

Library Research for Critical Minerals, Conflict Minerals, and Rare Earths - Transcript

Today is library research critical minerals and complement of rare earths. Today and said she had presented many webinars for us which we are forever grateful. This should be another great one from her. Let me read you a little bit about Emily. She joined the University the website library as a chemistry geoscientist and environmental studies librarian in September of 2018. Emily has a bachelor of arts and a Master of Library information studies from the University of Rhode Island. From 2008 two 2018, she was a librarian physical scientist at the U.S. geological survey Denver library, which she helped library users find and use science legislative materials, as well as developed and presented online and in person training sessions on topics such as chemical and physical properties of the atmosphere rock, sentiment, and water, geochemistry and Geo physics and organic and inorganic chemistry and use and availability of mineral resources. From January 1996 until July 2008, she was U.S. geological survey hydrologist in the New England states which enjoyed the work, modeling report writing and stem outreach. Her scholarly interests include library instruction, reference citation and data management, debris and geospatial data sets physical and leverage. Test laboratory sampling. Before we get started, after working with you of our housekeeping reminders. If you have any questions you would like to ask Emily or if you have any technical issues, please feel free to use the chat box, which for people on computers it is located on the bottom right-hand corner of your screen. Keep track of questions that come in, and I will read them back to Emily at the end of the presentation, and she will respond to each of them. We are also recording today's session and will email a link to the recording and slides to everyone who registered for this webinar. And we will be sending you a certificate of participation using the email you used to register for today's webinar. If anyone needs additional certificates because multiple people watch the webinar with you, please email us and includes the title of today's webinar with the names and email addresses of those meetings. Desktop computer desk laptop commuters may submit on the site being presented. Click on the screen in the bottom left-hand side of your screen to exit the screen mode so that it expands and then click on the return button to get the full view. Finally, at the end of the session, we will be sharing a webinar satisfaction survey with you. I will let you know the survey is available . With very much appreciate your feedback after the session, including comments on the presentation style and value of the webinar. With that, I will head the virtual microphone over to Emily, take it from here.

Great. Thank you. I hope you can hear me. Welcome and thank you all for joining. I know that everyone is busy, and I also would like to note that I am happy to be back here on the Princeton University campus. So this is my first webinar in my office in over a year and a half. Thank you for coming, and one of the things that we always said when I was at the USGS as your president as well, if you can't grow it, you might. It. This is where most of my questions have from students and faculties and researchers are about mineral mining sent specifically conflict minerals. The subject was delayed. I wanted to start off with what is happening here at Princeton, both from the research cited, and also physically on campus. The Princeton researchers are teaching how to get to know zero. Also physically, our campus is changing. If you are in the Princeton area, or if you here on campus, you can drive around or walk around and see that there are a lot of things happening because we are in the middle of a change with our heating system. It is the Geo exchange, the first link that I put at the top of this chat for this session. And so, just to give you some ideas of critical minerals, these are the ones that I am asked about the most. I will put them in the chat. These are photos of them. So there is cobalt or lithium, this is in the natural sense here, but also that the M is in rock, but it is also when water. One of the things when I was living in Colorado, used to use as an example, a lot of people used to go to Mineral Springs either for

health reasons or to relax or for other aspects. This main photo that I used is Pike's Peak. This area is Manitou Springs. That's the link as well. This is an example of magnesium, which I also have a lot of inquiries about. And then the manganese or. But they are different minerals. Just to give you an overview of my past presentations. I'm not going to go into formation of the information, because I have had so many -- I've given 70 presentations when I was at USGS eight recently. I'm putting the link in their. If you want to look at the past presentations from the library that I did about how rocks form, where the different types of geologic processes occurred, specifically to the different minerals, the rock types, et cetera, and you can look at all of that in other presentations and see my old library. And then this presentation will include additional information about Princeton. I just wanted to say thank you to research chemist and geologist for sharing their information and their research, specifically at the USGS geochemistry group in the inner-city resources program specifically the central energy, also the USGS international programs and multiple international geological goal surveys. The reason why I can find a lot of this information very quickly is the researchers but the time to explain what they were researching and additional sources that they published. So I kind of absorbed all of that over 20 years at working at the USGS and then here at Princeton University. I have absorbed enough information that I left to share it. There are so many tricks. I think it was on my first slide where what happens to me is that people often say oh, my goodness that took you five minutes and I have been searching for this for three weeks or two weeks. That is why I encourage everyone to contact their library and or please feel free to contact me if you are a new librarian, and I can show you some additional tricks. Moving on. We're going to talk about critical minerals, conflict minerals and rare earth. One of the things to keep in mind is that the critical minerals will vary by countries and can also change. In the United States, it has already changed. It has only been a couple of years since we have been researching it. The conflict minerals can also change through time. And rare earths are actually not that rare. I don't have the link in front of me right now, but I will find it later. Also, one of the things that I start off with when I am helping people is the periodic table of elements and then I go to the basics of geology and minerals and the processes of forming. As a hydrologist and then a librarian, over the course of my entire career, I was working with mineral research chemist and geologist from worldwide geological surveys, mining companies, mining societies and organizations, regulatory agencies, universities and indigenous communities. While I was a John Kubis, the water was in the ground. Also, the mining companies use water. There is a huge overlap of that. And so this is something that I have been using the sources for a very long time. I also wanted to mention that in addition to the students that I help here at Princeton in chemistry and geosciences and environmental studies, I also help them research politics, policy, engineering, economics, finance, evolutionary biology, Chinese studies, art and archaeology. There is a list of my colleagues that often refer people to me or vice versa. This USGS of 2021 is the most frequently asked publication. When I let people know immediately when it comes out, then after they read it, they come back and they say I want more information. One other aspect here at Princeton is that we have pretty much the same collection, if not more, then we had at the USGS library. In addition, we have all of the map libraries. My life here is pretty much the same. The difference is that there is a great mapping staff here in this building. And so I always refer people to them for example if there's a question about finding maps, specific to mineral resources. She can help with that as well. Okay. This is me. I am here in the Lewis science library, which is part of the Princeton University library. Please feel free to email me, I am here on campus for the summer on Tuesdays and Thursdays. If you are on campus or if you are in the area, I can meet up with you at some point. And so just to let you know, because I mention this when I help people with mining and minerals. My personal investments are still within the USGS ethics guidelines and I followed the ALA confidentiality. A lot of times, folks can be concerned about if they ask me a question, will it be repeated they may be looking to purchase land, or they may be looking into something that is sensitive. Sometimes, especially the legal community, I still follow all of that at Princeton. And these are some examples of the New York and Quebec areas. I am actually from the New

York/ Quebec border, and so I love showing people these two examples. I grew up with a mining in the family, if you will. People were always talking about it, mineral extraction and different aspects of finding minerals. I grew up speaking English and French. But my family also spoke French, Italian, German, and Polish. The reason I mention that is because when it comes to minerals and mining research, a lot of it is international, which is what this presentation is about. It isn't just in the United States. To start with chemistry, I and the chemistry geoscience librarian. I like to start everyone over the chemistry because it is the building block for mineral research. You have to understand the chemical aspect. So these are all the chemistry sources that I use just to become familiar with where they are within the table, and then did what type of information is available beyond that. There is detailed information from the IUPAC and also tons of information available from the USGS. There is IUPAC from the technical support. This is the one report that I use a lot to show the smart phones, this ordinary mineral smart phone capabilities. If any of you have a smart phone, these are all of the different minerals that are used to make your small farm work -- smart phone work. In Colorado, I used to say how many people have a smart phone? And then you would go through everything that makes their phone work. It was kind of -- and then we would look at whether minerals come from. That was kind of making that connection to just because you might not ever go to Africa, for example, maybe that is where a lot of the minerals are coming from that make your smart work. And so, these are examples from chemistry from our childhood. I grew up within the United States and also with the historical aspects of my family in France and Germany, and so this is the timeline of the discoveries of the chemical elements. If you are new to the periodic table of elements, I recommend going through this. I also wanted to point out that when you are looking at the chemistry information, it is in the chemical society, which I have posted the link in the chat. And so these are examples of the ACS and France and in Germany. France and Germany also had a lot, as well as other countries of discovery of the chemical elements. When the things to note is that as you are going to the history, you can see that, you know, it is not always in the lab that they are discovering this, it is in the rocks. They are doing fieldwork. 's and so there is a huge overlap. And within the field of chemistry, a lot of the sources come from the chemical society. And so that is one of the biggest differences between chemistry and geology. This is my other favorite. Especially if you are getting to know -- just getting to know the elements. There is the link. I think I did it. It should be in there. Yeah, okay. In geology, it isn't necessarily just the primary -- isn't just the geology societies, the primary is actually the a geological. There is tons of information from the geological survey. This is just what is happening right now of why I help researchers with critical minerals and information in the news. This is the latest White House information about the critical minerals as well as the Canadian and European information. And France and Germany, the information about how they are finding new sources for critical minerals. They just posted that there. This is the new White House information about sustained minerals. This is a USGS figure, which I noticed immediately. I read all of the publications. You will notice that the title of it is China's share of global primary production from 1990 to 2018. This is a question that comes up a lot. There's tons of resources available. A lot of it is from USGS are Department of Energy. Another example of the critical minerals is investments, the Senate hearings. This is a link to -- or an example of one of the U.S. senators that is interested in the domestic critical minerals supply chain for the Department of Energy's. And also likewise in Europe and Canada. The recent news that I have found exciting is the type of information that is coming out of France and Germany, where they are actually extracting minerals in a different way. When example is using the lithium from the geothermal brines in France and then the testing of getting the nodule collectors on the floor of the ocean. That information comes up. The students that I help love to write papers about this. They are very interested in how that is changing, the mineral research aspect. Moving on. This is the most recent USGS report about critical minerals, or one of the most recent. And this is where I would suggest if you have a chance, if this is coming up in your library or if your students are interested in it, to make sure that you read it. This is comparing the 2021 information to the 2018 original list. I am trying to copy it so

that you can follow along. This is the 28 -- 20 2018 version. When that final came out, I was still at the USGS. Before coming to Princeton, that it does what I said a lot of my time researching and helping people with, especially mining companies. So I can help you with that if you are interested. And so this is the list. This has changed to some degree. For example, helium is not on it anymore, because in the previous document, basically they are ramping up production enough that helium isn't necessarily a critical mineral. That is one thing, if you look at that list -- the previous slide, you want to look at that. For the most part, many of them are just the same. It is a lot to go through. And if I had about 24 hours or more, I could go through each one of them and show the library resources. But I only picked a couple because I think I only have until 3:00. To start with, why is it that I am helping with critical minerals is the question that comes up a lot. There are solar panels, there's arsenic, gallium, germanium, and odium, and told her room. And this is for 2017. This is what I use a lot, especially when I'm teaching the sustainable features to students. This is one thing they are interested in. The batteries are called white, graphite, lithium, and make mayonnaise. The coal baked lithium are my top three as well as magnesium within the question that I received. So this is another cell phone version. This is something that I am bringing up again just because a lot of times people may not realize how much the smart phone alone causes the need for more minerals when they talk about the technologies, sometimes it just is this awful -- the cell phones. It isn't just the solar panels and windmills. In some cases, it can be a personal choice. If you do not want to have a cell phone -- or a smart phone because of the other aspect that are happening, one of the students I was helping was interested in the details of this exact graphic, and so, for example, Argentina and Chile have the lithium how do we know that? And where does that information come from? These are the steps that about the students through. This is kind of a quick illustration of how I help people, not the students, but mining companies and researchers here at Princeton and also when I was at USGS. Yeah, I help the chemist and geologist prior to publication, then a healthy researchers find a publication and data once the public patient comes out. Any type of journal or article or even at chapter in an encyclopedia about geology, I help all of those references that are within that. I also helping mining companies, and investors that are looking at land purchasing, if they are looking for the references and of the data. For example, different companies that are in New York City or the Princeton area, as well as Princeton alumni, and then I help geologist find data and new research published since the last USGS publication. This is something that comes up quite a lot , especially with something like cobalt or another mineral. Every couple of years, they will publish, and I will help find all of those sources. Most of the time when I help mining companies and geologist, they asked me how do I find this list of references here at Princeton when I was at USGS, within the USGS library. These are two examples if you're interested in magnesium are lithium, I highly recommend these. These are older, 2017 list. There are many details. The difference types of rocks where the mineral exist and different types of scenarios. It walked through additional issues that are happening. And so I just highly recommended.

Moving on. Like I mentioned with chemistry and some other fields, usually it is the society that has the most information for that subject. So for chemistry, it is the chemical societies within each country and then the international information. In geology, most of the information is going to be in the geological surveys, either in the country or the state or province. These are some examples of what I use. I used the Japan geological surveys a list, because when they were visiting Emma they showed it to me, and I have been using it every sense. There is an English version which I put the link in there. So when you open up the link, all of the flags come up, the second link that I posted. You if you know the flag, you can click on it, or you can scroll down, and there is the name. Canada is one of the ones that I helped with the most, because it is nearby. I also helped a lot and am constantly using the one in Quebec and then in France and Germany. These are some of the examples. I'm going to put them all in here. The one I use the most within Canada is this one. When I was out in Colorado, I actually used British Columbia and

Northwest Territories. Those were the ones I use the most. Here at Princeton and with USGS, they have the same type of bulletins and professional players -- papers, just like the geological survey does. All of the geological surveys and date our profits surveys have the same type of series. It is a huge chunk of the collection. And so if you want more information on that, I would be happy to help. Likewise, with France. And so I use this quite often. All of the publications are in French and websites are in French and English. If you're looking for either Rand or -- one of the things if you do get a chance to go to this website, you will notice that they have a new publication . My favorite part of that is that they have a map of all of the rare earths in Europe. I can't remember the page number, but that is something to look at. And then in Germany. Germany has been doing a lot as well with critical minerals and also conflict minerals and looking at mining the ocean. That type of information and those updates are going to be on this website. This is where it gets a little intense. I can find this stuff pretty quickly. But just to give you the information, these are the sources that I use pretty much every day, even though I am at Princeton, because it is where the information is that students are looking for and so these are the three ways that I go about it. There is the main page, there is the unnumbered series which have the minerals your books and other commodity information just listed, and then there are the numbered series which have the different professional papers and other type of information applicable. When I am showing people for the first time how to do this, this is how I show them. For example, in Algeria, one of their main -- helium. This is an example of how I show the students or any researcher how to find the Algeria mineral industry as well as specifically helium. The reason there is a delay between them mineral industry and the other commodity summaries is because there are more details in these. There has always been a delay. These come out every year. There will be a 2022 published sometime in February or March. The 2017 for the mineral industry one will be coming out sometime within the next year or so. And so that is something to just keep in mind is that there is always a delay. Likewise, the next mineral is cobalt. Sorry. I'm trying to copy it so you can follow along. This is one of the interesting minerals because cobalt is a critical mineral and a conflict mineral. If you look -- it is hard to see, but one is the mine production for cobalt. One of the links that I put in here is the responsible minerals initiative. That is if you are interested in the conflict side of the mineral production and what type of information they are looking for and why does it become a conflict mineral. That is more information that you can obtain. Oh, and within the USGS publications, put in the Democratic Republic of the Congo. A lot of times if you click on that, you will see that many of the different minerals that are mined in the Congo are the conflict minerals. Lithium is another big one. It comes up quite often. Here's the webpage. It is used quite a lot. I think the first time I started doing outreach was back in 2012. The reason why it was mine production and more people were interested in looking where lithium was on earth was because the electric vehicles or hybrid vehicles were just starting to hit the market more, and they need the batteries. And so this is -- in 2014, this was my number one question, where is the lithium and how much has lithium mining increased. If you look back in time, if you're interested in looking at the history of lithium, go back to 2010 and just go through all of these in both the mineral commodity summaries and the minerals yearbook. You will see what countries, the details of what countries and what mines were operating. There's additional information in there as well. I should point out that a lot of these publications are not findable. They are findable through Google scholar and Microsoft academic, but they are not necessarily in any of the other commercial vendors.

Now we have Tantalum. This is a critical minerals and a conflict minerals. Those are sources that are recommended. Again, put the responsible mineral initiative in here as well. I just think it is interesting to look at the bigger picture. There is more information from both United States and the European Union on the conflict minerals. Especially for the whole supplied chain aspect of it. I am going to go into the too much detail, but point you in the right direction of what to look for. Again, if you go to the different years and see how much production has changed and where it is and the different footnotes that the

geologists are making, that is where the information that most students are looking for is in that, in the footnotes in these publications. So another thing that I wanted to mention is the new database, they are making a new database. There is more information going to be available soon through the American geological survey and geological survey in Canada and Queensland and Australia. They have joined forces to do this initiative. This is something that if you are not aware of it, it is something that you might be interested in, or your faculty or students or other people that are interested in minerals and mining might be interested in. That is June 28th at 3:00 on Eastern standard Time. This report may be of interest as well. Especially if you're interested in what type of rocks the critical minerals are and. There is more information in here that people realize. A lot of these are not in the commercial vendor databases.

Another thing that I use quite often for presentations and also when I am helping students is this it vexes and critical minerals research, this is something that happened in January of 2021. There are 27 videos. It is the Americas, Europe, Africa, and Oceania. Here is the link for both the YouTube and the link. Vic was a wonderful person. He actually worked down the hall from me. He passed away last year. This forum was in his memory. He was the one that showed me different tricks about mining and minerals internationally. He also referred people asking questions from different societies. I got to personally give tours to and meet different researchers from around the world. And so it was a great opportunity. My experience in Denver definitely was amazing in that way. People were just very professionally generous in sharing knowledge and also introducing people from around the world. So if you have a chance to go to Denver once things open up again, there is really a lot of interesting meetings that are happening and other initiatives. It is a great place to understand the mineral industry. So these are some other memorials to . And then the USGS has many labs, there are over 500 of them. When I told this to my chemical students, they were excited. They did not realize how many they were. I love talking about them especially because I know how hard the researchers work to publish this information . When I worked at USGS is to get emails of all hours of the night and so this is one of my favorites is the stable isotope lab. There is reference material and calibration services and also instructions on set and recipes. These are some examples of the reference materials and calibration. My other favorite labs that were in Colorado where the suspect lab and also the mineralogy and microscopic eat library. They were all incredible helpful. Whenever they had questions and needed help finding reports, of course, I was always there to help them. The great part was that they loved to talk about what they were working on. I was able to get tours of a lot of the labs out there. And they just kept me up to date on what they were working on. And so that is another trick to finding this information really quickly, is just knowing the scientists and see what they're working on. It just makes it a lot easier. It makes it faster to find it later. Another one my favorite labs is the national water quality lab, which, I know, I'm a former hollow geologist. I was rich in water. One of the reasons I like to mention this is because if water is so friendly, he goes through the rocks. It's an issue if you have a mining area. There are aspects that are happening, there could be groundwater interactions. And so the national water quality laboratory has guidelines for lab experiments. They have field data collection manuals that they work on with the EPA. This is the recent study that they did with many, many collaborators. The methods used for the collection and analyst of chemical and biological data for the tapwater exposure study, the United States, 2016 through 2017. That is one thing that students and anyone interested in government, USGS and other governments work with other universities, and they work with other government agencies and state agencies and international geological surveys for example. It isn't just one person or one group working along. It is very collaborative. Usually there is a prepared in cooperation with, and then there are many people that are involved. Oh,, this is one of my favorite things. We recently acquired these. Was a joint effort between the Lewis science Library and the East Asian library to obtain these. They are my public -- favorite publications. The publications for China. I had to leave them behind when I left USGS, but I was working with the Chinese area studies library in here. I mentioned it, and he was like, oh, my gosh. I can

look for them. He got the entire set. I was so excited. This is an example of what it shows. This is a part of China. It has the story on -- this is what the type of information that they were looking for. I was pretty excited to obtain these. If you're interested, I could provide more information as well. Also, this is an example of just a day and my life. I do chemistry and geology simultaneously. These are some books from the inorganic chemistry session and these are the Polish geography books. Languages are Polish, English, French, and Russian. That is something to keep in mind too. A lot of these geology books are international. They are published in multiple languages. The state geological surveys, this is an example of Colorado. The Colorado mining group that I used to work with, I am pasting it here. This is an example of the Canadian critical minerals. I use this a lot when people are looking at the difference between the U.S. and Canada as far as which critical minerals are critical within the different countries. Likewise, the Quebec critical and strategic minerals. This is my favorite map. If everyone in the world made a map like this, it would be amazing for mineral research. This map has the location of the mines, but also the companies, and that it is color-coded maybe critical or strategic minerals. This is something to keep in mind if you're looking at great ways to represent the information and make it easier for the user. I used this one a lot for outreach, just to show the type of information. Plus, this is nearby. It's not that far away.

And then there is new information from Germany. This is the German geological survey. One of the things that comes up -- when this news broke, it was pretty exciting that they are building a new EV battery plant in Germany and also that they are looking to tap lithium out of the underground springs in the Rhine River area. This is something to keep in mind as well. And then, of course, this is the example of the cobalt DRC information about the responsibility of mineral supply chains. Germany has been doing quite a bit about this. Also, whenever I was at USGS, we were broken up by the language that we knew. I happen to do all of the French language geological surveys. There were others that did Chinese or Japanese or Russian. And so I was always helping with Algeria. This is an example of the Algeria -- Algerian geological survey. They are number three in the world in helium. Also, this is what we have here at Princeton. I will put those sources in the chat. Oh, and using the mobile GIS applications to support mineral resources investigation in the region and Algeria.

This is one of my favorites. Here's the Algeria one in the chat. This is called the mineral baby. It is the mineral education coalition up in Colorado. They came up with this every year. Basically they like to illustrate that even if you don't think that you are affecting these different mineral resources are energy resources, every person born in the United States will need this for something. It is just being part of society. That is something that the students really like. It resonates with them. And then this is another one of my favorite publications to show students, because it is the breakdown of how minerals are used in the sectors. This is from 2015, but it is still usable. That may be of interest. And then the rare earths. I'm not going to go into this because I would need another couple of hours. But the rare earth elements are easily findable on the USG webpages. There are a lot of details. When you go to the webpage, and again this is one of the best publications that explain the other aspects of the rare earths'. If you go to either -- they will have a rare earths element or link or news about it. It is pretty much, everybody is following it. And so this is another snapshot of it. And also, this is one of my favorite things to report as well, it has the deposit location, the resource, comments, and then the references if you're looking for additional reference materials, meaning publications. And so, the trick to finding a lot of things quickly is that the nice thing about working at the USGS library was that everything was related to geosciences pick and so I still use it, and my students still use it. It is just an easy way to find titles of reports are different report series. I find it at USGS and copy and paste it and then find it at Princeton. It is faster that way. This is an example of within geology, chemistry, and mining within the Library of Congress library classification system, of how you can find different books and other materials. And everything in

red is pretty much of mineral research inquiry. This is why a lot of my colleagues refer to the research inquiries to me. In some cases, these books are downstairs. In cases, it is faster. I can find the information pretty quickly. And said no -- another quick reminder it is the USGS and that mineral resources on lines facial data. I can show the previously mapped information and data sets that are available from the USGS. This is something that I show which students the most as well, once they know where they want to look and the mineral that they want. Then I go into those databases. I think I am almost done. Just to give a quick information about, for years I have been using information about indigenous communities. These are the sources that I use and some examples of what I have been involved when. Especially the gold King mine information, that happened in 2015. The most asked question is about uranium and the Navajo nation. Thank you. If you have questions, please feel free to contact me at ewild@princeton.edu. And if you are interested in additional presentations by the Princeton University library, they will be announced at library.Princeton.edu.

Thank you. That was a fantastic webinar. I really appreciate it. Any questions for Emily? I'm tight on time. I'm supposed to end at 3:00. Any questions for Emily? I think you will be able to see the chat also. The recording will be there. We are off tomorrow. We just got a new holiday tomorrow. I think by Monday you will see all of this information. Any questions for Emily? I was really surprised, 500 USGS labs. That was really amazing to me. The other thing was the minerals in TVs and phones, do you need a lot in those? The panels are relatively inexpensive all things considered. I'm just trying to figure out if they need rare materials, you would think they would be very expensive.

That is another conversation. But, yeah, that is something that comes up a lot. I think it is a good point. It is just amazing of the connection of how we are using technology and how much it costs and then the other, if you go back, what's happening and where you are mining at and what is happening to the people that live near there. That is the part that I spend most time with is the raw material and making the connection. Especially when I was at USGS. A lot of people did not realize how much we were importing today U.S..

And must be a very small amount that you use in a cell phone. Are there any resources on recycling minerals for smart phones, for example? I am guessing it's less lucrative to recycle for manufacturing companies.

True, but if you go to the mineral, each mineral has its own webpage on the minerals information page. Any recycling information or additional information will be available. For example, magnesium, they have additional information, but they also have their own conferences.

Great.

I work in areas of a.s. Jim in the Amazonian basin. And gold as a conflict mineral with complications of mercury poisoning.

Yeah, if you want more information, some of my colleagues at USGS have been doing studies on that. There is also a researcher here Princeton. I remember the gold and the mercury poisoning. There are reports about that.

Any other questions for Emily? I wish we had all afternoon. Unfortunately, we don't. Emily will be doing more webinars. Please check your calendars. She's going to be doing a bunch more pics

Yeah, and if anyone is a new library thing and look into how to do presentations to your community, that is something that I help people with as well. Especially for stem librarians that may not have the experience specifically with minerals, it is something that I do show people and sometimes give them my slides and say, you know, here's how you can get started. Because there really aren't that geoscience librarians in the world.

Any last questions for Emily? Come back to the Academy, we've got more webinars coming. Without one on Tuesday. Emily will be back in the future. We are planning more webinars with her. It looks like you covered everything. The slide deck will be invaluable. Webinars are like graduate seminars. You can take the presentation and the slide deck and have a tremendous amount of information.

I have to give the credit to the USGS because they trained me well.

Yeah, thank you. Okay. It is 3:00. It looks like the questions have run out. I would like to thank you one last time, Emily. Another fantastic webinar. More to come. Thank you Ashley for great tech support work and thank you audience. Please come back to the FDLP Academy for more great webinar. Come back next Tuesday and check our calendar for upcoming webinars. Thank you. Have a great rest of your day.

Thank you.

Yeah, by .

[Event Concluded] [Event Concluded]