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MESSAGE FROM THE PRESIDENT

Greetings and Happy New Year PCPG Members,

As I write to you today, we are winding down and catching our breath from the annual PCPG meeting. As always, it was wonderful to reconnect with old friends and colleagues while also networking with several new faces. Once again, I want to extend my sincere gratitude to all the PCPG members for your unwavering support of the organization throughout 2023. I also wanted to express heartfelt thanks to Vincent (Vinnie) Carbone for his dedicated efforts as last year's PCPG president, and to Tiffani Doerr, our 2023 Past President. Additionally, I extend my thanks to our outgoing PCPG board members for their invaluable service: Vicki Pitman, P.G. (serving as Newsletter Chair), Tom Wagner, P.G. (serving as Governmental Affairs Chair), and Andrea Wright, G.I.T.



Please join me in welcoming our newest board member Alex Ulmer, P.G., as well as our young professional liaisons on the board, Chelsea Tarbell, P.G. and Shravani Kalita. Lastly, I am thrilled to congratulate and introduce current board member Jenny Kachel, P.G., who will serve as President-Elect this year. Jenny, who previously served as Outreach Chair, will be assisting me this year, and Vinnie will be serving as the Outreach Chair.

As I step into the role of PCPG President, I feel a sense of gratitude and anticipation. It's a privilege to serve alongside passionate professionals who share a common commitment to making a positive impact on our geoscience professions. I wholeheartedly agree with the importance of continuing Vinnie's vision of Community for PCPG, encompassing both our geoscience professional and public communities. However, I also believe in harnessing the power of passion to continue growing the PCPG organization in a positive direction and instilling the value of passion in our younger generation of professionals. Passion is one of my core values, and I am dedicated to fostering it within our organization.

Recently, during a Continental Drifters networking event, I engaged in discussions with fellow geoscience professionals about the challenges of filling entry to mid-level positions in our companies and convincing our younger professionals to obtain licensure. One common observation was the absence of passion in some of our young professionals.

To briefly describe what passion means to me, it's something that fills me with excitement and drives me forward each day. Passion is what organizes our thoughts and motivates our actions. Our passions may change over time, especially as we get older and wiser, but since

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UPCOMING PCPG EVENTS

April 16, 2024

[CCUS in the US and a Glimpse into What is Possible in PA](#)

Webinar: 1:00-2:00 PM ET

April 18, 2024

[Southcentral-PA Continental Drifters \(Networking\)](#)

Harrisburg: 5:30-7:30 PM ET

FOR A COMPLETE LIST OF **UPCOMING EVENTS** OR TO REGISTER ONLINE, CHECK OUR [HOME PAGE](#) EVENT CALENDAR, OR VISIT [PCPG'S COURSES AND EVENTS](#) WEB PAGE.

2024 PCPG ANNUAL MEETING

This year's PCPG Annual Meeting brought exciting presentation topics, networking, another student and young professionals session, familiar faces, many new faces, and lots and lots of geology!

From start to finish the audience was engaged through the incredible lineup of presenters this year. We learned about the state of the Pennsylvania Geological Survey, given 50% of their staff is new since 2021, and the interesting new initiatives they are working on through an interactive exercise for our audience.

Next up we were immersed in the world of reactive approaches to remediate karst hazards as they relate to civil and land development projects, through a variety of case studies. After lunch, our PCPG President provided an update on current and planned activities for PCPG in 2024 and recognized special guests who joined us at this year's annual meeting. The next topic discussed was all about carbon sequestration: what is it, its history in the United States, and what the future holds for it. Next up, we heard from another member of the PA Geological Survey, taking us on a journey of methods used to discover rare earth elements, critical minerals, and novel geological resources to meet the demand to find local, sustainable resources to satisfy



new research and technology requirements. The next presentation gave us a look into the history of the I-99 project, a historical perspective of the construction activities, initial and long-term remedial response efforts, and a look at the current surface water/groundwater conditions 20-years later. This session even brought a pH demonstration aided by one of our Young Professionals who attended the event! We closed out the meeting with a look ahead towards legal changes that are coming in 2024 for the environmental and geologic community.

Dr. Scott Snyder, from Samaritan Consulting, joined us again this year to facilitate the Student & Young Professionals session. This year the topic was focused on professional development through a few key topics such as emotional intelligence, change management,



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PCPG CONTINENTAL DRIFTERS EVENTS

PCPG has held monthly Continental Drifters events this year on January 25 at Palette and Pour, in the ArtsQuest Center in Bethlehem, PA; February 8 at Victory Brewing Company in Downingtown, PA; and March 7 at The Sports Grille in Cranberry Township, PA. The Continental Drifter events have been hugely successful thus far! Business cards were passed, contacts were made, and information was exchanged.



Event 1:
ArtsQuest Center, Bethlehem, PA
(top image)

Event 2:
Victory Brewing Company,
Downingtown, PA (bottom image)

Event 3:
The Sports Grille, Cranberry Township, PA
(middle image)

If you are looking for a fun evening surrounded by fellow PCPG professionals, students, Corporate Members, and Associate Members and enjoying refreshments and conversation, these events are for you. We are looking forward to seeing you at the next event on April 18 at Harrisburg's Lancaster Brewing Company. Keep a lookout for future networking events planned to take place in late summer and early fall of this year.



TOXICITY OF PFAS-FREE AQUEOUS FILM-FORMING FOAMS (AFFF) TO AQUATIC ORGANISMS

Jamie G. Suski, Neil Fuller, Sarah Lanasa, Michael K. Chanov
EA Engineering, Science, and Technology PBC., Hunt Valley, Maryland

1. Background

Aqueous film-forming foams (AFFF) are widely used to suppress class B fires in municipal, industrial, and military settings, as well as in testing and training scenarios. Historically, AFFF used for fire suppression has contained per- and polyfluoroalkyl substances (PFAS) due to the high thermal and physical stability of these compounds and efficiency in controlling fires derived from flammable volatile liquids (Bourgeois et al. 2015). Amid global concern regarding the potential health and environmental effects of PFAS, there is a need to develop and test alternative AFFF products that do not contain PFAS. Given the potential for contamination of surface and groundwater following the application of AFFF (Moody et al. 2002), aquatic systems are of particular interest in the assessment of risk associated with PFAS-free AFFF. Consequently, this study aimed to determine the effects of acute and chronic exposure to seven PFAS-free foams and one PFAS-containing foam on three aquatic species at different trophic levels.

2. Methods

Details of the AFFF used for the study are given in Table 1. Three aquatic species were used to assess the toxicity of AFFF: *Raphidocelis subcapitata* (green algae), *Chironomus dilutus* (invertebrate larva), and *Pimephales promelas* (fish larvae). Acute toxicity testing was based on standardized OECD or EPA methods for each species. Similarly, chronic studies were based on EPA or OECD methods, comprising a 7-d survival and growth test for *P. promelas*, a 10-d survival and growth test for *C. dilutus*, and an additional 60-d emergence test with *C. dilutus*. Given the extremely short life cycle of *R. subcapitata*, chronic tests were not performed with this species. Nominal AFFF concentrations were based on preliminary range finder studies. All toxicity tests were performed at EA's ecotoxicology laboratory in Hunt Valley, Maryland.

Table 1. Candidate AFFF used for acute and chronic aquatic toxicity testing.

AFFF Name	Formulation Type	Abbreviation
National Foam NFD 20–391 Formulation – 1 L	SERDP Developmental Formulation	NFD
Fomtec ENVIRO 2–3 % FFF	Commercial PFAS-free Formulation	Fomtec
Buckeye Platinum Plus C6 MILSPEC 3 %	Reference C6 Formulation	Buckeye
National Foam AVIO F3 Green KHC 3 %	Commercial PFAS-free Formulation	Avio
NRL 502 W Siloxane-based Formulation	SERDP Developmental Formulation	NRL 502W
Bio-Ex ECOPOL A 3 % FFF	Commercial PFAS-free Formulation	ECOPOL
Solberg Re-healing Foam RF3 3 %	Commercial PFAS-free Formulation	Rehealing
Angus Fire ICAO-B JetFoam 3 %	Commercial PFAS-free Formulation	Angus

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PA BROWNFIELDS CONFERENCE 2024

John Gross, Pennsylvania Department of Environmental Protection

DEP's Land Recycling Program along with the Engineer's Society of Western Pennsylvania would like to cordially invite you to the Pennsylvania Brownfields Conference.

The conference will take place in State College, PA at the Penn Stater Hotel and Convention Center from March 25-27, 2024.



PA BROWNFIELDS
CONFERENCE

March 25-27, 2024
The Penn Stater, State College, PA

Join the Department of Environmental Protection's Land Recycling Program and the Engineers Society of Western Pennsylvania at The Penn Stater Hotel in State College, PA on March 25-27 for a chance to collaborate with industry professionals and explore a vast array of brownfield topics.

Explore the conference program [here](#) and discover sessions on environmental justice, PFAS, solar on brownfields, funding, brownfields success stories and more!

You will also hear from our keynote speaker, former environmental attorney and author Joel Burcat, along with EPA Region 3 Administrator Adam Ortiz and DEP's Executive Deputy Secretary Ramez Ziadeh. There are also sessions that include an EPA Grant writing workshop, an all-grantees meeting for those entities that currently have brownfields grants, and state and federal regulatory and funding updates.

Please visit www.dep.pa.gov if you wish to sponsor or exhibit at the conference. We look forward to seeing you!



THE PENNSYLVANIA
**BROWNFIELDS
CONFERENCE**
MARCH 25-27, 2024
The Penn Stater Hotel and Conference Center
State College, PA

REGISTER NOW!



► We'll be at 2024 PA Brownfields Conference

PCPG will be exhibiting at this year's PA Brownfields Conference scheduled for Monday-Wednesday, March 25-27 in State College at the Penn Stater Hotel. Be sure to stop by our booth on Tuesday or Wednesday to say hello and see how PCPG promotes the many services offered by Professional Geologists. PCPG is sponsoring the Tuesday night networking reception at the conference, and we look forward to seeing you all there!

200TH ANNIVERSARY OF THE FIRST DINOSAUR TO BE NAMED: MEGALOSAURUS OF THE MIDDLE JURASSIC OF ENGLAND

By: David Wilcots, P.G.

British scientist, William Buckland, coined the name *Megalosaurus* in a publication on February 20, 1824, officially marking the beginning of dinosaur science. Dinosaur fossils had been found by many local communities all around the world prior to that time. However, this was the first time that a set of fossils, from one individual dinosaur, was named in the context of scientific study. William Buckland was a professor of geology at the University of Oxford, and he discovered the fossil remains at Stonesfield, a village in Oxfordshire about 10 miles northwest of Oxford, England.

This discovery and the naming of *Megalosaurus* changed the field of paleontology. Mistaking them for the bones of a giant lizard, Buckland named *Megalosaurus* by combining the Greek words "megas" meaning "big" or "great" and "sauros" meaning "lizard." Buckland's [description of the first non-avian dinosaur](#) on February 20, 1824, was presented at a meeting of the Geological Society. At the time, the *Megalosaurus* was viewed as a large reptile. The term "[dinosaur](#)", meaning "terrible lizard," wasn't coined until 18 years later by Sir Richard Owen.

Megalosaurus was about [20 feet long](#) and walked on two legs. It was about half the size of a *Tyrannosaurus rex*. *Megalosaurus* was a carnivore that lived in the Middle Jurassic period, between 165 to 168 million years ago.

The image shown below is the section of the right lower jaw of *Megalosaurus* that was the primary piece of Buckland's discovery.



Section of the right lower jaw of *Megalosaurus*

Photo source: <https://www.theprehistoricstore.com/products/28-5-cm-megalosaurus-dinosaur-jaw-replica-original-found-by-william-buckland>

PFAS-FREE AFFF *Continued from Page 4*

3. Results

Results of the acute toxicity testing including lethal concentration of 50% of test organisms (LC50) values are given in Figure 1. The PFAS-containing reference AFFF exhibited lower acute toxicity compared to most of the tested PFAS-free AFFF in all three species. Two formulations, Avio and Angus, were consistently the most acutely toxic across all species.

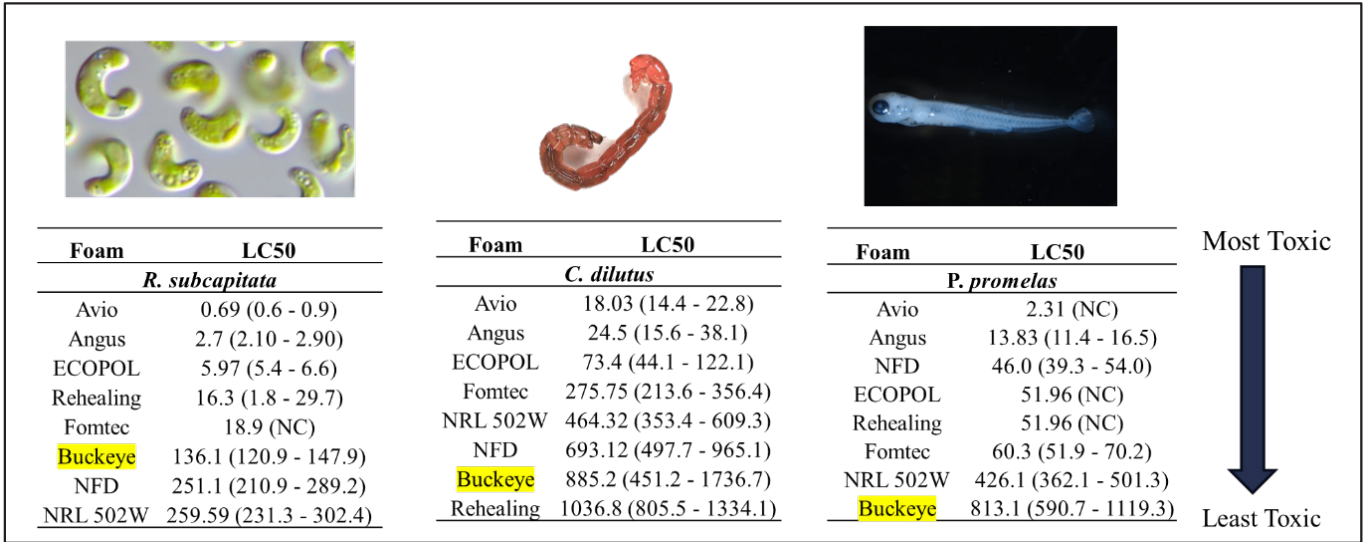


Figure 1. Calculated LC50 values from acute toxicity testing of PFAS-free and PFAS-containing (highlighted in yellow) AFFF with three aquatic species.

Similarly, chronic testing with *C. dilutus* and *P. promelas* indicated that PFAS-free AFFF were more toxic compared to the PFAS-containing reference foam across all endpoints tested. Calculated effective concentration 50 (EC50) values for all endpoints tested in *C. dilutus* are given in Figure 2.

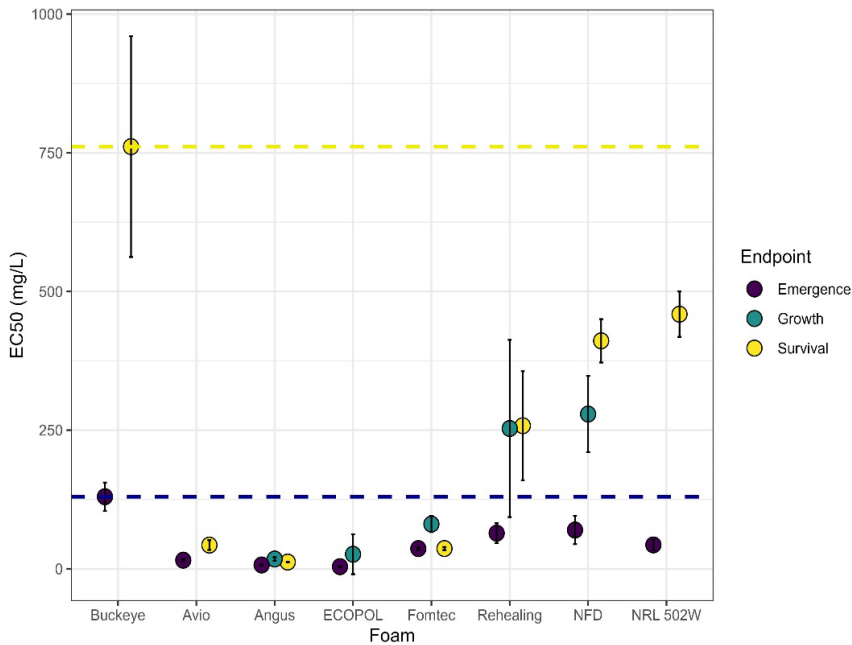


Figure 2. Comparison of EC50/LC50 values for all endpoints in *C. dilutus* chronic toxicity tests with AFFF. The dashed lines represent EC/LC50 values for emergence (blue) and survival (yellow) in the PFAS-containing reference AFFF, Buckeye.

Continued on Page 8

PFAS-FREE AFFF *Continued from Page 7*

A comparison of chronic LC50 values in *C. dilutus* and *P. promelas* is shown in Figure 3, with broadly similar findings in *P. promelas* compared to *C. dilutus* in terms of toxicity rankings. One of the PFAS-free foams, NRL 502W, was consistently ranked among the least toxic in acute and chronic studies with multiple species.

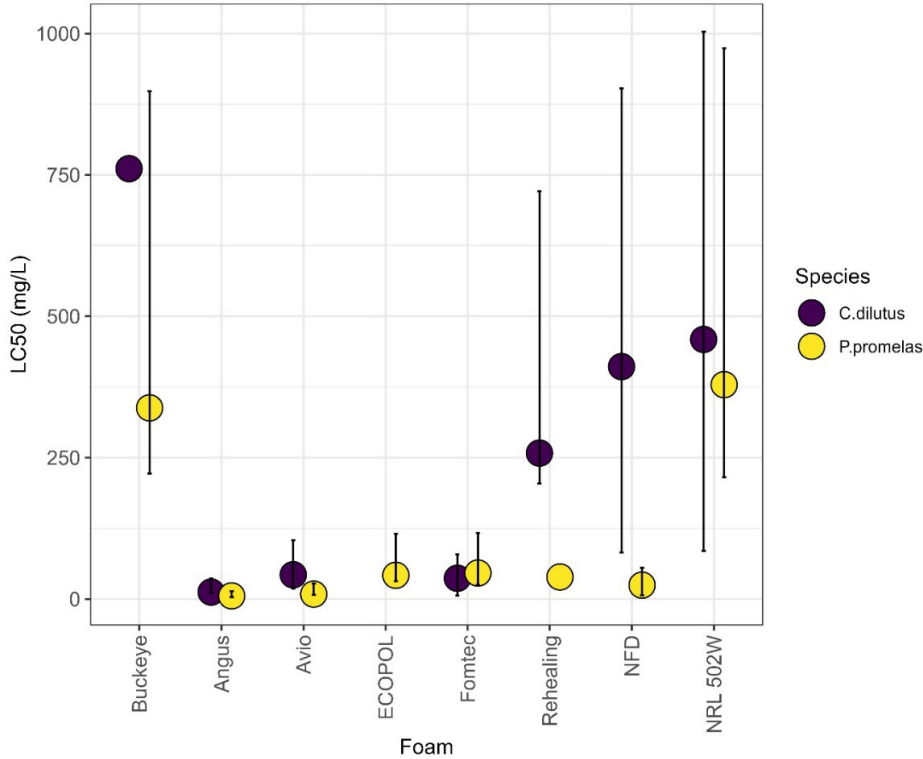


Figure 3. Comparison of chronic LC50 values for *C. dilutus* and *P. promelas* chronic toxicity tests.

4. Summary

The present study tested the acute and chronic toxicity of a suite of novel PFAS-free AFFF to three aquatic species. Overall, most of the PFAS-free AFFF tested exhibited higher toxicity than the PFAS-containing reference foam. This study will be used in conjunction with related toxicity research on other species including mice, birds, and reptiles, as well as biodegradability studies to aid in decision-making and selection of appropriate replacement PFAS-free AFFF.

5. References

Bourgeois, A., Bergendahl, J., & Rangwala, A. (2015). Biodegradability of fluorinated fire-fighting foams in water. *Chemosphere*, 131, 104-109.

Moody, C. A., Martin, J. W., Kwan, W. C., Muir, D. C., & Mabury, S. A. (2002). Monitoring perfluorinated surfactants in biota and surface water samples following an accidental release of fire-fighting foam into Etobicoke Creek. *Environmental science & technology*, 36(4), 545-551.

New PCPG Associate Member

Please join us in welcoming our newest
PCPG Associate Member:



Interested in becoming a PCPG Associate Member? Visit our [Join PCPG](#) page to review Benefits of Membership and enroll online. Associate Members qualify for up to four (4) membership contacts, one complimentary half-page digital ad in a quarterly newsletter, and a complimentary display table at our Annual Meeting along with appearing in our Associate Member Directory in each quarterly newsletter. Telephone PCPG by dialing (717) 730-9745 for more information.

PRESIDENT'S MESSAGE *Continued from Page 1*

college, my professional passion has always been geology, particularly rocks and water. I think a large part of my professional passion comes from solving a geological mystery or puzzle, such as finding a sustainable groundwater source for a water supply well, determining the depositional setting of a given type of rock, mitigating a site due to a spill or geotechnical issue, or conducting an environmental forensic investigation.

As I mentioned previously, college is the time we develop and assess what we deeply feel passionate about, through the guidance and motivation of our professors, classmates, or both, who help us find our passion. Unfortunately, I feel that many young professionals aren't developing their professional passions in college, whether its attributable to the separation they had during COVID restrictions, virtual classes, or lack of available social organizations (geological societies, outdoor clubs, etc.). Right, wrong, or indifferent, if we want ourselves, colleagues, and companies to continue to be successful in the near and distant future, and make a lasting impact in the geoscience industries, we have the responsibility of fueling professional passion in our younger generation workforce. Passion is what motivates us during cold, wet, miserable days in the field, as well as those long, arduous hours at the office working on a report or proposal; without passion these may seem like insurmountable tasks.

Returning to my conversation at the Continental Drifters event regarding staffing and passion in young professionals, one colleague noted that if a young professional lacks full comprehension of the geosciences but possesses passion, we can work with and mould that individual. I couldn't agree more!

I urge you to take the time to fuel your professional passion and joy, and to help our younger professionals develop and harness their passions as well. Need help fueling your professional passion? Volunteer with a non-profit environmental organization, attend one of our PCPG webinars, join a local geological society, participate in one of our PCPG committees, provide outreach at your local university / college, mentor a young geoscience professional, or simply take a hike into the wilds of nature and geology.

Please don't hesitate to contact me or any PCPG Board Member with thoughts or ideas of how PCPG can further support you and your organization. I look forward to seeing and hearing from you throughout this year.

Wishing You the Best in the New Year,

Jason Floyd, P.G.

PCPG President

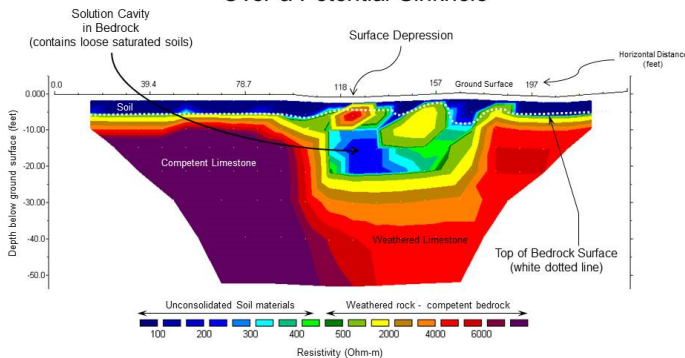


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Example Earth Resistivity Profile Over a Potential Sinkhole



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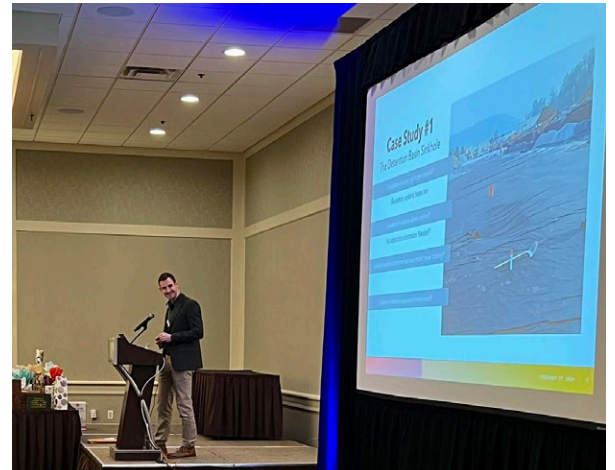
ANNUAL MEETING *Continued from Page 2*

positive assertiveness, and accountability. Starting out as a young professional in your career can be daunting but the participants of the Student & Young Professional session left with new tools to aid them in being successful as they start their careers!

The day was wrapped up in the best way possible, with the 2nd Annual Barb Dunst Memorial Bottle Auction Fundraiser and Continental Drifters Reception. The room was full of energy, and we sincerely thank all of those who donated, bid on, and/or won a bottle. The auction was fast-paced and lively with over 40 “dressed” bottles donated. With proceeds gained from this event, and an additional contribution from PCPG and other generous donors, we are officially underway to support one of Barb’s most cherished projects: supporting young professionals pursuing the PG license in Pennsylvania.

Of course, we cannot forget to thank our sponsors who attended the event and set up booths to talk to all the conference attendees - we wouldn’t be able to do this without you.

We look forward to seeing you at the 2025 PCPG Annual Meeting!



DEADLINE FOR OUR NEXT NEWSLETTER IS MAY 10, 2024

- o **Are you a geologist/artist?** Send us a geo-cartoon, picture of a rock/mineral painting of yours, other creative elements we can include!
- o **Are you a geologist/photographer?** Send us your cool rock/rocky landscape pics!
- o **Are you a geologist/academic researcher?** Send us a summary of your latest research!
- o **Are you a geologist/project manager?** Send us a summary of your latest really awesome project!
- o **Are you a geology student/recent grad?** Send us a summary of a class project, technical paper, field camp experience, senior thesis, etc.!
- o **Are you a geologist/lawyer?** Send us a summary of the latest geology-related legal news!
- o **Are you a geologist/site safety officer?** Send us reminders of how to stay safe on the job site!

Articles are suggested to be about 700 words maximum. For more information, contact our PCPG Newsletter Editor and Communications Committee Co-Chair - Leslie Hartzell, by [email](#).

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