from the mantle; lead isotopes of the tetradymite formed in the late metallogenic epoch is different from that of both pyrite and pyrrhotite formed in the early metallogenic epoch, further indicating that the three minerals formed in different metallogenic epochs; lead isotope compositions

(Article continued on page 38)

Tectonic

PROFESSORIAL SOLUTIONS. EXCEPTIONAL SERVICE.

- NJ Licensed Site Remediation Professional (LSRP) Services
- Phase I/Phase II Environmental Site Assessments
- Industrial Site Recovery Act Services
- Tank Closures & Spill Investigations
- Vapor Intrusion Studies & Mitigation
- Remedial Design of Contaminated Soil/Groundwater
- Terrestrial Ecological Evaluations
- Mold, Asbestos & Lead Management
- Subsurface Investigations & Geotechnical Engineering
- Geotechnical Instrumentation & Monitoring
- Vibration & Noise Monitoring
- Retaining Wall & Excavation Support Systems Design

www.tectonicengineering.com

800.829.6531

NY, NJ, CT, PA.

StoneHill Environmental, Inc.

**Providing Environmental Consulting Services
Throughout New England Since 1989**

- ▶ **Phase I & II Due Diligence Assessments**
- ▶ **Water Resource Impact Studies & Development**
- ▶ **Rock Blasting Groundwater Impact Studies**
- ▶ **Expert Witness and Litigation Support**
- ▶ **Contaminated Site Investigation and Remediation**

Contact: Timothy Stone CPG

Licensed Geologist NH, ME, DE, PA / Massachusetts LSP

600 State Street, Suite 2, Portsmouth, New Hampshire 03801
(603) 433-1935 □ (800) 639-4503 □ FAX: (603) 433-1942

NH-WBE/MBE, MA-SOMWBA, WBE Teaming

HAGER-RICHTER

Geophysics for the Engineering Community

***National Reputation | Nationwide Practice
Take a Closer Look. You'll Like What You See.***

www.hager-richter.com

Main Office

8 Industrial Way—D10
Salem, New Hampshire 03079
T: 603-893-9944

NY / NJ Office

846 Main Street
Fords, New Jersey 08863
T: 732-661-0555

dba HR Geological Services in New York



HAGER GEOSCIENCE, INC.

**Innovative solutions
to Subsurface
Problems**

**Celebrating 27 Years of
Geophysical Consulting
Services for Engineering,
Environmental, and
Infrastructure Projects**

PH +1-781-935-8111

hgi@hagergeoscience.com

Jutta Hager, Ph.D., P.G., President
jhager@hagergeoscience.com



**Building communities.
Improving our infrastructure.**

Creating new possibilities with clients.

- Property development and brownfields reuse
- Remedial investigations, design and construction
- Environmental, health and safety management
- Energy facility and linear utilities development
- Underground construction risk management
- Sustainable design enhancement

25 Offices Nationwide • T. 617.886.7400 • HaleyAldrich.com



An Environmental Consulting
& Remediation Firm

**Timely Response.
Time-Proven Solutions.**

- Guaranteed Fixed-Price Remediation
- Environmental Due Diligence
- Regulatory Compliance
- Litigation Experts and Environmental Forensics
- Indoor Air Quality

Call the experts at EWMA to assist with
your environmental questions.

(800) 969-3159
www.ewma.com

Parsippany, NJ
Hamilton, NJ
New York, NY





"Realize Your Vision"



- Assessment & Remediation Services
- Vapor Intrusion Evaluations
- Brine Disposal Wells
- Reservoir Evaluation and Gas Storage Facilities
- GIS Services

Contact us today to learn how we can help with your next project!

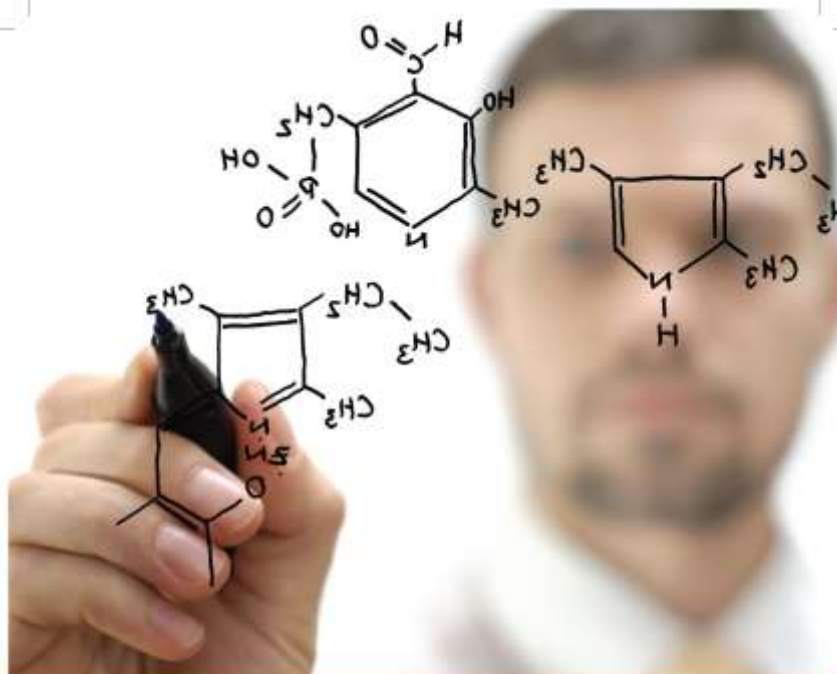
Environmental • Civil Engineering • Structure Design
Landscape Architecture • Land Planning • Municipal • Energy • Survey

(845) 454-2544 | www.PVE-llc.com | info@PVE-llc.com

What are the AIPG Purposes?

The mission of the Institute shall include:

- Advancing the geological sciences and the profession of geology;
- Establishing qualifications for professional geologists;
- Certifying the qualifications of specific individual member geologists to the public;
- Promoting high standards of ethical conduct among its members and adjuncts and within the profession of geology; and
- Representing and advocating for, the geological profession before the government and the general public.



Solutions to complex challenges

A continually shifting world makes any engineering design solution difficult, often overwhelming. We help you overcome these challenges.

First, we start with you – defining true value and a successful outcome. With a deep understanding of the nexus between regulatory, technological and environmental drivers, we deliver certainty on cost-effective projects and programs that meet and exceed your goals.

Together we can do a world of good.

www.arcadis-us.com

Two Huntington
Quadrangle Suite 1510
Melville, NY 11747
631 249 7600

Imagine the result.

 **ARCADIS**
Infrastructure · Water · Environment · Buildings

FPM Remediations, Inc.

Environmental Remediation Services

An **Olgoonik** Company

- ♦ HUBZone-Certified Small Disadvantaged Business
- ♦ Self-Perform Investigation/Remediation Activities at Sites Impacted by Environmental Contaminants and Munitions
- ♦ Specialize in Performance-Based Contracting
- ♦ Certified/Licensed Engineers, Geologists, Geophysicists, and Scientists and In-house Unexploded Ordnance Experts
- ♦ 20+ Years DoD Experience



FIND OUT MORE AT: WWW.FPM-REMEDIATIONS.COM

**Your FULL COLOR
half-page advertisement
could be right here!**

**Contact Advertising
Manager Richard Young
at ryoungnj@aol.com**

(Article continued from page 31) reveal that tellurium ore bodies emplaced in a quick process mainly in the form of ore magma; lead of the deposit is primarily from the mantle with some captured from the Earth's crust. These findings help fill in large gaps of information for the mineral tetradymite.

Introduction

Tellurium (Te) is usually categorized as a scattered or dispersed element (abbreviated as SM). SM are those metals, semimetals and/or nonmetals that have similar geochemical characteristics with Clark values too low to enrich into independent deposits, but that play very important roles in modern science, industry, national defense and the frontiers of technology. It is *(Article continued on page 40)*



Carich
ENVIRONMENTAL SPECIALISTS

Your Full-Service Environmental Expert Since 1982

- Due Diligence
- Geology Services
- Emerging Contaminants
- Groundwater Resources
- Air Quality / Soil Vapor
- Construction Oversight
- Brownfield Redevelopment
- Remediation
- Peer Review
- Regulatory Liaison
- Litigation Support
- Valuations / Tax Cert.
- Expedited Deal Flow
- Strategic Thinking

17 Dupont Street, Plainview, NY 11803 ■ Tel. 516.576.8844
Fax. 516.576.0093 ■ www.carichinc.com



- > environmental engineering
- > site assessments & remediation
- > environmental investigations
- > environmental services related to real estate transactions
- > storage tank management
- > hydrogeology/groundwater modeling
- > cost recovery litigation support
- > expert testimony
- > brownfields



**Hatch Mott
MacDonald**

Delivering Solutions

*headquarters: Iselin, NJ
offices across North America*

800.832.3272

www.hatchmott.com

thought in the traditional theory of mineral deposits and geochemistry that Te could not form independent deposits, but only exist as associated components in other metallic deposits. The abundance of Te in the Earth's Crust is very low. According to Li1, the average content of Te in the Earth's crust is 2.0×10^{-8} in China, and only 1.34×10^{-9} worldwide.

At present, the world's supply of refined tellurium is mainly recovered from Te-bearing minerals including pyrite, sphalerite, chalcopyrite, galena, pyrrhotite, volcanogenetic sulfur, bismuthinite, arsenopyrite, and cassiterite, etc. Generally speaking, only sulfide ores containing more than 0.002% Te can be used. As a result, the amount of refined tellurium that can be recovered is very limited. Most of the recoverable Te in the world is from copper deposits, and it is estimated that only 0.065 kg of Te can be produced in the refining process of one ton of copper^{2,3}.

Regional Geological Setting

The Dachuigou tellurium deposit is located in the transitional belt between the Yangtze Platform and Songpan-Ganzi folded belt, as part of the Tibetan Plateau (Fig. [1](#)). The deposit is nestled in the convergence between the Indian, Eurasian and Pacific Plates. The crust-mantle structures and properties in the region are the result of tectogenesis throughout various geological times. It implies the turning boundary of the Earth's crust's thickness. It is also a gravity gradient zone which controls not only the production and development of earthquakes and tectonomagmatic events, but

(Article continued from page 40)

also the distribution of a series of mineral deposits. Geophysical data indicate that the upper mantle below the region uplifts obviously. As a result, the area has characteristics of high heat flow.

There is also a low-velocity, low resistivity zone in the middle crust that is interpreted as a decollement. The abnormal mantle exists under the crust in the region. It has properties of both geosyncline and platform, as well as special characteristics of its



Location map of the dashuigou tellurium deposit. (Google Earth 7.1.8.3036 (32-bit): <http://download.pchome.net/industry/geography/detail-20351.html>, and 91 v17.5.8: www.91weitu.com; accessed January 25–27, 2020)

own. The belt is a geo-tectonically active zone with very complicated igneous rock structures. According to the regional geophysical data, the region's characteristics exhibit high velocity, high density, high resistance, high geothermal flow, high magnetism as well as well-developed earthquakes and mantle's uplift. In summary, this region is both geologically very active

(Article continued on page 44)

(Continued from page 12)

The NE-AIPG is proud to announce the nine recipients for the 2019-2020 academic year. The name of each recipient, the college or university they attend, and the award amounts are listed below:

Maurizia DePalma	Kean University	\$3,000
Klementina Mato	Salem State University	\$3,000
Kaitlin Taylor	Central CT State University	\$3,000
Kyle Comstock	University at Buffalo	\$2,500
Jarret Pidgeon	SUNY Plattsburgh	\$2,500
Lauren Carver	University of Maine	\$1,500
Joyce Franco	Rutgers University	\$1,500
Alika Katzenbach	University of Maine	\$1,500
Cornelia van Hazinga	Salem State University	\$1,500

Due to the on-going COVID-19 pandemic, none of this year's recipients received their scholarship checks in person. Instead, all checks were distributed via U.S. mail. Each of the applicants that did not receive an award were emailed an acknowledgement letter notifying them of the results and thanking them for their interest in our scholarship program. Those that will maintain their eligibility for next year were encouraged to apply again.

I want to thank each member of the scholarship committee for their time and effort evaluating the 19 applications and selecting the 2020 scholarship recipients. I also want to thank our NE-AIPG Treasurer Bob Blauvelt, for distributing the checks. Lastly, I want to offer special thanks to Scholarship Committee member Kelly Weyer. Kelly worked tirelessly with me calculating the composite numerical and ordinal scores for each application and for her insight and perspective in developing new ways of viewing and evaluating the composite results.

Thank You Messages Excerpts from Scholarship Recipients 2019-2020 Academic Year

I am writing to thank you for the generous reward of \$3,000 from the Angelo Tagliacozzo Memorial Geological scholarship. I was ecstatic and extremely appreciative to learn I was a recipient of your scholarship. By awarding me the Angelo Tagliacozzo Memorial Geological Scholarship, you have lightened my financial burden immensely. I paid for my education solely on my own for four years, and at times it was difficult. I had concerns on how I was going to pay for my (graduate school) tuition and other expenses. However, with this scholarship, you have helped diminish some of these worries and helped me focus on the most important aspect of my education, learning. Your generosity has inspired me to help others and give back to the community. I hope one day I will also be able to help and inspire the next generation of aspiring geologists.

Maurizia DePalma, Kean University

(Continued on page 62)



GeoVISION™ BOREHOLE VIDEO CAMERA SYSTEMS

**Hand Reel to 1000 Feet, Electric Winch to 2000 Feet
Joystick-Controlled Pan Tilt or Dual View Cameras**



Bore Diameters From 1-Inch To Mine Shafts

sales@alleghenyinstruments.com
www.alleghenyinstruments.com

800-255-1353
802-626-5302



Serving Southern New England and Eastern New York

Connecticut Test Borings, LLC

Geotechnical and Environmental Drilling

- ✦ **Hollow Stem Auger Drilling**
- ✦ **Soil Sampling - Rock Coring**
- ✦ **Monitor Well Installations**
- ✦ **Direct Push (Geoprobe®) Sampling**



www.connecticuttestborings.com • 203-888-3857 • fax 203-888-0655 • ctbllc@sbcglobal.net

and a very important south-north trending tectonomagmatic-mineral belt^{3,4,5}.

The strata, igneous rocks and structures trend south-northward. The strata are low-grade metamorphic rocks of the Silurian, Devonian, Permian systems and middle-lower Triassic series. A large amount of Archaean metamorphic rocks of the Kangding Group emerge to the southeast of the deposit. The well-developed igneous rocks in the region include ultrabasic, basic, neutral, acid and alkaline, produced in different geological times. Different types of mineral resources in the region are very rich; many of these are well known, including Ti, V, Cu, Pb, Zn, SM, REE, coal, asbestos and the Panzhihua Vanadium Titano-magnetite deposit^{3,4,5}.

Geology of the Deposit

The strata of the area are low-grade metamorphic rocks of the lower-middle Triassic age, including marble, slate and schist. The main wall-rocks of the ore bodies are schist and slate. All of the Triassic strata make up a NNE-trending dome. The geological and geochemical characteristics in the area indicate that the protolith of the tellurium ore veins' direct wall-rocks is poorly differentiated mantle-derived basalt^{3,4,5,6,7}.

Both faults and folds are well-developed in the area. The annular and linear structures together make up special "Ø" pattern structures, which control the formation of different types of endogenetic mineral deposits,

Support Our Advertisers and Sponsors!

The Executive Committee reminds all our members to support the companies that advertise in this Newsletter and generously sponsor our meetings. Their support represents a major contribution that helps the Northeast Section continue its mission to promote the profession and build the cornerstone of our Section, the *Angelo Tagliacozzo Memorial Geological Scholarship Perpetual Trust Fund*. It is our advertisers and sponsors who make our Newsletter so successful and well-distributed, reaching more than 600 members across eight states.

Please let our advertisers and sponsors know you appreciate them by working with these companies whenever possible. Be sure to personally acknowledge their support when you speak with their representatives, and mention you saw their ad or sponsorship in our Newsletter.

Thank you to all our advertisers and sponsors!



Eastern Analytical, Inc.
professional laboratory & drilling services

- GROUNDWATER
- SOIL & SLUDGE
- WASTEWATER
- STORMWATER
- DRINKING WATER
- SURFACE WATER

we're with you every step of the way | www.eailabs.com | 800.287.0525



Experience Sonic

When it comes to unconsolidated formations, there is no better technology than Sonic. With drill speeds up to 4 times faster and as much as 80% less waste, environmental consultants are realizing significant results and value. Benefit from clear and undisturbed samples in overburden, sand, gravel, clay, cobbles, boulders, bedrock, and delicate formations.

Also consider that cutting-edge technology is only part of the story. **Summit Drilling's Sonic Division** has invested in the best people the industry has to offer. Our new sonic rigs are operated by highly skilled and specially trained drillers who deliver unmatched sample quality and efficiency in the field. *More importantly*, sonic represents the safest drilling technology to date. At Summit Drilling, safety is more than training. It's our company culture.

Experience Sonic at An Exceptional Level. Call Summit Drilling and Speak with a Sonic Expert Today.

***Now Open! Our Albany, NY Office
Serving NY, CT & MA***

www.summitdrilling.com



Drilling ■ Direct Push ■ Injection
An Exceptional Experience™

800-242-6648



COMING FULL CIRCLE

Dennis McGrath
Co-Chair, Scholarship Committee

I am sure that most of you reading this article are very familiar with the Angelo Tagliacozzo Memorial Geological Scholarship. This program in the Northeast Section has been awarding scholarships to undergraduate students pursuing a degree in the geosciences since 1986. In addition to all the students that have benefited from this scholarship, and the growth of the scholarship program that has occurred over the past 34 years, something very special and unique happened this past year that I want to highlight in this article. Before I tell you about that though, let me first digress a bit and give you a little background and overview on some of the program accomplishments.

The scholarship application process starts every year between late August/early September, when we attempt to contact virtually every geology/geoscience department in the eight Northeast Section member states (CT, MA, ME, NH, NJ, NY, RI, and VT). In theory, at least one faculty member in each of those departments will receive an email announcement with details on the application process for the upcoming academic year. In practice, if multiple faculty members in a specific department have sponsored an applicant anytime in the past, they continue to receive an email with the announcement every year. Currently, approximately 82 separate geology departments and 160 individual geology faculty members are in our database. While there are still a few geology departments where we only have one faculty contact, most departments now have two, three, four or even five faculty contacts. They all receive the announcement and we try never to forget their past support and contribution because their continued participation is critical in the application process.

A list of all submitted applications and every scholarship recipient are maintained and updated annually. It is possible, therefore, to very accurately state that since its inception, more than \$272,000 has been awarded to 205 students at 62 different colleges and universities. In the first few years, awards were typically \$250 and the total award pool (sum of all scholarships awarded in one year) was \$1,000. Over time, we have been able to significantly increase both the number of awards and the award pool. For example, over the past 10 years, the scholarship program has averaged eight awards/year and an Award Pool of \$18,000. The highest individual scholarship award ever made was \$5,000; the highest annual Award Pool was \$22,500.

(Continued on page 86)



THE TRUSTED LEADER IN ENVIRONMENTAL DRILLING SERVICES

Since 1985, SGS has helped set the standards of excellence in our industry.

SGS is the world's leading inspection, verification, testing and certification company.

SGS ENVIRONMENTAL DRILLING

Brian McGuire, General Manager

t. +1 800 962 7327

us.envdrilling@sgs.com

www.us.sgs.com/drilling

WHEN YOU NEED TO BE SURE

SGS

Fast & Accurate Surface and Borehole Geophysics

Acoustic & Optical Televiewer Logging

Borehole Video & Geophysical Logging

Multi-Electrode Resistivity Imaging

Seismic Refraction & Reflection

Radar, Magnetics, EM & VLF

**G E O P H Y S I C A L
A P P L I C A T I O N S**

I N C O R P O R A T E D

Holliston, MA • 508-429-2430

Do
More
than
Scratch
the
Surface...

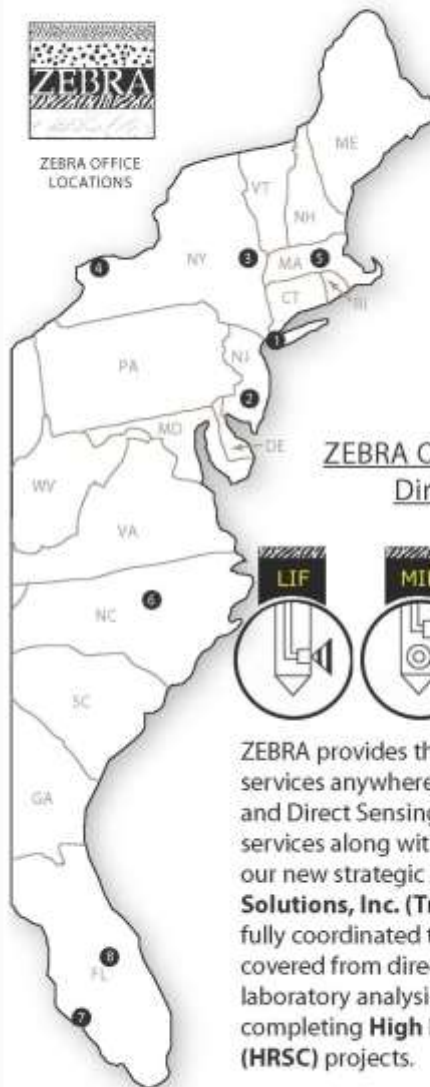
Ask about our geophysical instrument rentals

ZEBRA Environmental Corp.

Providing Subsurface Sampling, Injection and Data Collection
for Environmental Professionals Since 1992



ZEBRA OFFICE
LOCATIONS



Headquarters:
NYC, NJ &
Southern
CT Area

1 LYNBROOK, NY
516-596-6300

2 JACKSON, NJ
732-275-8333

Upstate NY &
New England

3 ALBANY, NY
518-355-2261

4 NIAGARA FALLS, NY
716-297-6567

5 UXBIDGE, MA
508-581-9880

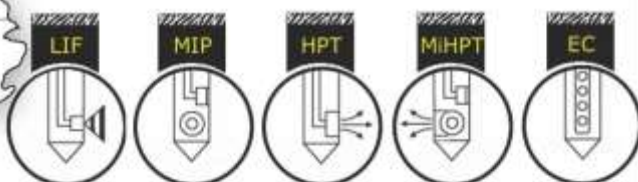
Southeast
Region

6 CARY, NC
813-626-1717

7 TAMPA, FL
813-626-1717

8 Orlando, FL
813-626-1717

ZEBRA Offers The Widest Range of Direct Sensing Services:



ZEBRA provides the widest range of Geoprobe/ DPT services anywhere, including a toolbox full of Injection and Direct Sensing systems. ZEBRA is now offering **UVOST** services along with **EC, MIP, MIHPT, CPT, MIP/CPT**. With our new strategic partnership with **TRIAD Environmental Solutions, Inc. (TriadES)** we are able to offer our clients a fully coordinated team of professionals. We have you covered from direct sensing to quantitative on-site laboratory analysis with DPT operators experienced in completing **High Resolution Sites Characterization (HRSC)** projects.

1-800-PROBE-IT

WWW.TEAMZEBRA.COM

BOYD ARTESIAN WELL CO., INC.

We design, manufacture and install round holes!

GEO THERMAL WELLS
WELL ABANDONMENT
ROTARY & PERCUSSION DRILLING
WELLS REPAIRED & DEEPEMED
COMPLETE WATER SYSTEMS
HYDROGEOLOGICAL CONSULTING
MONITORING WELLS

SPLIT SPOON SAMPLING
EXPLORATORY DRILLING
HYDROFRACTURING
IRRIGATION WELLS
SPECIALTY DRILLING
GRAVEL WELLS
SITE ASSESSMENTS



CARMEL, NY

(800) 321-2693

WWW.BOYDARTESIANWELLCO.COM



Site & Subsurface
Investigations

Geotechnical &
Environmental
Site Investigations

SOILTESTING, INC.

- Test Boring - Core Drilling
- Monitoring Wells
- Micro Piles
- Helical Piers
- Underpinning

53 Years of Drilling Services

140 Oxford Road, Oxford, CT 06478

1-800-388-4473

(203) 888-4531

fax (203) 888-6247



AARCO Environmental Services Corp.

Premier Drilling Company



AARCO Environmental Services Corp. is a premier full service environmental contracting company. Our expertise includes a wide variety of drilling services:

*Environmental Drilling, Geotechnical Drilling
Hollow Stem Auger, SONIC Drilling, Air
Rotary Drilling, Mud Rotary Drilling, Well
Installation, Well Decommissioning, Chemical
Injection, Direct Push, Remote Access,
Truck and Track mounted rigs.*

NY & NJ Licensed



AARCO Environmental Services Corp.

50 Gear Avenue, Lindenhurst, NY 11757

Ph: (631) 586-5900 Fx: (631) 586-5910

www.aarcoenvironmental.com

NEW ENGLAND BORING CONTRACTORS OF CT., INC.

129 KREIGER LANE, GLASTONBURY, CT 06033

THE RIGHT EXPERIENCE, THE RIGHT EQUIPMENT, THE RIGHT COMPANY

Serving New England, NY & NJ

- Test Borings
- Monitor Wells
- Construction Drilling
- Multi-Rig Capabilities



www.newenglandboring.com

(800) 410-5550 • (860) 633-4649 • FAX: (860) 657-8046



Maine Test Borings

18 Mack Lane
Hermon, ME 04401

Jon Rudnicki

Ph: (207) 848-7041
Ph: (800) 698-9142
Cell: (207) 659-1749

Fx: (207) 848-7042
www.mainetest.com
jon@mainetest.com

Want to reach more clients? How about over 800?
Then ADVERTISE!

Contact Dick Young 973-335-2289 or email
RYoungNJ@aol.com **to get your company's advertisement**
in the newsletter.

We offer all size ads from full page to business card size
and full color to black-and-white.

(Article continued from page 44) including the Dashuigou tellurium deposit.

No intrusive rocks emerge within a 5 km radius around the deposit. Only two small Permian ultrabasic-basic rock bodies emerge within a 10 km range of the deposit. Large neutral, acid and alkaline intrusive bodies exist beyond 10 km, which are unrelated to the deposit.

Quantitative chemical analyses of Te, Bi, Se, As, Au, Ag, Cu, Pb and Zn were conducted on different rock samples including granites, metamorphic rocks, altered rocks, and carbonate veins of different geological times. The main findings are summarized below^{3,4,5,6,7,8,9}.

The Te content in the granites is under 1×10^{-7} , which is similar to its Clark value in the Earth's crust. Te in the metamorphic rocks is slightly higher than in the granites and varies slightly between metamorphic rocks of different geological times, while being relatively higher in the Triassic metamorphic rocks. Of the metamorphic rocks in the same geological time, the Te content in the slate and schist is higher than in the marble. Te content in rocks of the same stratohorizon of the same geological time also varies; namely, it is higher in rocks within the mining area than in those beyond the mining area. Te content is closely related to the intensity of alterations; that is, the ore-forming elements are not derived from the country rocks, but instead from the mantle.

The deposit is located at the northeastern end of the Triassic metamorphic dome. The ore bodies are controlled by and fill a group of shear fractures. Nine tellurium

(Article continued on page 54)

ore veins have been discovered, which strike from 350 to 10 degrees and dip at 55 to 70 degrees westward. Widths of the ore bodies vary between 25 and 30 cm. The narrow ore bodies are in the shape of lenticular veins and have sharp contact with the wall rocks.

The altered rocks occur in narrow bands ranging between several centimeters and one meter in thickness. Altered zones beside the massive ore veins are narrower, at only several centimeters wide. The dominant alterations include dolomitization, silicification, biotitization, muscovitizaion, tourmalinization, sericitizaion, greisenization, and chloritization.

Approximately thirty minerals are identified in the ore, which include tetradymite, pyrrhotite, pyrite, dolomite, quartz, chalcopyrite, tsumoite (BiTe), tellurobismuthite (Bi_2Te_3), galena, magnetite, gold, silver, electrum, ilmenite, calcite, calaverite, siderite, mannesite, rutile, muscovite, biotite, sericite, hornblende, chlorite, plagioclase, K-feldspar, tourmaline, hematite, garnet, apatite, and epidote. The first five minerals are the most important and comprise 85% of the ore^{3,4,5,6,7,8,9}, though tetradymite is so rare that many monographs on mineralogy do not have any related data on it^{10,11,12}.

Replacement, remnant, reaction border, and granular are the dominating textures of the ore. Massive, vein/veinlet, stockwork veins are the dominating structures of the deposit (Figs. 2 and 3). The most important ores are massive and the secondary ores are disseminated. The Te content in the ore varies between 0.01% and 34.58%.



Figures 2 & 3—Lead grey-silvery colored tetradymite ± tsumoite (BiTe) ± tellurobismuthite (Bi_2Te_3) fine veinlets in massive pyrrhotite (dark colored) + dolomite (brownish white) + wall rock (dark brown) from the deposit (sample #: SD34, Ore body #I-1 in Drift 3) and sample #: SD40, Ore body #I-1 in Drift

Mineralogy of Tetradymite

Mineragraphy

Tetradymite is the most common telluride and makes up more than 90% of all the tellurides of the deposit. It occurs as a silvery-white fine- to coarse-grained flake with one group of complete cleavages and lower Moh's hardness (1.4 ~ 2.1).

In addition to tetradymite, tsumoite (BiTe) and tellurobismuthite (Bi_2Te_3) occur as lamellar and myrmekitic intergrowths within tetradymite. These fine-grained minerals are therefore hard to separate (Figs. 2 and 3).

Members of the tetradymite group present complex problems, many of which remain unsolved due to incomplete data¹⁵.

The group of compounds in the four-compound system Bi-Te-Se-

(Article continued on page 56)

S represents a particular challenge, not least because the number of natural occurrences of the phases that have been comprehensively documented remains limited¹⁶. The difficulties are compounded by the rarity of the species, the varying quality and limited quantity of published data including reflectance and micro-pressure hardness of tetradymite, and by the invariably smaller-grained size and intergrown character of the mineral. Since the published data on reflectance and micro-pressure hardness of tetradymite is not plentiful, it does not permit a comparison and confirmation regarding the normality of these results.

Chemical Compositions & Formula

Four of the nine tellurium veins in total had been mined out by the time this research started. As a result, all samples were collected from the five remaining veins. Chemical compositions of the tetradymite analyzed by electronic probe are listed in Table 1.

sample #	Vein	Te	Bi	S	Fe	Cu	As	Ni	Zn	Au	Ag	Total	chemical formula
SD34	* I-4	34.75	60.29	4.57	0.03	0.04	0.09	0.01	0.05	0.01	0.02	99.90	Bi _{12.00} Te _{11.89} S _{2.99}
SD36	* I-5	34.80	60.24	4.42	0.03	0.02	0.10	0.02	0.06	0.02	0.04	99.75	Bi _{12.00} Te _{11.89} S _{2.99}
SD41	* I-1	34.54	60.22	4.81	0.13	0.04	0.00	0.02	0.06	0.03	0.04	99.89	Bi _{12.00} Te _{11.89} S _{2.98}
SD45	* I-2	34.38	59.48	4.70	0.03	0.04	0.00	0.15	0.10	0.01	0.08	99.05	Bi _{12.00} Te _{11.89} S _{2.95}
SD53	* I-10	34.58	60.03	4.71	0.14	0.05	0.05	0.09	0.10	0.03	0.02	99.80	Bi _{12.00} Te _{11.89} S _{2.92}
SD59	* I-10	34.57	60.21	4.38	0.09	0.05	0.05	0.09	0.11	0.03	0.00	99.58	Bi _{12.00} Te _{11.88} S _{2.95}
average		34.60	60.08	4.61	0.08	0.04	0.05	0.06	0.09	0.02	0.03	99.66	Bi _{12.00} Te _{11.89} S _{2.90}

Table 1 Electron-microprobe data of tetradymite from the Dashuigou tellurium deposit (%).



"We look into the earth"

PENNSYLVANIA DRILLING CO.

FOUNDATION TESTING

MONITORING WELLS

DAM DRILLING

ENVIRONMENTAL WORK

"PENNDRIILL" DRILLING SUPPLIES

MONITORING WELL SUPPLIES &

MANUFACTURING

INCORPORATED 1900

281 ROUTE 30

IMPERIAL, PA 15126

PHONE 724-695-2400

FAX 724-695-2455

800-245-4420

www.pennsylvaniadrillingco.com



SB CHURCH

WELL & PUMP SERVICES SINCE 1886

49 Great Hill Road, Oxford, CT 06478

203.888.2132

www.sbchurchco.com

GET TO THE SOURCE... THE FIRST TIME!



with Horizontal Remediation Wells

Some of the benefits:

- No business interruption during installation
- Maximum exposure to contaminants
- Cost efficient
- Reduced maintenance equipment, and operations cost.

And a few of the applications are:

- Horizontal Air Sparging
- Horizontal Soil Vapor Extraction
- Horizontal Bio Remediation
- Horizontal Soil Sampling
- Chemical Oxidation
- And many more...

DIRECTIONAL
Technologies, Inc
Horizontal Directional Drilling Services

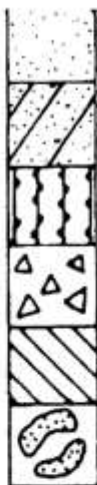
203.294.9200

www.directionaltech.com | Email: ksequino@directionaltech.com

CARL VERNICK, P.E.
President

SOIL MECHANICS DRILLING CORP.

3770 MERRICK ROAD • SEAFORD, L.I., NEW YORK 11783
(516) 221-2333



Test
Borings

3770 Merrick Road
Seaford, New York 11783
Phone (516) 221 - 7500
Fax (516) 221 - 0254

SOIL MECHANICS

Environmental Site Assessments
Geoprobe Environmental Sampling
Inspection-Testing-Drilling

Carl Vernick P.E.
President

Based on the results presented in Table 1, chemical compositions of the tetradyomite samples collected from different ore bodies of the mine are very similar: Te content varies between 34.38~34.80% with a maximum difference of 0.42% and average of 34.60%; Bi content varies between 59.48~60.29% with a maximum difference of 0.81% and average of 60.08%; S content varies between 4.38~4.81% with a maximum difference of 0.43% and average of 4.61%.

Synthetic tetradyomite ($\text{Bi}_2\text{Te}_{1.9}\text{S}_{1.1}$), which is similar to the tetradyomite from the Dashuigou deposit, and two compounds, $\text{Bi}_{48}\text{Te}_{21}\text{S}_{31}$ and $\text{Bi}_5\text{Te}_3\text{S}_2$, were generated at 400 °C. Sulfur-rich tetradyomite appears more chemically stable than stoichiometric $\text{Bi}_2\text{Te}_2\text{S}_{16}$.

The contents of trace elements in the tetradyomite are similar to those in the mine's pyrrhotite and pyrite. The only difference is tetradyomite is richer in gold than both the pyrite and pyrrhotite, which is identical to the observation results under microscope study of the minerals. This indicates that gold formed in the tellurium epoch mentioned above.

X-Ray Power Diffraction Data

Due to insufficient quantity of the tetradyomite mineral, single-crystal X-ray studies are lacking and previous X-ray diffraction data and unit cell parameters of tetradyomite were mainly obtained via crystal powder photography, the accuracy of which is not very satisfactory.

The quantitative phase analysis of one powder sample (#SD-40, Fig. 3) using the RIETVELD method and X-ray powder diffraction data, Project 1902410 – PO# 18576, was done by Jacob Kabel, and Dr. Elisabetta Pani, et al. from Dept. of Earth, Ocean & Atmospheric Sciences, the University of British Columbia, Canada in December, 2019.

Experimental Method and Procedure

The sample SD-40 was reduced to the optimum grain-size range for quantitative X-ray analysis ($<10\ \mu\text{m}$) by grinding under ethanol in a vibratory McCrone Micronizing Mill for 10 minutes. Continuous-scan X-ray powder-diffraction data were collected over a range $3\text{--}80^\circ 2\theta$ with $\text{CoK}\alpha$ radiation on a Bruker D8 Advance Bragg-Brentano diffractometer equipped with an Fe filter foil, $0.6\ \text{mm}$ (0.3°) divergence slit, incident- and diffracted-beam Soller slits and a LynxEye-XE detector. The long fine-focus Co X-ray tube was operated at 35 kV and 40 mA, using a take-off angle of 6° .

Results

The X-ray diffractogram was analyzed using the International Centre for Diffraction Database PDF-4 and Search-Match software by Bruker. X-ray powder-diffraction data of the sample were refined with Rietveld program Topas 4.2 (Bruker AXS). The results of quantitative phase analysis by Rietveld refinements are given in Table 2. Another X-ray crystal

(Continued from page 42)

I intended on using the funds to attend AG-220 Environmental Change in the High Arctic Landscape of Svalbard at the University Centre in Svalbard as my field camp. Due to the recent outbreak of COVID-19 my course has been cancelled but I will be using the funds to cover tuition and any future field camp expenses.

This scholarship will reduce the financial burden of achieving my educational dreams. Because of your generosity, I will be able to focus on my studies rather than worrying about finances. I cannot thank you enough for this generous award. I hope that one day I will be able to help students finish their education just as you have done for me.

Lauren Carver, University of Maine

I have just received the letter and check today and I am really thankful and happy for this scholarship. This is a great help for me and a great encouragement to continue and successfully finish my undergraduate degree as a geologist. I appreciate and thank you and the committee that chose me as one of the recipients for the Angelo Tagliacozzo Memorial Geological Scholarship. I am planning to use this check towards the fees for my undergraduate degree.

Again, thank you very much for this scholarship, it will be a huge help for me. I will spread the word virtually to my department with great joy.

Klementina Mato, Salem State University

(End)

SOIL
BORING

(203) 758-5817 Phone
(203) 758-0822 Fax

ROCK
CORING

Portable
Skid/Propane
Track
Truck Rigs


**General
Borings,
Inc.**
SUB-SURFACE INVESTIGATIONS

Monitor Well
Specialists
OSHA
Certified

OBSERVATION
WELLS

P.O. Box 7135
Prospect, CT 06712

CONCRETE
CORING



Environmental laboratory solutions provided for your most demanding applications.

The 6th largest environmental testing laboratory in the United States and the largest privately family owned laboratory in the country with more than 50,000 square feet of state-of-the-art laboratory facilities offering:



Air



Sediment & Tissue



Forensic Petroleum



Regulatory Soil



Regulatory Water



Emerging Contaminants

For more information please
contact us at 800-624-9220
info@alphalab.com
www.alphalab.com

Westborough, MA | Mansfield, MA | Brewer, ME | Portsmouth, NH
Mahwah, NJ | Albany, NY | Buffalo, NY | Rochester, NY | Syracuse, NY | Holmes, PA

(Article continued from page 61)

Mineral	ICSD Collection Code	Ideal Formula	SD-40
Tetradymite	26720	$\text{Bi}_2\text{Te}_2\text{S}$	51.5
Tsumoite	100654	BiTe	11.5
Tellurobismuthite	74348	Bi_2Te_3	1.9
Pyrrhotite 4 C	42491	Fe_7S_8	26.1
Ankerite – Dolomite	66333	$\text{Ca}(\text{Fe}^{2+}, \text{Mg}, \text{Mn})(\text{CO}_3)_2 - \text{CaMg}(\text{CO}_3)_2$	8.1
Chalcopyrite	80095	CuFeS_2	0.5
Quartz	174	SiO_2	0.4
Total			100

Table 2—Results of quantitative phase analysis (wt.%) – project 1902410 –

Mineral	ICSD Collection Code	Ideal Formula	SD-40
Tetradymite	26720	$\text{Bi}_2\text{Te}_2\text{S}$	51.5
Tsumoite	100654	BiTe	11.5
Tellurobismuthite	74348	Bi_2Te_3	1.9
Pyrrhotite 4 C	42491	Fe_7S_8	26.1
Ankerite – Dolomite	66333	$\text{Ca}(\text{Fe}^{2+}, \text{Mg}, \text{Mn})(\text{CO}_3)_2 - \text{CaMg}(\text{CO}_3)_2$	8.1
Chalcopyrite	80095	CuFeS_2	0.5
Quartz	174	SiO_2	0.4
Total			100

Table 3—Table 4 Results of quantitative phase analysis (wt.%) – project

(Article continued on page 67)



GEOD CORPORATION

AERIAL PHOTOGRAMMETRY • LAND SURVEYING • SUE

GEOD OFFERS YOU:



Photogrammetric Mapping • GIS Base Mapping



Subsurface Utility Mapping



Land & Engineering Surveying



Construction Surveys



Laser Scanning

24 Kanouse Road, Newfoundland, NJ 07435
Telephone: 973-697-2122 ■ Fax: 973-838-6433
Email: marketing@geodcorp.com
Website: www.geodcorp.com



***Specializing Exclusively in
Land, Marine, and Borehole Geophysics***

TECHNIQUES

Ground Penetrating Radar
Seismic Refraction/Reflection
Magnetics
Microgravity
Electromagnetics
Resistivity
Electrical Imaging
Spontaneous Potential
Multibeam Sonar

Metal Detection
Side Scan Sonar
Hydrography
Geoelectric Leak Detection
Induced Polarization
Sub-Bottom Profiling
X-Ray Fluorescence
Acoustic Leak Detection
Borehole Logging and Imaging

APPLICATIONS

Rock Depth/Rippability Mapping
UST / Drum Detection
Utility Detection / Tracing
Well/Water Supply Siting
Fracture Detection
Sinkhole Mapping
Ordnance Detection
Rebar and Cable Mapping
Grave Detection
Contaminant Plume Mapping
Landfill Liner Leak Mapping
Boring Location Clearance
Subgrade Washout / Void Mapping
Seafloor Mapping

Shipwreck Location
Seismic Hazard Studies
Hydrocarbon Detection
Seismic Site Classification
Bathymetric Surveys
Well Characterization
Well Construction Confirmation
Bridge Pier Scour Detection
Archeogeophysical Surveys
Septic System Delineation
Blast and Vibration Monitoring
Detection of Foundation Elements
Water Table Mapping
Buried Landfill Detection

7 REASONS TO USE ENVIROSCAN

Geophysics is our only product - so we really know what we're doing.
We own all the gear for all techniques - so we use the right tools every time.

Since we do only geophysics, we are not your competitor!

We have 4 licensed PGs on-staff managing or reviewing every project.

We provide fully electronic / digital / GPS-based mapping and reporting.

We provide one-stop shopping for land, marine, and borehole geophysics.

We are WBE - certified.



717-396-8922

1051 Columbia Avenue • Lancaster, PA 17603

www.enviroscan.com



powder diffraction analysis done in lab of the Research Center of Standard Materials, China Academy of Metrological Sciences, Beijing of China reveals that the tetradyomite from the Dashuigou tellurium deposit is different than that from the Paonia mine in Colorado, US, but similar to kawazulite from the Kawazu mine in Japan. Even so, tetradyomite from the Dashuigou deposit is lacking in Se compared to the Japanese kawazulite.

Kawazulite, $\text{Bi}_2\text{Te}_2\text{Se}$, which was originally described by Kato (1970) as the Se analogue of tetradyomite, is isostructural with tetradyomite, which has been synthesized by Glaz (1967), Evdokimenko and Tsy-pin (1971), and Abrikosov and Beglaryan (1973). The compositional limits of tetradyomite have been known to be $\text{Bi}_2\text{Te}_2\text{S}$ - $\text{Bi}_2\text{Te}_{1.7}\text{S}_{1.3}\text{As}$ determined by Kuznetsov and Kanishcheva (1970). Pauing (1975) explained why the substitution of Te by S increases the chemical stability. The calculated intensities of an X-ray powder-diffraction pattern of kawazulite with the ordered tetradyomite structure type are similar to the visually estimated observed X-ray powder-diffraction intensities of kawazulite (PDF 29–248). The visually estimated observed intensity data is not sufficiently accurate to exclude partial ordering of Se and Te¹⁵. Extensive solid-solution between S- and Se-bearing end members can be documented in many series; for instance, tetradyomite – kawazulite, and continuous solid-solution between tetradyomite and kawazulite is well developed¹⁶.

The Layne logo is enclosed in an oval with a 3D effect.

**Resource Development
and Maintenance**



Water Treatment

Layne Christensen's well-trained field crews and experienced staff work with clients to:

- Develop new water sources
- Rehabilitate existing wells, through either chemical or mechanical processes
- Provide pump service (new sales, repairs and installation)

Layne Christensen's professional engineers can assist in determining an appropriate treatment technology. We then fabricate systems scaled to each client's requirements.

Experienced • Equipped • Committed

... Since 1882

New England • (978) 937-2242

New York • (518) 295-8288

Long Island • (631) 218-0749

Looking for Material for the Northeast Section Newsletter— We want you!



From the Editor

There is plenty of room for growth in the Newsletter, and the digital/internet versions offer many opportunities to add value to your organization.

Thus, if you are interested, email Editor Brandon Tufano at btufano@integral-corp.com or Dick Young at ryoungnj@aol.com.



50 Gear Ave
Lindenhurst, NY 11757

LPS/OSHA/CPR
Certified

Phone: (631) 979-2890
Fax: (631) 979-2891
Email: locator@optonline.net
Web: www.x-raylocating.com

We offer:

- Line Locating
- Ground Penetrating Radar (GPR)
- Video Pipe Inspection (DVD supplied)
- Digital Mapping/Reports
- Fault Locating

Short notice? No problem.
Call us and we'll work with
you.

We work on commercial,
residential, industrial and
government properties

We find buried:

- Electric and Communication cables
- Water and Gas lines
- Sewer and Drainage pipes
- Metallic/Non-metallic pipes
- Tanks
- Cesspools/Drywells
- Manhole Covers
- Valves
- Pull-Boxes/Splice Boxes

Our employees are
professional, courteous
and accommodating

Visit our website
www.x-raylocating.com
and fill out our
Mark-out Request Form



X-ray
Utility Locating Service
(631) 979-2890
locator@optonline.net

Pyroelectricity

It is believed that pyroelectricity of minerals can be used to determine their origin and process of formation. Unfortunately, there existed no pyroelectricity data of tetradymite prior to the research of this paper.

Pyroelectricity of minerals can be divided into N (electron) type, P (electron hole) type and the mixed N and P type.

The tetradymite from Dashuigou deposit is completely of N conduction type. All of its pyroelectricity is negative, and the values are both close to each other and vary between $-209.0 \sim -274.0 \mu\text{V}/^\circ\text{C}$. With a maximum difference of $-65.0 \mu\text{V}/^\circ\text{C}$ and an average of $-243.12 \mu\text{V}/^\circ\text{C}$, the data implies that the tellurium veins were all formed in the same geological event and from the same source.

The negative pyroelectricity of the tetradymite resulted from insufficient sulfur, As and Se impurities, and other isomorphous mixtures of Te in tetradymite.

Sulfur and Lead Isotopes of Tetradymite

Sulfur isotope results of the dominant sulfides collected from various veins of the deposit are provided in Table 10. It can be seen that sulfur isotopes of various sulfides formed in different veins of different metallogenic epochs and/or stages are very close to each other, varying within a narrow range with an average below 1‰, a crest value around 0.6‰, and a clear tower effect (Figure 4).

(Article continued on page 71)

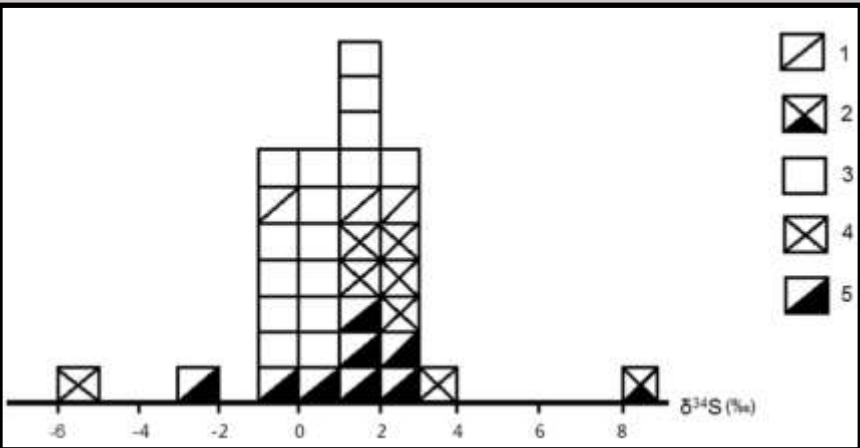


Figure 4 - Histogram of $\delta^{34}\text{SCDT}$ (‰) of the dominant sulfides from the Dashuigou deposit. (35 samples in total included in Table 10). 1. chalcopyrite, 2. chalcocite, 3. tetradymite, 4. pyrite, 5. Pyrrhotite

Cao and Luo researched and published their $\delta^{34}\text{SCDT}\%$ results of 1.13~3.17 with an average of 1.9617, which indicated that sulfur isotopes of the Dashuigou deposit were very homogeneous and thus originated from the deep mantle.

In general, sulfur isotopes of the deposit are very similar to those of meteorite, moon rock and mantle-derived materials, indicating that the sulfurs are from the mantle. This finding is in agreement with Cao and Luo's studies¹⁷. The $\delta^{34}\text{SCDT}\%$ of series #16 & #22 samples, which are collected from regional country rocks far from the deposit, clearly deviate from that of samples collected from the deposit.

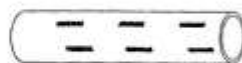
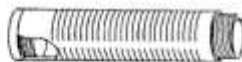
The series #16 sample is coarse- to very coarse-grained cubic pyrite in the upper Permian metamorphosed basalt to the south of



**Atlantic
Screen &
Mfg., Inc.**

Manufacturers of Slotted & Perforated Pipe
ranging from 1/2" to 24" in diameter

- Well Rehab. Products
- Manholes
- Bentonite
- Filter Sock
- Inline Chemical Mixers
- Sampling Bailers
- Clear PVC Pipe
- Locking Caps



302-684-3197

FAX 302-684-0643

142 Broadkill Rd. • Milton, DE 19968

www.atlantic-screen.com

email: atlantic@ce.net



COMPLETE ENVIRONMENTAL TESTING, INC.

80 Lupes Drive
Stratford, CT 06615

Contact Robert Blake
Technical Sales Representative

Tel (203) 377-9984
Fax (203) 377-9952
E-mail: rblake@cetlabs.com
www.cetlabs.com

- Since 1886 -

SAMUEL STOTHOFF CO., INC.

Flemington, NJ

**WATER AND MONITORING WELL DRILLING
ROTARY -AUGER-CORE-PROBE RIG
DOWN HOLE VIDEO INSPECTION SERVICES
HYDROFRACTURING & WELL REDEVELOPMENT
7 PUMP SERVICE TRUCKS AND INVENTORY OF 400 PUMPS**

**Dick Stothoff
FAX: 908-782-9528**

**David Lyman
Phone: 908-782-2116**



Online Continuing Education Courses for Geologists and Engineers



Satisfy Your Continuing Education Requirements Easily and Inexpensively

Course #1001

Pyrite at Skytop: I-99 History and Geologic Setting

Course #1002

Pyrite at Skytop: Local Geology

Earn 4.0 PDH credits for each course

www.gmre.co/education.php

Arnold G. Doden, Ph.D., P.G.
Geologic Mapping and Resource Evaluation, Inc.
925 W. College Ave., State College, PA 16801

Phone: 814.571.7716
Email: Arnold@gmre.co
www.gmre.co/education.php

(Article continued from page 71)

the deposit, while the series #22 sample is chalcocite from the Shaoyaocao copper showing, demonstrating a connection to the basic to ultra-basic intrusive to the east of the deposit. In theory, $\delta^{34}\text{SCDT}\%$ of these two samples should be close to that of mantle-derived materials ($-3 \sim 2$), since their wall rocks are from the mantle. In fact, they are not similar to each other, which may be owed to the post metamorphism after their formation.

$\delta^{34}\text{SCDT}\%$ of all the pyrrhotite samples varies between $-3.1 \sim 2.1$ with an 8-sample average of 0.175, close to that of the meteorite, indicating that they are mantle derived. Meanwhile, $\delta^{34}\text{SCDT}\%$ of all the pyrite samples is between $1.4 \sim 2.8$ with a 6-sample average of 1.717, also close to that of meteorite and implying that they too are mantle derived.

(Article continued on page 76)





Providing Critical Environmental Data on Properties Throughout the U.S.

Envirosite's cost-effective government records database and historical property research solutions are used industry-wide for:

- Environmental Site Assessments (ESAs)
- Environmental Risk Management
- Phase 1 & 2 Reporting
- RSRA Desktop Reviews
- Due Diligence



Our solutions provide near real-time data delivery. Receive the environmental information you need – when you need it.

*Contact us at **866-211-2028** and reference our NEAIPG newsletter ad for a **FREE TRIAL REPORT**.*



HOW DO YOU ACCESS DIFFUSION LIMITED PORE-SPACE?

With **COMPLETE CONTROL** of injection **DIRECTION**,
RADIUS, and **VELOCITY**.

From the grounds of Space Launch Complex 15 at Cape Canaveral,

BADGER INJECTION SOLUTIONS, LLC

is now servicing the Northeast with kinetically adjustable pore space dilation injection techniques to emplace your selected in-situ treatment amendment.

It's all about **CONTACT**, and the
Badger Technology **DELIVERS**.

- DAILY injection volumes average 2,500 GALLONS with injection rates of up to 35 GALLONS PER MINUTE
- TARGET SPECIFIC TREATMENT AREAS using a selection of nozzle arrays (360°, 270° or 180°) with a MINIMUM RADIUS OF 15-FEET
- VARIABLE INJECTION FLOW RATES - essential in allowing amendments to diffuse into limited pore spaces



Environmental Assessment & Remediations is the certified BADGER technology provider for the Northeast.

**Contact us NOW to coordinate your
INJECTION SERVICES for 2016!**

(631) 447-6400 ext 153

allen@enviro-asmnt.com

badgerinjectionsolutions.com



ENVIRONMENTAL
ASSESSMENT &
REMEDICATIONS

$\delta^{34}\text{SCDT}\text{‰}$ of both the deposit's pyrrhotite and pyrite formed in the same metallogenic epoch are in a similar narrow scope. For samples #SD-29 and SD-55 in Table 10, $\delta^{34}\text{Spyrite}\text{‰} < \delta^{34}\text{Spyrrhotite}\text{‰}$, suggesting that the sulfur exchange between pyrite and pyrrhotite of these samples did not reach balance. For samples #SD-23 and SD-41 in Table 10, $\delta^{34}\text{Spyrite}\text{‰} > \delta^{34}\text{Spyrrhotite}\text{‰}$, indicating that sulfur exchange between pyrite and pyrrhotite of these samples reached balance.

As shown in Table 10 and briefly discussed above, $\delta^{34}\text{SCDT}\text{‰}$ of both pyrrhotite and pyrite varies within a very narrow range, indicating that sulfur exchange between pyrite and pyrrhotite became highly uniform and achieved balance. For the pyrrhotite (Pyr) and pyrite (Py) veins of the deposit's early metallogenic epoch, the specific equation should be as follows:

Taking $X_1 = 98\%$ (Pyr% by volume of total sulfides in the veins) and $X_2 = 2\%$ (Py% by volume of total sulfides in the veins), average values of $\delta^{34}\text{SPyr}\text{‰}$ and $\delta^{34}\text{SPy}\text{‰}$ are respectively 0.175 and 1.817; therefore, $\delta^{34}\text{S}\Sigma\text{s}\text{‰}$, the general sulfur component of the early metallogenic epoch's metallogenic hydrothermal solution should be:

The general sulfur component of the early metallogenic epoch's hydrothermal solution is close to that of the meteorite and also indicates that the deposit's sulfur is derived from the mantle.

Sulfur isotopes of tetradymite (Tt) formed in the late tellurium epoch of the deposit vary narrowly between $-0.5\sim 2.1\text{‰}$, with a range value of 2.6‰ , a peak value around 0.5‰ , and a 15-sample

average of 0.56‰, also close to that of the meteorite and mantle materials. Sulfur isotopes of chalcopyrite (Cp) of the late tellurium epoch vary between -1.4‰ and 1.9‰ with a range of 2.3‰ and a 3-sample average of 0.33‰, likewise close to that of the meteorite and mantle materials.

The general sulfur component of the late tellurium metallogenic epoch's hydrothermal solution is close to that of the meteorite and demonstrates that the deposit's sulfur is derived from the mantle.

Per discussions on sulfur isotopes of the deposit's minerals above, the authors' preliminary conclusions are that $\delta^{34}\text{S}$ of both single sulfide minerals from different veins of different metallogenic epochs and the general total sulfur isotope components of the deposit's metallogenic hydrothermal solutions vary within very narrow scopes with very small ranges close to 0.0‰. As a result, the deposit's sulfur is very close to that of the meteorite and may be derived from the mantle.

Lead isotope

Lead isotope results of samples collected from the study area are listed in Table 11, and further summarized in Table 12. Model lead ages in Table 11 vary significantly between 0.00 ~ 916.25 Ma, likely indicating that the lead isotopes mainly consist of more radioactive lead which is not homogeneous and thus results in strong anomalous model ages.

Figure 3 shows the components of lead in the study area. According to Zhang¹⁸, the area to the left of $206\text{Pb}/204\text{Pb} = 18.5$ is generally the evolutionary area of normal lead, while to the

(Continued from page 77)

right is the evolutionary area of anomalous leads. This confirms that lead isotopes in the study area, especially those of ore samples from the deposit, are not uniform. As a result, the model lead ages does not make sense geologically.

In general, the lead isotopes of pyrite are more homogeneous than that of pyrrhotite, with the least uniformity in tetradymite.

(Article Continued on page 79)



EMPIRE GEO
SERVICES, INC.
A SUBSIDIARY OF SJB SERVICES, INC.

"Quality and Service - the way it used to be."

- Subsurface Exploration
- Geotechnical Engineering
- Geotechnical Laboratory Testing
- Special Inspections
- Construction Materials Testing
- Environmental Services
- SWPPP Monitoring
- Storm Water Infiltration Testing
- Asbestos Abatement Monitoring



1.800.821.5911 • info@sjbegs.com • www.sjbegs.com

Offices in: Albany, Buffalo, Cortland, Jamestown and Rochester, NY

(Continued from page 78)

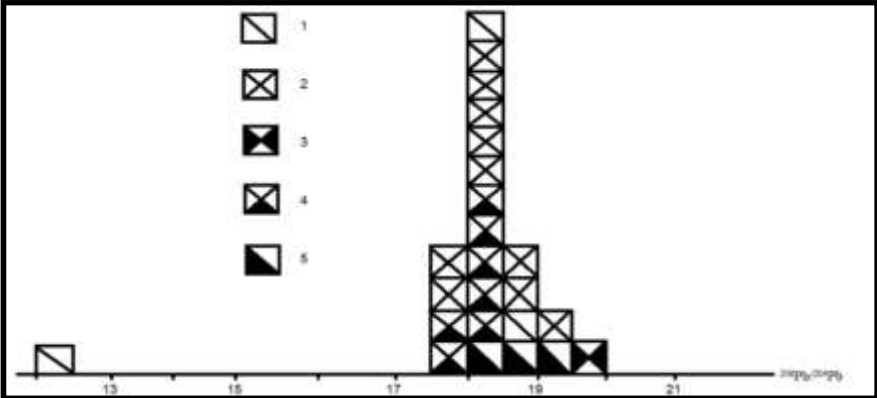


Figure 5—Histogram of $^{206}\text{Pb}/^{204}\text{Pb}$ of samples from the study area. 1. slate, 2. pyrrhotite from the deposit, 3. granite, 4. pyrite from the deposit, 5. tetradymite from the deposit.

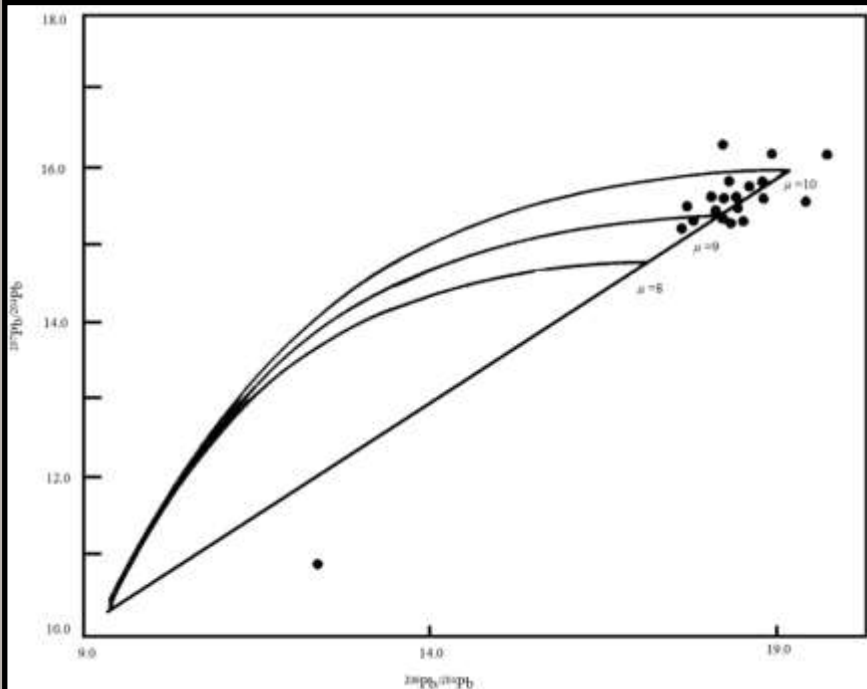


Figure 6— $^{207}\text{Pb}/^{204}\text{Pb}$ - $^{206}\text{Pb}/^{204}\text{Pb}$ diagram of samples from the study area. (The single-stage evolution isochron and growth curve diagram of lead isotopes, part of the samples coincide with each other on the diagram).

(Article continued on page 80)

Parent rock of the slate is mantle derived basaltic rock^{3,5,6}. It can be seen that the deposit's wall rock slate is mantle derived, though post metamorphism made it deviate from the lead of pure mantle materials. Upon synthesizing lead isotope results of slate and schist from the middle-lower Triassic ages published by former researchers in the study area, lead isotope deviations caused by the post metamorphism become clear.

Lead isotope of the deposit's middle-lower Triassic marbles in Table 12 is similar to that of the upper crust in Table 13. Lead isotope of the lower Permian metamorphosed basalt as well as that of pyrite in the basalt are between those of the mantle and the lower crust. Likewise, lead isotope of the granite of the Indo Chinese epoch is similar to that of the upper crust, though it was possibly contaminated with the lead from the crust.

In comparison to Table 14, it can be seen that lead isotopes of the granite at the Niubeishan outside the deposit and those of the wall rocks at the deposit, including slate, schist, marble and metamorphosed basalt as well as the pyrite in the basalt, are similar to that of the post Cambrian rocks.

As demonstrated in Tables 11, 12 and 13, the isotopes of pyrite and pyrrhotite of the same metallogenic epoch of the deposit are similar to each other and similar to that of the mantle, indicating that the ores' leads are derived from the mantle. Lead isotopes of the tetradymite formed in the late metallogenic epoch are

both similar to and different from that of pyrite and pyrrhotite formed in the early metallogenic epoch of the deposit, implying that lead isotopes of the late metallogenic epoch are mixtures of lead from both the mantle and the crust (Fig. 9).

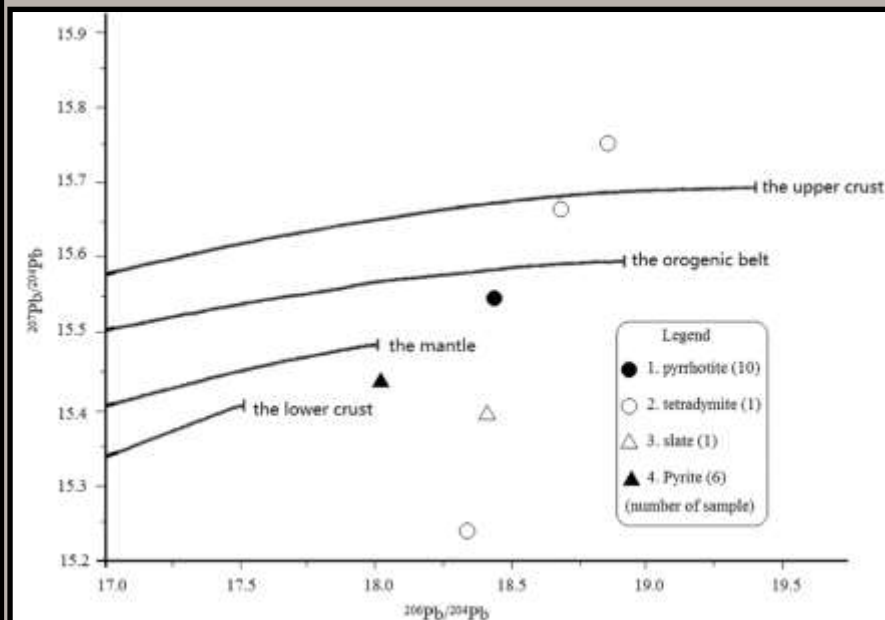


Figure 7— $^{207}\text{Pb}/^{204}\text{Pb}$ - $^{206}\text{Pb}/^{204}\text{Pb}$ diagram of rocks/minerals from the study area.

Lead isotopes of tetradymite from different ore veins are different from each other. This likely implies that:

Emplacement of the ore bodies completed in such a short period of time that lead isotopes in the ore did not have sufficient time to homogenize.

When quickly uplifting and emplacing, the ore bodies rose in the form of ore pulp, during which lead isotopes from the crust were captured and mixed with the original mantle derived isotopes. This

PIGGYBACKING: SERVICE EXPANDED FOR NE/AIPG ADVERTISERS!

The NE/AIPG Newsletter has again expanded its Piggybacking options offered to Advertisers. Advertisers can include promotional flyers or brochures along with NE/AIPG's normal distribution of the Newsletter.

Piggybacking gives NE/AIPG Advertisers a cost-effective way to get their promotional material into the hands of NE/AIPG's targeted audience of decision-makers. That audience has grown to over 800, including ~700 NE/AIPG Members and Applicants throughout New York, New Jersey, and the six New England states, as well as ~40± AIPG National and Section Officers, plus over 70 Advertisers, and others. NE/AIPG Members benefit from keeping current on available and innovative products and services.

Piggyback Rates for digital issues (see <http://issuu.com/neaipg/docs>):

1. A "Full Page" (~8" high by 5" wide) Space in Full Color costs \$125 per issue.
2. A "Double Full Page" (~8" high by 10" wide) Space in Full Color costs \$225 per issue.
3. A "Quad Full Page" (2 Doubles of ~8" high by 10" wide each) Space in Full Color costs \$425 per issue.

To schedule your Piggyback promotion, or to learn more, just call Dick Young at 973-335-2289 or e-mail RYoungNJ@aol.com.



Geo-Environmental Site Investigation Services

- Cone Penetrometer Testing • Piezo, Resistivity and Seismic Cones
- Ultra Violet Induced Fluorescence (UVIF) CPT, Natural Gamma (GCPT)
- Limited Access Drilling and Cone Penetration Testing
- Specialists in Overwater CPT Work
- Direct Push Geo-Environmental Soil Sampling
- Continuous Surface Wave Seismic Testing
- Groundwater and Vapor Sampling
- SPT Energy Calibration
- Customized Electronic Instrumentation
- Electric Piezometer Sales and Installation

ConeTec serving the U.S. And Canada with offices in:
West 1-800-567-7969 • East 1-800-504-1116
www.conetec.com • insitu@conetec.com
Vancouver, BC • Edmonton, AB • Salt Lake City, UT • West Berlin, NJ • Charles City, VA

CRAFTMANSHIP You Can Trust

Put our 65+ years of Experience to the test

Services Offered

- Environmental
- Construction
- Alternative Energy
- Maintenance



Visit us online @

www.islandpumpandtank.com



1-800-458-PUMP

Two Companies have Joined Forces!



ENVIRENT
corporation

Environmental RENTAL

**FREE
DELIVERY**
on rental
orders in
North Jersey

- PID'S
- Water meters
- Dust meters
- Bailers and
much more....

**Now bigger and better
with expanded capabilities
for all your equipment needs
while still providing the same
great personal service you expect.**

10% OFF
your first rental
with postcard

(800) 446-8736 and (800) 219-7368

www.environmentalrental.com

www.envirent.com

means that the lead isotope compositions can be used to determine the metallogenic mechanism of mineral deposits.

It is interesting to note that lead isotope of tetradymite from Ore vein #I-10 (series #22 sample in Table 11) is different from that of the series #24 sample collected at the footwall of Ore vein #I-10 in the same table. This may further confirm that tellurium ore bodies emplaced in the form of ore magma in a very quick process, during which captured and mixed leads from both the mantle and crust and made compositions of the lead isotopes very complicated.

It can be concluded on a preliminary basis that lead isotopes of the research area consist of more radioactive lead and are very inhomogeneous. The lead isotopes of the wall rocks slate, schist and metamorphosed basalt as well as the pyrite in the basalt are mantle derived, though overlapped with characteristics of lead of the later geological events. Lead isotopes of both pyrite and pyrrotite are close to each other and mantle derived, while that of tetradymite is different from the former, indicating that they formed in different metallogenic epochs. Lead isotope compositions reveal that tellurium ore bodies emplaced in the form of ore magma in a quick process. Finally, lead of the deposit was mainly from the mantle but also partially captured some lead from the crust.

Conclusions

Chemical formula of the tetradymite from the Dashuigou deposit is $\text{Bi}_{2.00}\text{Te}_{1.89}\text{S}_{1.00}$, which contains more Te but less S compared to

(Article continued from page 84)

the tetradymite with a chemical formula of $\text{Bi}_{2.00}\text{Te}_{1.65}\text{S}_{1.35}$ on the JCPDS card in 1979, indicating that the Dashuigou tetradymite was formed in an Te-rich but S-poor environment.

The negative values of the Dashuigou tetradymite's pyroelectricity indicate that it formed in an environment with low sulfur fugacity.

The sulfur isotope $\delta^{34}\text{S}$ of both single sulfide minerals including tetradymite from different veins of different metallogenic epochs, and the general total sulfur isotope components of the deposit's metallogenic hydrothermal solutions, vary within a very narrow scope and a very small range close to 0.0‰, indicating that the deposit's sulfur is similar to that of meteorites and may be derived from the mantle.

Lead isotopes of samples from the research area consist of more radioactive lead and are very inhomogeneous; lead isotopes of the wall rocks slate, schist and metamorphosed basalt as well as the pyrite in the basalt are mantle derived, though overlapped with characteristics of lead of the later geological events; lead isotopes of both pyrite and pyrrhotite are close to each other and mantle derived, while that of tetradymite is different from the former, demonstrating that they formed in different metallogenic epochs; lead isotope compositions reveal that tellurium ore bodies emplaced in a quick process mainly in the form of ore magma; lead of the deposit is mainly from the mantle but captured some other lead from the crust.

Data Availability

The data that support the findings of this study is available from the

(Article continued on page 88)

(Continued from page 81)

Getting back to the focus of this article, the term 'coming full circle' implies returning to an original starting point following a long series of events or changes. During this past academic year (2019-2020), two former scholarship recipients – Jeff Frederick and Nancy Price, returned and participated in the application process again, but this time in very different ways. Jeff Frederick received a \$500 scholarship in 1994 while attending Colgate University. Jeff, a NE Section ExCom member since 2010 who served twice as NE Section President and who has made countless other major contributions to both the NE Section and AIPG National, participated this year as a member of the Scholarship Committee – reviewing and evaluating the 19 applications received. Nancy Price received a \$1,000 scholarship in 2004 while she was a student at The Richard Stockton College of New Jersey (now Stockton University). Some of you may remember that Nancy also wrote a column in TPG over a period of three years while she was a student. Nancy, currently an Associate Professor at SUNY Plattsburgh, participated as faculty sponsor for an application submitted by one of her students – Jarret Pidgeon. Jarret, by the way, was awarded a \$2,500 scholarship last month.

OK, now STOP! Please just take a minute and think about this: the Angelo Tagliacozzo scholarship program has existed long enough now that these two individuals who received awards 26 and 16 years ago, respectively; have both gone on to successful careers as geologists (this is not surprising); have 'come full circle' back to that same scholarship program and participated in different ways to help ensure the program's continued success! As Nancy commented in a recent email message, it is an example of the 'first generation' of scholarship recipients coming back to help guide the 'second' generation! The fact that this has happened is a tribute to Jeff and Nancy – both as practicing geologists, but more importantly as unselfish and nurturing human beings. It also serves as a testament to a scholarship program that has far exceeded (and continues to exceed) everyone's expectations when the program started in 1986.

I am going to end this with an optimistic look into the future. Of course, pressure will continue be on the Northeast Section to keep the scholarship program active and growing so that this type of 'coming full circle' participation can continue to occur. Who knows, perhaps Jarret might ultimately follow in Nancy's footsteps, attain a faculty position at a college or university in the northeast, and sponsor a 'third generation' applicant for the Angelo Tagliacozzo Memorial Geological Scholarship, sometime in the next 10-20 years (no pressure, Jarret!). Perhaps other scholarship recipients will do the same or more. Whatever happens though, it promises to be exciting!

(End)

Have an idea for a Newsletter article?
We are always more than willing to
incorporate our member's
ideas and experiences
into the quarterly Newsletter!

Submit your ideas to Brandon Tufano
at: btufano@rouxinc.com



**Your FULL COLOR
half-page advertisement
could be right here!**

**Contact Advertising
Manager Richard Young
at ryoungnj@aol.com**

authors upon reasonable request; see authors' contributions for specific data sets.

References

1. Li, T. Abundance of chemical elements in the Earth. *Geochemistry*, (3): 167-174 (1976, in Chinese).
2. Yin, J. et al. Introduction of tellurium resources in the world. *Journal of Hebei College of Geology*, 18(4): 348-354 (1995e, in Chinese).
3. Yin, J. On the metallogenic model and mineralizing mechanism of the Dashuigou independent tellurium deposit in Shimian County, Sichuan Province, China-the first and only independent tellurium deposit in the world: Chongqing Publishing House, 13-94 (1996, in Chinese with English abstract).
4. Yin, J. et al. Geological characteristics of the Dashuigou tellurium deposit in Sichuan Province, China. *Earth Science Frontiers* 1 (4), 241–243 (1994n). in Chinese.

Google Scholar

5. Yin, J. et al. Original rock of the host rock of the Dashuigou independent tellurium deposit in Sichuan Province, China. *Bulletin of Mineralogy, Petrology and Geochemistry*, (2): 114-115 (1995d, in Chinese).

6. Yin, J. et al. Geology and geochemistry of host rocks of the Dashuigou independent tellurium deposit in Sichuan Province, China. Journal of Changchun University of Earth Sciences 26(3), 322–326 (1996b). in Chinese.
7. Yin, J. et al. Geology and geochemistry of altered rocks of the Dashuigou independent tellurium deposit in Sichuan Province, China. Journal of Xi'an College of Geology 18(4), 19–25 (1996d). in Chinese.
8. Yin, J. et al. Rock-forming minerals and ore-forming minerals of the Dashuigou tellurium ore deposit unique in the world - A preliminary study. Sci. Geol. Sinica 3(2), 197–210 (1994g).
MathSciNet
Google Scholar
9. Yin, J. et al. Mineralogical research of the Dashuigou independent tellurium deposit in Sichuan Province, China. Bulletin of Mineralogy, Petrology and Geochemistry, (3): 153-155 (1994k, in Chinese).
10. Berry, L.G. and Mason, B. Mineralogy. San Francisco and London, 618-630 (1959).
11. Chesterman, C.W. Field Guide to North American Rocks and Minerals. Alfred A. Knopf, New York, 831-850 (1979).

(Continued from page 89)

12. Bates, R.L., and Jackson J. A. (editors). Dictionary of Geological Terms. Anchor Books, A Division of Random House, Inc., New York, 520 (1984).

13. Yin, J. et al. K-Ar isotope evidence for age of the first and only independent tellurium deposit. Chinese Science Bulletin 40(22), 1933–1934 (1995a).

Google Scholar

14. Yin, J. The metallogenic model and mineralizing mechanism of the Dashuigou independent tellurium deposit in Shimian County, Sichuan - the first and only independent tellurium deposit in the world. Acta Geoscientia Sinica, special issue: 93-97 (1996a).

15. Bayliss, Peter Crystal chemistry and crystallography of some minerals in the tetradymite group. American Mineralogist, Volume 76: 257-265(1991).

16. Cook, N. J., Ciobanu, C. L., Wagner, T. & Stanley, C. J. Mineral of the system Bi-Te-Se-S related to the tetradymite archetype: review of classification and compositional variation. The Canadian Mineralogist ume 45, 665–708 (2007).

17. Cao, Z. and Luo, Y. Mineral sequence and ore genesis of the Sichuan telluride lode deposit in China. In: New Research Progresses of the Mineralogy, Petrology and Geochemistry in China.

(Article continued on page 91)

(Continued from page 90)

Lanzhou: Lanzhou University Publishing House, 476-478 (1994, in Chinese).

18. Zhang, Q. Geology and Metallogeny of the Early Precambrian in China. Changchun: Jilin People's Publishing House, 295-297 (1984, in Chinese with English abstract).

19. Wang, X. Research on isotopes of gold mineralization at Shimian-Huili area of the Kang-Dian axis in southwest China. *Mineralogy & Petrology*, 14(1): 74-82, in Chinese (1994).

Acknowledgements

Support for this study was received from both the China National Postdoctoral Foundation and from Bureau Veritas Commodities Canada Ltd., Prof. Yusheng Zhai of the China University of Geosciences in Beijing, also an Academician of the Chinese Academy of Sciences, and Prof. Rongfu Pei of the Chinese Academy of Geological Sciences, also an Academician of the Chinese Academy of Engineering in Beijing. Additional support was provided by Prof. Yuan Zhang of the College of Earth Sciences, Jilin University in Changchun of China, all of whom provided insightful discussions and critical reviews of this manuscript. The mineragraphy measurement of the tetradymite was done in the lab of the College of Earth Sciences, Jilin University. The chemical analyses by electronic probe and sulfur isotope analysis were carried out in the lab of the Chinese Academy of Geological Sciences. The X-ray diffraction

(Article continued on page 92)

(Continued from page 91)

analyses were carried out respectively at the lab of the Department of Earth, Ocean & Atmospheric Sciences, the University of British Columbia, and that of the Research Center of Standard Materials, Chinese Academy of Metrological Sciences, Beijing, China. The pyroelectricity measurement was carried out in the lab of the China University of Geosciences in Beijing, China, and the lead isotope analysis was done in the lab of the Chinese Academy of Sciences in Beijing. The authors very much appreciate the time invested respectively by Peter Sean Daly, a professional technical editor/writer, M.Eng., and P.Geo. with APEGBC of Canada, and Mr. Mark Storey, M.Eng., and P.Eng. with APEGBC of Canada, for their review and editorial work on this contribution. Mr. Haoyu Yin helped generate the Fig. 1 of this paper.

Article Citation

Yin, J., Shi, H. Mineralogy and Stable Isotopes of Tetradymite from the Dashuigou Tellurium Deposit, Tibet Plateau, Southwest China. Sci Rep 10, 4634 (2020). <https://doi.org/10.1038/s41598-020-61581-3>

(End)



NE/AIPG 2020 PUBLICATION SCHEDULE

Winter Newsletter

January 10	Deadline (Material to Editor)
January 24	Content to Publisher
February 10	E-mail to Members

Directory of Members

February 10	Deadline (Material to Editor)
March 13	Content to Publisher
April 13	E-mail to Members

Spring Newsletter

March 20	Deadline (Material to Editor)
April 3	Content to Publisher
April 20	E-mail to Members

Indian Summer Newsletter

July 24	Deadline (Material to Editor)
August 14	Content to Publisher
September 1	E-mail to Members

Holiday Newsletter

October 9	Deadline (Material to Editor)
October 23	Content to Publisher
November 9	E-mail to Members

**Please e-mail News, Info, & Articles
to Brandon Tufano:**

btufano@integral-corp.com

Cell 570.702.9992

**For Advertising Rates & Info, Please Contact
Dick Young:**

RYoungNJ@aol.com

cell 203.627.8085

ANGELO TAGLIACOZZO MEMORIAL GEOLOGICAL SCHOLARSHIP TRUST FUND LIST OF CONTRIBUTORS SINCE 1987

(All Contributors, Since Fund Inception Through October 2019)

FRIENDS OF THE FUND **(\$1,000+)**

Aquifer Drilling & Testing, Inc.
Banino, George
Blauvelt, Robert P.
Dimmick, Charles Wm.
Kasabach, Haig F.
Kraemer, Curtis A.
Leggette, Brashears &
Graham, Inc.
McGrath, Dennis G.
Northeast Section – AIPG
Rexrode, H. Leonard, Jr.
Roux Associates
Roux, Paul H.
Schiffman, Arnold
Slayback, Russell G.
Valkenburg, Nicholas
Young, Richard H.

Burke, Michael R.
Con-test Analytical
Laboratory
EcoRental
Gavras, John M.
Graff, Carol S.
Harrington, Jonathan
Kleiman, Amy
Mahier, Luke
Miller, David W.
Neubeck, William S and
Jean M.
Nova Consulting &
Engineering, LLC
Patota, Jean M.
PVE Sheffler
Rich, Charles A.
Richter, Dorothy
Rosenfeld, Mordecai
Soil Testing, Inc.
Whitbeck, Luanne and Dean

BENEFACTORS (\$500+)

Cascade Drilling, Inc.
Emerson, Mark
FPM Remediations
Frederick, Jeffrey
Herrick, Dean H.
Higgins, Jonathan B.
(In Memory of Leo Hall)
Kayler, Kyle
McEachern, Michael
Proce, Christopher
Stone, Timothy S.

PATRONS (\$250+)

Airmag Surveys, Inc.
Allen, Boyd III
Alpha Analytical
Anonymous
Brinkerhoff, Laura
(In Honor of
Frank McCarthy)

SPONSORS (\$125+)

Alpha Geoscience
Brown, Christopher
Chamberlain, John Mark
Clemens, Robert H.
DeAngelis, James
Eggers, J.
ERM – Northeast
Fakundiny, Robert
Graham, Jack B.
Greenman, Michael
Heindel, Craig and
Chaves, Judith
Hince, Eric
Koch, Ellis
Mathez, Muriel
Pieriboni, John
Prehoda, William P.
Schechner, Claire and Louis
Scheuing, Laurie
Standish, Richard
Stewart, Robert A.

(Contributors continued on page 95)

(Contributors continued from page 94)

Tsacoyannis, Nicholas
Urban-Mead, Russell B.
Waste Management, Inc.
(Matching Gift on Behalf of
George Banino)

Waring, Andrew D.
Wenz, Kenneth P.
Werle, Craig
West, William T.
Wohlford, Thomas

CONTRIBUTORS (\$50+)

Arguden, A. Tefvik
Barish, James M.
Becker, Arthur E.
Bell, David L.
Belt, Edward S.
Bugh, James
Davis, R. Laurence
Environmental Compliance,
Inc. (On Behalf of
Joseph Torlucci)
Flick, William
Gallagher, Evelyn A.
Hanlon, Kerry
Herman Karpel Memorial Fund
(On Behalf of Friends of
Rhoda Tagliacozzo)
Hottavange-Tellen, Ken
Hoogeryhyde, Kevin J.
Housman, John J., Jr.
Jonathan Paul Associates, Inc.
Kaczor, Sofia
Ketani, Ralph
Mase, David F.
Maslansky, Steven P.
McEachern, Jessica
Mozer, Robert
Neubeck, William S.
Penn, William E.
Rice, John
Rhyner, John
Russo, Luigi
Ryan, Michael J.
Scott, David
Shope, Steven
Sillman, Robert and Roberta
Sparrow, Leslie
Stokes, Kurtis W.
StoneHill Environmental, Inc.
Tatlock, Derek
Timmons, Robert
Torlucci, Joseph
Tyers, George

DONORS (Up To \$50)

Bablin, Christopher
Barbour, Richard and Rose
Becker, Jennifer
Bowes, James
Bradley, Margaret
Busa, Mark D.
Clausen, Jay
Cox, Peter
Faldetta, Sarah
St. Germain, Daniel J.
Fournier, Leroy
Fredrick, William T
Gannett Fleming, Inc.
Hager, Jutta
Harwood, David G.
Hergert, David
Hixon, Richard A.
King, Daniel
Kowalski, Richard G.
Ross, Lauren and Shelley
Sass, Daniel B.
(In Honor of K. E. Caster)
Shakti Consultants
Sinnot, Joseph
Skehan, James
Speidel, David
Susca, Michael
Vozza, Scott
Wayland, Russell
Weinstock, Eric
Wheran Engineering

***Why Isn't Your Name
On This List?
Solve it!
Simply see Pg. 97 and then***

Move into Action!

(End)

Celebrating 34 Years of Scholarships!

The Angelo Tagliacozzo Memorial Geological Scholarship

The Angelo Tagliacozzo Memorial Geological Scholarship was established by the Northeast Section of the American Institute of Professional Geologists in late 1986. The first Scholarships were presented to undergraduate Geology students in 1987.

ATMGs recognizes the dedicated leadership and service which Angelo provided to NE/AIPG, to AIPG, and to the geological profession, until his untimely passing on October 11, 1986. The Scholarship furthers Angelo's goal of acquainting young geologists with AIPG and with AIPG's importance to the geological profession.

ANGELO TAGLIACOZZO (1936 - 1986)

Angelo Tagliacozzo received his doctorate in Geology from the University of Rome (Italy) in 1962. Thereafter, he worked in various positions as geologist, geophysicist, and hydrogeologist, which included assignments abroad, in the U.S., and with the United Nations. Angelo provided exemplary service to AIPG at the Section and National levels. He was a Northeast Section Executive Committee Member (1973-1982), Vice President (1977-1978), President (1979-1980), National Advisory Board Delegate (1981-1982), and Screening Board Chairman (1984-1986). Angelo's dedication to and leadership of the Northeast Section Screening Board has become the ultimate standard against which service in such a position is measured. Angelo also served as an AIPG National Executive Committeeman (1982); he was a vigorous advocate of measures to increase professionalism. Angelo was (and will be remembered as) a respected professional... and a friend.

THE SCHOLARSHIP

NE/AIPG grants Scholarships to undergraduate geology students annually. The Scholarships are designed to help with the cost of summer field courses, textbooks, and other aspects of geological education. Scholarships are awarded, both on academic achievement and on financial need, to students enrolled in recognized geology programs at colleges or universities in New England, New Jersey, & New York.

YOUR CONTRIBUTIONS

Your participation is encouraged in support of this dynamic memorial to Angelo and his recognition of the importance of AIPG to the geological profession. Contributions to the Scholarship Perpetual Trust Fund should be written to:

Angelo Tagliacozzo Memorial Geological Scholarship Trust Fund, and mailed to:

**NE/AIPG Geological Scholarship Trust Fund
c/o Dennis McGrath, CPG
1133 Warburton Avenue, Apt. 211N
Yonkers, NY 10701**

All Contributions are invested perpetually, with earnings thereon used solely for the Scholarship. NE/AIPG bears all costs of administration. Please ask your employer about Matching your contribution, and Additional corporate contributions.

For further information, contact Dennis McGrath:

mcgrathdg@gmail.com Cell: 914-424-8816

Memorandum

To: Dennis McGrath, Chairman, ATMG Scholarship, Northeast Section, AIPG

From:

Date:

Re: *I'm Taking the Pledge: **I'M IN FOR 2020!***

Dear Dennis,

Just a quick note to let you know that I'm 100% with you when it comes to achieving the Section's goal of 100% participation in support of the Scholarship Perpetual Trust Fund during 2020, the 34th Anniversary of the Scholarship! I agree with your encouragement that each and every Section Member make a contribution in accordance with their ability... and this is the one time when I don't want to be the odd person out!

I'M IN FOR 2020!

For 2020, the 34th Anniversary, I'm considering pledging... Thirty Bucks A Week, Thirty Bucks A Month, or Thirty Bucks for the Year!

Now, I know it could be more—and you know it could be less!—but I am committed to contributing as much as I can, so I'm not going to delay it any longer: **I'M IN FOR 2020!**

Yes, my personal budget is tight, but I figure that, somehow, I can set aside \$30 each month (aka the cost of weekly lattes) this year to give back to the profession that has given me so much. Also, I just wanted to tell you I am delighted to know that every one of those hard-earned dollars that I contribute will be INVESTED in the Scholarship Perpetual Trust Fund, so my contribution today can keep on giving, year after year!

And that makes me feel like my contribution really means something, both now and in the long term! I have thought it over, and I know how important 100% participation is for Section pride! So, Dennis, **I'M IN FOR 2020**

Professionally yours,

Times are really (GREAT / poor), so I am pledging:

____ 30 Bucks A Week (\$1560 for 2020)

____ 30 Bucks A Month (\$360 for 2020)

____ 30 Bucks A Year (\$30 for 2020)

Other: _____ (Every little bit is better than nothing!)

____ I'll make it easy on you; I have enclosed my check, made out to "*Angelo Tagliacozzo Memorial Geological Scholarship Trust Fund.*"

____ Please invoice me for my 2020 pledge by 10/31/2020. I'll pay by 12/1/2020.

Signed: _____

Name Printed: _____

Address: _____

Mail this Pledge to: NE/AIPG Geological Scholarship Trust Fund, c/o Bob Blauvelt,
345 Stuyvesant Ave Lyndhurst, NJ 07071

- or -

Email this Pledge to: NE/AIPG Geological Scholarship Trust Fund, c/o Bob Blauvelt
blauvelt@geiconsultants.com