The annual Colorado Section Summer Picnic will be Saturday, August 4th, at 4 PM at the home of Graham and Norma Closs, 843 South Nelson Way, Lakewood. All members, prospective members, and guests are welcomed.

As is customary, the Section will provide burgers, veggie burgers, brats, buns, beer, and soft drinks. Attendees are asked to bring pot luck dips, chips, salads, or deserts. Please let Graham know you’re planning to attend so we can get a count at 303-988-4131 or chez-ctc@comcast.net by August 1st.

Jane Davey, Louis & Lori Bull, and Ron Pritchett at the 2017 Section picnic.

Louis & Lori Bull, Tom Van Arsdale, Doug Peters, Ada & Jessica Davey at the 2017 Section picnic.
The Board normally meets the first Tuesday of each month at 7:00 AM; all members are invited to attend. Please contact a Board Member to confirm time and location.

Letters, articles, announcements, ads, etc. must be received by the Editor by the end of the fourth full week of the month preceding publication. Letters, articles, ads, announcements, etc. accepted on a space available basis. Submission of articles, etc. via e-mail is the preferred method; copy can be accepted in most PC formats, but DOC or DOCX are preferred. Call or e-mail David Abbott for details on submission of copy or advertising at 303-394-0321, dmageol@msn.com.

Copyright © 2018 by the Colorado Section, AIPG. Material may be reprinted with attribution. This is your newsletter, use it.

The opinions expressed are those of the authors and not the Colorado Section officers unless clearly stated otherwise.

Back issues: available in PDF at www.dropbox.com/home/CO AIPG/Colorado Professional Geologist
President’s Letter

My letter this quarter was inspired by the President’s Desk section of the May 2018 issue of the AIPG Michigan Section Newsletter. In that, President Tim Woodburne covers an uncomfortable albeit recoverable project incident in the earliest part of his career that required an appropriate ethical response and means of fixing the problem. I thought it would be worthwhile to cover something like that which happened when I still was an undergraduate geology student at the University of Pittsburgh and working during the summers in town to both get funding and to get practical geoscience/geo-engineering experience. Hopefully this vignette will aid students and young professionals in dealing with situations that can come up that generally are not covered in your past or present studies.

My employer was a geotechnical firm that did a lot of work on building foundations and various other earthwork projects requiring soil analysis and core drilling. My primary job during the summers was to perform lab geotechnical testing of various samples and materials, with side jobs (when lab testing work was slow or other personnel were fully booked) of field testing, job site inspection, and general maintenance of the company building and grounds (including weeding the landscaping when it was REALLY slow work wise). Included in the maintenance tasks was intermittently clearing out old core boxes and soil samples, based on lists from the engineers of jobs that were completed and well aged. This was done to keep workable space in the inside storage/shop/garage area as well as in the large outside storage area for cores.

The situation in question came up as part of this clearing-out process one summer. The list I got that day had eight job numbers on it. One was a job number that I had seen many times in terms of core boxes stored both inside and outside, with the majority of the outside ones being well weathered to downright decrepit. Clearly an OLD job that apparently had been in process for some time. However, there was a small stack (with the same job number) of brand spanking new core boxes in the shop area, perhaps six holes worth, that had appeared earlier in the summer while I was on another job site! There also were a couple holes worth of old weathered core boxes for the same job on the stack. Seeing that job number on the list, with no qualifiers as to which boxes to discard, gave me some pause regarding the new boxes.

So thinking that something was amiss, I took the job list to each of the four engineers working there at the time, asking if these REALLY were supposed to be discarded. Everyone looked at the list for a few minutes each and completely agreed that everything on there was due to be eliminated. So, having checked with everyone to the extent I possibly could without physically making them go look at the boxes (not something I had the power to do given they all were busy with project work), I shrugged off my uncertainty and proceeded ahead full speed.

The outside boxes for that job number were in sufficiently poor shape that it was going to take at least several hours to make sure I got them and their contents to the dump location (a drainage ditch at the back of the office property) without spreading them all over.

(Continued on page 13)
Editor’s Remarks

David M. Abbott, Jr.

I hope you’re having a good summer, whatever that means for you. The candidates for governor have were selected in the June 26th primary election; Jarod Polis for the Democrats and Walker Stapleton for the Republicans. I was hoping that the inclusion of independents in this year’s primary balloting would encourage more centerist candidates to run for office. It didn’t happen. I hate having to vote against a candidate rather than for someone I can really support.

Polis makes no secret of his desire to eliminate fossil fuels from the energy mix, and he is not alone. If you adopt this view, then natural gas and propane could no longer be used for home heating, fleet transportation fuel, etc. Most Colorado homes are have a pressurized gas line feeding methane or propane into the furnace.

Converting a gas furnace to electricity is more difficult than the conversion from coal-fired boilers to gas-fired boilers in the middle of the 20th century. My previous two homes, both built in the early 20th century had undergone this conversion and asbestos-covered pipes still exist the basements of both homes. Those low-pressure heating systems were really nice. My new home, like most newer homes, has forced air heating, which allows for home air conditioning, but neither my new home or my previous homes can be easily converted to electric heating.

I’ve owned an electrically heated home. The baseboard heating units worked well, although you had to be careful that what, if anything, you put near them, wasn’t heat sensitive.

Nobody, not even CRED, seems to have picked up on this drive by the anti-fossil fuel folks to eliminate gas-fired furnaces. The conversion costs will be staggering and beyond the means of many. The failure to recognize this consequence of fossil fuel elimination astounds me.

Although various bills to eliminate or curtail oil and gas drilling in Colorado failed in this year’s legislative session, ballot initiatives to this end are expected on the November ballot. As noted above, Jared Polis’ position on this is clear; he’s against the oil and gas industry. You should look at the energy positions of the state senators and representatives you’ll be voting for in November.

Page 9 of this newsletter contains a slightly edited announcement of the kick-off meeting the stakeholders in the Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) Regulations Stakeholder Process. This process is mandated by a bill passed by the 2018 Legislature. Depending on where the limits are set, the naturally occurring radioactivity in formation waters could exceed permitted limits.

Some people feel that any radiation is bad and should be eliminated. For those folks, I’d like to post a radiation hazard sign on organic bananas because of their contain $^{40}$K, the third most common radioactive element. I liked the radiation level based on the average radiation in New Hampshire. New Hampshire is the granite state and New Hampshire’s granites are relatively high in radioactivity. Since New Hampshire’s residents haven’t suffered notable radiation sickness for around 250 years, the general background radiation level in New Hampshire isn’t too high.
Boy Scout Day at Dino Ridge

By Jeneane Barber, MSU Denver

May 12th, 2018 was an unusually crisp and blustery Saturday, a nice respite from the warm weather we’d been experiencing. On this day, the AIPG Colorado Section volunteered again at Boy Scout Day at Dinosaur Ridge, for the fifth consecutive year. It is Dinosaur Ridge’s first outdoor event, wherein Boy Scouts can earn Geology Merit Badges, Belt Loops, and Academic Pins.

The scouts, along with their families, visited our booth to learn to identify minerals. Fred Barnard brought pieces from his personal collection and volunteers from MSU Denver brought a few fossils from the University collection and a sand box filled with mineral samples for the children to keep (after learning a tidbit or two about them, of course). We helped the scouts use mineral kits to identify the minerals they dug out from the sand box. They particularly enjoyed being told they could lick the halite to identify it, but were understandably disappointed that we didn’t bring any diamonds.

We also discussed and handed out cards that illustrate the many minerals raising a child will require throughout their life—an eye-opener at times, for the parents. A strong effort was made to really teach the kids how minerals are used in products with which they are familiar—mica in makeup, quartz in glass, obsidian for surgical instruments, to name a few.

These events are always incredibly heartwarming. Watching the children’s eyes light up about geology makes involvement with the AIPG Colorado Section, and the entire field in general, that much more rewarding. Thanks to Fred Barnard, Brant Dennis, Katie Burger, Dani McDowell, and Jeneane Barber for helping out with this year’s Boy Scout Day.

The Section also sets up a booth for Girl Scout Day, Dinosaur Ridge’s last outdoor event, which will be Saturday, October 13th; see page 8. To volunteer for these events, please email Tom Van Arsdale at tomvanarsdale@gmail.com.
By Douglas Peters, CPG-8274

The 2018 Colorado Section Annual Field Trip was held on June 2nd using the same route (and field guide) as a 2016 Geological Society of America field trip. Sixteen people besides field trip leaders Dr. Barbara EchoHawk and Dr. Uwe Kackstaetter of Metropolitan State University (MSU) in Denver attended the event. No participants were permanently lost during the carpooling trip, although we did have a delayed rejoining of the trip by a couple cars after part of the convoy got slightly scattered on the way through Ft. Collins in the afternoon and its many stop lights along the way.

We did have the added benefit of a radio transmission (used by one of the trip leaders) and personal headset (used by all the participants) collection that MSU obtained for use on field trips. Whereas it did not transmit far enough for all cars in the convoy to hear discussions between stops, it was very useful at stops where there was traffic noise or where participants were scattered loosely around the speaker.

The first stop was a review of local and regional geology north of Boulder by Dr. EchoHawk, at a stop near an outcrop of the Fort Hays Limestone Member of the Niobrara Formation (west side of the highway). Geobotany was included, as displayed in Figure 1 (striping of thicker and lighter vegetation) where different beds within the Smoky Hill Shale Member of the Niobrara Formation (east side of the highway) provide micro-habitats conducive, or not, to different plants. The group then moved to the top of the limestone ridge to review folding (anticline and syncline of the Six-Mile Fold) and faulting in the limestone and underlying Benton Formation.

Stop 2 was at an outcrop of pegmatite in Lefthand Canyon northwest of Boulder that was reduced, but not removed, by highway construction after the September 2013 flooding. The canyon drive is very scenic as you traverse (east to west) from the Cretaceous through Pennsylvanian formations and into the Precambrian crystalline rocks. The pegmatite is especially interesting as an illustration of the lower end of the Bowen Reaction Series, where K-feldspar, muscovite (in sizeable flakes and books), and quartz are the minerals present.

The original Stop 3 of the GSA trip was bypassed due to ongoing road construction following the 2013 flooding, but hydrothermal mineralogy and coloration in outcrops could be viewed from the cars as we drove by. Our Stop 3 was still in upper Lefthand Canyon at an old fluorite mine (Burlington Mine). There Dr. Kackstaetter reviewed a small example of acid mine drainage from an old adit in the mine complex (Figure 2). Participants also had a chance to hunt for purple fluorite mineralization in mine debris before we had to leave to keep on schedule.

Our Stop 4 was at the Devil’s Backbone Open Space Park near Lyons, which also served as the lunch and restroom break for the trip. Drs. Kackstaetter and EchoHawk discussed various aspects of the local geology along a park loop trail (Figure 3; “Devil’s Backbone” is visible in the background) after lunch. The geologic nature trail also has placards along it to explain various aspects of the geology to the public. One of the trail stops was at a large trench in the Morrison Formation (Figure 4), a remnant of the Marsh and Cope dinosaur hunting “Bone Wars” in the 1870s-1880s. The “backbone” of the park’s name is formed by the Dakota Formation.

Stop 5 was another dinosaur-themed, publicly accessible site at a large roadcut in the Dakota and Morrison Formations. Drs. EchoHawk and Kackstaetter discussed the general geology as a reprise to the discussion at Stop 4. They also led the group up the hill to where dinosaur bone fragments (Figure 5) of vari-
ous sizes could be found in float from the Morrison Formation higher on the ridge. Alas, no large bones jumped out at any participants to grace their collections.

Stop 6 was at the Owl Canyon roadcut where a large exposure (on both sides of U.S. 287) of the Ingelside and Owl Canyon Formations can be accessed (Figure 6). Besides a discussion of the formations and related geology, this was an opportunity for participants to try and find calcite crystals in the upper Owl Canyon. However, the site is picked over by crystal hunters, and the best available crystal locations we saw on short timing required bigger digging tools than we had available on the trip.

Stop 7 on a side road off of U.S. 287 was at the only known easily publicly accessible kimberlite outcrop (Figure 7) in the State Line diamond district. It was found by Dr. Kackstaetter and students from MSU who performed mineralogical and geochemical studies to confirm it was a kimberlite. Many, if not most, kimberlites in the district are fenced off and seemingly guarded by adjacent private landowners. This is a deeply weathered kimberlite, so the outcrop material is mostly small to fine weathered fragments. Interestingly, the material feels “soapy” between your fingers due to the high chlorite clay content.
The eighth and final stop on the trip was at a roadcut in the Virginia Dale ring dike complex heading back southeast on U.S. 287. Here a mixing pattern between the original mafic and felsic magmas can be observed (Figures 8 and 9), making a striking black and gray pattern in the outcrop. The mafic host magma/rock was near its solidus point, thereby giving it a blocky appearance where the more liquid granitic magma (Outer Caprock monzodiorite) intruded before the mafic unit was fully solid and broke it up, also dissolving the mafic material in places and making a hybrid melt/rock within the mix.

The trip was enjoyed by all and gave everyone a diverse flavor of geologic features between Boulder and the Wyoming state line. If you did not get a copy of the field guide from GSA as part of the trip discount (mentioned in the last CO-AIPG newsletter), the guide still is available from GSA at the member or nonmember pricing. I highly recommend it as a resource for doing self-guided field trips in Colorado, including this particular trip.
New Editor Needed!

David Abbott

“The time has come,” the Walrus said, “to talk of many things:…” Specifically, the Colorado Section needs a new Editor. I was the Section Editor from 1993 to 1996, when the Colorado Professional Geologist published monthly, and currently have served since 2016. I’m ready to pass the position on. Being the Editor is a good way for a younger member, indeed a Young Professional, to become involved in the Colorado Section’s leadership as member of the Executive Committee.

The Colorado Professional Geologist is now published quarterly. It takes approximately 8–10 hours or so per issue (depending on size and number of contributions and pictures).

The Colorado Professional Geologist is created in Microsoft Publisher™, which was originally a separate program but now is standard part of Microsoft Office 365 for Home™ (up to 5 computers) or Person (single computer) for PCs. Publisher is not available for Mac. Publisher is a layout program rather than a word processing program. Pictures and text are placed where you put them and don’t move around. It’s not a difficult program to use once you get the hang of it. Besides, you use a previous issue as the starting point for things that don’t change from issue to issue, such as the Executive Committees names and contact information. And I’m willing to assist you. Please let me know if you are interested in the position. You don’t have to be in the Denver area.

The 2018 AIPG Annual Meeting is September 8–11 in Colorado Springs. Have your registered yet? AIPG annual meetings are a great way to meet geologists from around the country and across the profession who are very worth knowing for a variety of reasons. Because this meeting is Colorado Springs, it can cost less than meetings elsewhere. Plan to attend. Sign up on the AIPG website, www.aipg.org.

This space (and more) is available for your article or Letter to the Editor or a good picture of geoscience interest. Please consider a contribution.
The University of Northern Colorado’s Student Chapter took a 5-day field trip May 6–10 to the Delaware-Permian Basin. UNC alum Dean Gaddy, who has worked in both the Delaware-Permian Basin and the Permian Basin in Russia helped lead the trip along with UNC Professors Bill Hoyt and Emmet Evanoff. This Basin is one of the best geological excursions in the world—the exposures are fabulous and the exhumed Permian Reef and adjacent deep-to-shallow evaporates bring many textbook concepts to life. We added wild caving in the Gypsum Karst at Parks Ranch to standard geological stops.
Volunteers Needed! 2017 Girl Scout Day at Dinosaur Ridge, October 13th

It’s time for Girl Scout Day at Dinosaur Ridge, and the Colorado Section is in need of volunteers to run the booth on October 13th. Girl Scout Day is the last major event of the season at the Ridge, and it is truly a treat. The Scouts, along with their adult supervisors, receive lessons concerning: mineral identification, rock formation ages, everyday products produced from minerals and rocks, and the various disciplines within the geosciences, among other topics. The Scouts also ask many excellent questions. The AIPG volunteers brought numerous elemental, mineral, rock, and fossil specimens for the attendees to view, and handle. While the Scouts readily identify a number of the specimens, the Miocene whale vertebrae still “threw them for a loop.”

The event will be held on Saturday, October 13th from 9:00 AM to 3:00 PM at the Dinosaur Ridge Visitors Center, located at 16831 W. Alameda Parkway. We ask that you volunteer for a two-hour time period (9 AM-11 AM, 11 AM-1 PM, or 1 PM-3 PM), or come for the day. The only other request is to have FUN! Please contact Tom Van Arsdale at tomvanarsdale@gmail.com to volunteer. Thank you.

The 2018 edition of the Mineral Baby has been released by the Minerals Education Coalition. Although copyrighted, the Mineral Baby picture may be downloaded from www.mineralseducationcoalition.org and freely distributed.

The mineral consumption data in the Mineral Baby changes every year; see Abbott, D.M., Jr., 2017, The mineral baby: iconic graphic continues to tell important story: Mining Engineering, July 2017, p. 41-48, for details on how the data is collected and has changed over the years.
The Colorado State legislature passed a bill this session (SB 245) that gives Colorado Department of Public Health and Environment (CDPHE) the authority to promulgate rules for the safe management of Technologically Enhanced Naturally Occurring Radioactive Material (TENORM). TENORMS include the radioactive components in the formation water encountered in drilling, particularly oil field drilling. The bill requires CDPHE, through its Hazardous Materials & Waste Management Division to:

- convene a stakeholder group to discuss the development of rules and the impacts the rules might have on various industries.
- review TENORM residual management and regulatory limits from other states.
- prepare a report that considers background radiation levels in the state, waste stream identification and quantification, use and disposal practices, current engineering practices, appropriate test methods, economic impacts and data gaps
- develop a proposed residuals management rule based on the report

The report must be provided to the state legislature by December 31, 2019 and we cannot file a notice of proposed rulemaking until the report is presented to the legislature. The rules must be adopted by December 31, 2020.

At a kick-off meeting on July 11th, 1–3 PM, at the CDPHE Sabin-Cleere Room, 4300 Cherry Creek Drive South, Denver; or by phone, dial: +1 669-500-5472 PIN: 138 773#

**AGENDA**

1. Introductions
2. Expectations and CDPHE Proposed Stakeholder Process
   CDPHE is proposing to develop, with stakeholder input, a series of topics to guide our regulatory process. Once we come to agreement with stakeholders on these topics, we would open a 90 day written comment period to gather stakeholder input on the questions. We would also hold a series of stakeholder meetings to discuss the topics and gather additional stakeholder input. Additionally, CDPHE will be hiring a contractor to research and prepare the report required by SB 245.
3. Radiation and TENORM Basics
4. Topics for subsequent meetings
   a. Setting an exempt level
   b. Setting regulatory limits for landfill disposal
   c. Setting a regulatory limit for beneficial reuse
   d. Setting a regulatory limit for licensing
   e. Implementing the limits/levels
   f. Other topics
5. Upcoming Meetings
   a. July 31, 1-4 pm, CDPHE, Phone access: +1 984-235-0750 PIN: 211 203#
   b. August 29, 9 am-12 pm, CDPHE, Phone access: +1 413-489-4348 PIN: 924 620#
   c. September 6, 1-4 pm, CDPHE, Phone access: +1 321-684-7602 PIN: 367 454#

The TENORM regulations and regulatory limits could potentially shut down the oil and gas drilling in Colorado. This is the intent of at least some of the TENORM proponents.
Annual Meeting
Silent Auction

The annual meeting will feature a silent auction to benefit the AIPG Foundation. This is an opportunity to downsize your ever-growing collection of geology-related stuff: rock and mineral specimens, fossils, books, maps, old hammers, stereoscopes, etc. Since the meeting is in Colorado Springs, shipping weight is not an issue for donors. At the 2013 annual meeting, I donated my copy of the RMAG Atlas, that huge red book. This year I’m donating a 1939 dynamite box I got from Steve Zahoney. You also can deduct the value of your donation from your income tax in the charitable donation category.