

>> **Dr. Torrey:** Okay, so now we can get started with our topic today. Our speaker is Lise Pederson. She has a master's in chemical engineering and a P.E. license. She has spent many years in the environmental engineering field, including in both the public and the private sector. For example, she's worked for HDR Engineering, Rust E&I, both the EPA and the State Department. And she's done quite a lot of contracted work with the Corps of Engineers, particularly in the Pacific Northwest Division on their dams. She has been six years now at Reclamation, and she has been in the Materials and Corrosion Lab since we reorganized two years ago, three years ago. So, we welcome her today to give the Intro to Hazardous Materials webinar.

>> **Lise Pederson:** Thank you, Jessica. Welcome this morning to Intro to Hazardous Materials. Okay, so I'm using the term hazardous materials as a general term. It covers many regulated materials, such as hazardous waste, asbestos, PCBs, equipment containing elemental mercury, used oil. And then depending on the state that your project is in, it may cover other things like electronics, which would be like printed circuit boards that you'd find in your control units. A lot of the electrical equipment may fall into this category. It also may cover concrete aggregate. And we'll talk about these a little more in detail later. So, what's the role of hazardous materials for BOR? Reclamation's facility managers shall consider hazardous waste handling before the initial purchase of hazardous materials, hazardous substances, oils, or as early as possible in the design processes which include hazardous materials or have the potential to generate hazardous wastes. It is Reclamation policy to carefully consider such purchases or designs with the intention of substituting nonhazardous materials or of making process changes where possible to avoid or reduce the generation of hazardous wastes. Whenever the generation of hazardous wastes is unavoidable, Reclamation will ensure effective management is employed to minimize potential releases to the environment and any long-term liability. Now, that's from Reclamation Manual, environmental P15, Section 5A. So, why do we have this? The federal regulations-- the federal environmental regulations are from cradle to grave. In other words, when we put something into one of our facilities and then we remove it, if it is a hazardous waste or hazardous material, we will own that from the minute we install it to perpetuity. So, that's why it's important to know what you're dealing with in a project. The other issue is that Executive Order 12088 states that all federal agencies will follow state and local environmental regulations. And those state and local regulations tend to be more strict than the federal. So, it's important to know where your facility is at and know what those regulations that are surrounding it. And by doing this ahead of time, you can save the schedule and budget for your construction project.

>> **Dr. Torrey:** Alright, for those of you that just joined us, if you could-- we're getting a little bit of feedback on the phone. So, please make sure that your audio is in mute mode. Thanks.

>> **Lise Pederson:** Okay, so as I said before, the regulations are from cradle to grave. So that when we are disposing or recycling of material, that responsibility cannot be delegated. Since

I've come to Reclamation, I've seen that in several cases, the idea that Reclamation can delegate the responsibility to the construction contract. That is not true. So, anytime we do have to dispose of it, we will still have the responsibility. That's why we want the records of the testing, transportation, and the disposal. We want to ensure the waste is being correctly classified and disposed of. Note that the contractors who also are working on the site and generate waste will become co-generators. Meaning they share the responsibility. And again, for the contractors, that responsibility cannot be delegated either.

[noise from line]

>> **Dr. Torrey:** This is Jessica again. I'm going to try and mute all the participants, but if you're on the line, we can hear someone. So, please try and make sure that your audio is in mute. And then we'll take questions at the end. Thanks.

>> **Lise Pederson:** So, continuing, as I just mentioned, contractors are co-generators. But Reclamation, as the site owner, holds the ultimate responsibility financially and legally. So, for example, On the Superfund sites where EPA is involved, we've got-- these issues will last and have lasted for sometimes decades. And if it happens on a BOR-- on a Reclamation site, Reclamation will be involved in having to deal with all those wastes until the site is cleaned up. And in some cases, we've had sites where PCBs from transformers and the like, that oil's leaked into the ground. BOR is responsible for the complete cleanup of those sites. We also have, currently going on, the Leadville Mine Drainage project. That even though these mines have closed down a hundred years ago, we're still being impacted by the acid mine drainage. So, just because it happened in the past, and though we may not be currently working there, didn't cause it, we're still going to be responsible to take care of it. Now, back onto the Executive Order 12088. And just a reminder that all government agencies shall follow state environmental regulations. Note that those state regulations tend to be more strict. They may cover-- they do tend to cover far more than state regula-- sorry, that they cover more than the federal regulations. So, for example, Colorado also has regulations on the book that cover the disposal of electronic wastes. Meaning if your project site is in Colorado, you cannot dispose of... monitors, printed circuit boards, wiring. Those all have to go into a special facility and they have to be recycled. They cannot be just disposed of as solid waste. Washington and California-- both of those states regulate PCBs down to smaller parts per million level than the federal standards. Federal standard is 50 parts per million, but Washington and California regulate PCBs and oil down to 2 parts per million and 5 parts per million, respectively. So, again, it's important to know what your state regulations say. So, by knowing ahead of time what you've got on your site and what's in your project, you can get a cost estimate that reflects this. So you can handle these costs and the risk early on, and you can budget far more efficiently. And the contractors will also be able to bid the work more accurately. It's not-- I won't say that it'll cut out change orders completely, but it will cut them down. And it also can cut down on construction delays. I've run into some

projects where a contractor ran into hazardous materials. There had been no survey done. And had to stop the project completely while this was dealt with. And it caused a several month delay. And some contractors don't wanna work with hazardous materials. Their attorneys won't let them do this. But if this does occur, there are other options we can deal with. We can split it out as a separate contract. And some of the regions were looking at putting IDIQ contracts in place just to deal with hazardous materials so that we can call up these hazardous materials contractors and deal with these issues. Okay, so what common materials, hazardous materials, can you find at BOR sites? We've mentioned some of these already, such as asbestos, PCBs-- which stands for polychlorinated biphenyls-- regulated metals, coal tar, electronics, and used oil. So, the first one, asbestos. This is probably the most prevalent. In that it's found in a lot of different locations throughout a BOR facility. You can find it in electrical wire insulation. In this particular picture on the left, half of those have asbestos and half don't. You cannot pick by color or texture. They're all cloth wiring in there. Like I said, that is not-- the only way you're going to be able to find it out is actually by testing. You cannot go by color. Just because it's white and asbestos is white does not mean it's asbestos. I think in this particular case it was the pink ones and the blue ones. So, there's actually no rhyme or reason. Picture on the right. Those are insulator boards. And those also tested very positive for asbestos. Sometimes you'll have other insulator boards that looks like a black plastic. Again, the only way you're going to know is to grab sample and have it analyzed. If somebody tells you they can look at it and tell you... Yeah. The only ways you specifically know is if you have the material tested. The places you can find it is in electrical putty. In the material that's in the block, and that's usually to prevent leakage. And occasionally you'll find it in coatings. This picture on the right is coal tar and asbestos wrapped. So, you just, you never know. You also may be able to find it in office materials. In floor tiles, ceiling tiles, and sometimes wallboard. Another common occurrence is transite. And the material on the right is electrical conduit Where you run your electrical wiring. And the material on the right are the trays that you lay your electrical equipment on. Those-- typically, you'll find those marked. They'll say transite on it. And in some cases they've gone ahead and marked them as asbestos containing and you'll find a sticker. The one on the right actually did. The one on the left was not. And again, the other places you can find it. So, in mechanical valves, in the stem packing. In control joints. It's sometimes uses a gasketing material. Not always, but sometimes. And since asbestos is a naturally occurring mineral, it may also show up in concrete aggregate. And the note up there says, it's directly regulated in some states, for example California. But just because it is not specifically named does not mean it's not regulated. It's still not allowed to be released into the air, which may occur when handling. And that goes to environmental regulations. It's 40 CFR 763. You're just not allowed to release environmental hazards into the air. Another very common one is PCBs, polychlorinated biphenyls. It is found in transformer oil. That's probably the classic place for finding PCBs that most people will remember. It works as an antimicrobial. It is also found in coatings. Most of our oil has been dealt with. Or if it hasn't, it's now required by law to have a sticker marked on it. If it does not contain PCBs, or if it does. And when it's been found in the hydraulic oil or the electrical breaker

oil, it's usually a result of cross contamination that where somebody had some extra oil back in the day and they just needed to top something off and they just dump this old stuff in. In that case, you end up contaminating pretty much the whole system and all of that oil has to be disposed of then as a PCB-containing oil. And so in coatings, the reason why it was added to coatings was as an elastomeric and also as an antimicrobial. It hasn't been terribly common. In my testing, I have not found it very commonly yet. But who knows. Regulated metals. These are very common in all of the coatings. So, we were talking back here about the vinyl resins. I've found it in the resins, the coal tar enamel, coal tar. And even the common day, the new coatings that we're using may also have metals in high amounts. Typically we've talked about lead. And that was the old standard, and it's a great coating. It adheres really well. It works very well for preventing corrosion. But it's now on its way out due to the health concerns. The other place you might be able to find it is in used oil. Again, it's probably a cross contamination issue where somebody put contaminated oil in with the hydraulic or regular oil, causing that oil to be contaminated. Now, what metals are we looking for? Federal standard has what's called the RCRA 8s, and that is on the far right where it talks about those eight metals. And that's the typical list for most of the states. Those eight metals. Now, in California, they regulate. 17 metals. And those are referred to as the CAM17s. And that is only for California. All the rest of the states for BOR would be following the RCRA 8. So it's just a difference for what California wants to regulate. But again, you need to know this for where that state is-- where your project is at. And coal tar. Coal tar is typically found in... Uh, it's a protective coating typically found in pipes. Can be found on the inside and on the exterior. Usually penstocks, large piping on the interior. And it's got-- coal tar enamel is the really thick stuff. And it's been several millimeters thick. And then it moved to coal tar epoxy. Both of them are black in color. They-- when you break up a chunk of it off and you smell it, it smells like asphalt. And again, tends to be very thick. Again, it's also a very good coating, but it again has environmental and health concerns. And our coatings people are looking at ways to-- well, looking at other coatings that we may be able to use and to replace these. Coal tar, it also may contain asbestos. There they go again with that asbestos, it shows up everywhere. It was used as a stiffener because the coal tar tends to be-- doesn't have much structure, so you can put the asbestos in there to give it structure and maintain it on the surface you want to coat. So, what do you do if you think you've got hazardous materials? So, in the inception of your project, this is the best place to go get a handle on what you've got. Start screening for those possible wastes-- possible hazardous materials that may happen based on what I've shown you, in the past, where it might occur. And then, once you've got an idea, you've got a site survey done, you can use those screening results in the design process for your cost estimate and for your design so the contractor knows what to deal with. We want to be able to tell the contractor what they're in, what he needs to deal with, and how to deal with it. What testing do we need, where-- what kind of facilities do they need to send these materials generated to? Are they gonna go to recycling facilities? Are they gonna go to hazardous waste disposal facilities? Are the PCBs going to have to go to a PCB incinerator? We need to spell this out in the specifications so the contractor can appropriately deal with any waste

generated. So then, once we've selected our contractor and we're on to construction, we get into the submittal review. We want to ensure that the contractor is following the specs that we wrote. So, we go through those, make sure that their submittals meet the standards. Are they sending it to a recognized, licensed facility? And then once, for example, once we've sent the waste out, we want to be able to get all the final paperwork back, like the final manifests from the disposal facility. One thing I've seen common is that the contractor will send you the manifest from the-- signed by the transporter. But you're not getting a copy of the manifest signed by the disposal facility, and that's the one that you want. That's the one that you want to be able to pay from. Because that means that the waste was sent to a facility and accepted. And that record keeping, we need copies of all this. Because we have to keep it in perpetuity. We don't know-- we're responsible for this paperwork. Yes, the contractors will keep their paperwork, but we will own this responsibility in perpetuity. So, we want to have good records in case there's ever a question. So, how can TSC and the Materials and Corrosion Lab help? Well, specifically, we have specialized training and certifications. So, currently we are Asbestos Building Inspector, federal and state for Colorado, Utah, and Montana. We'll be adding Nevada very soon. We've got the BOR or Reclamation HECF. And that includes Grand Coulee's HECF class. Confined space trained. And we also come with our own equipment. So, we've got all harnesses for fall protection. One of our members is also part of the TSC underwater inspection team. We've got certified hazardous materials managers, professional engineers. So, specifically in a project, how can we help? So, in the FER-- when we talked about the FER process before, what we would do with you is review the project scope and develop a hazardous materials survey scope in conversations with you. Looking at drawings, photos that you would have. If you have any historical documentation. Sometimes those old drawings and the product manuals will specifically list out like Mercoid switches or other asbestos or asbestos-containing material. That is a great source of information. And then once we have that information, we can develop a project scope. And then once we've done that and that's agreed upon, we'll look at scheduling a site visit. So, what we try to do is schedule that site visit during an outage so that we can get access to all the equipment that's on the scope. Because we want to do as thorough assessment as possible. And an outage is the best possible way to do that. But please understand that we're going to try to fit ourselves into your schedule, not you fit into ours. So, I've traveled weekends, evenings, whatever. Whatever it takes to try to make your schedule so that you're not having to put your facility in an outage just for us. And then once we're there, our people are experienced to know what to look for. And honestly that just takes experience in looking at the materials and understanding where they might occur. So, we'll go through and work with your people, especially if it's like electrical equipment, We'll work with your electricians on what we can get samples from. Because this sampling is destructive. So, it's not always possible to be able to get samples. But we could still document and note it. Then, once we're done with that, we send the samples to laboratories, they'll get analyzed, and then we'll get a report back that lists out our findings. And note that this information is stored on a SharePoint site. I've got the address listed, but this is what it looks like. And the point of it is that you'll always have access, for BOR

personnel. The other thing it includes-- these reports include-- are photo documentation. So, you'll see pictures of everything that we looked at. We'll know whether it's a suspicious-- suspect material or not, and what the findings were on any analytical results. Then, once we're done with that, we go into the design. And as we noted before, we research into the state and federal regulations so that you get specifications that are written for the federal and state requirements. So, we document how all these materials need to be dealt with. And then, once we're into construction, we provide reviews of the submittals to, again, as I mentioned before, we want to make sure that we've got them well-documented and that the contractor is meeting the intent of the submittal. And also, in case you run into something that wasn't dealt with before, we can also provide on-site assistance and consultation if you come up with something that you hadn't discovered previously. So here's a case study. It actually occurred on the same facility, but they are two entirely different projects. One is a gate recoating. And we looked at-- we did sampling of all the gates at the facility and the hydraulic controls. And then we went and collected samples of all of the coating materials and the control wiring and the oils and all that to get an idea of what we had on the site. So, what does-- from that third bubble, what we ended up looking at were metals, asbestos, GROs-- GROs go with the hydraulic oil-- PCBs were coatings, and then... Uh, this was compiled and analyzed. There was-- we put together the report and talk about that with the facility owner and then the team lead. So, what that allowed us to do is to put together quantity estimate worksheets and specification sections that met the state and federal regulations for this particular project. And now we're in the construction phase. And going through the submittal reviews and approvals to again ensure that we're meeting the state and federal regulations. And this is actually a fairly common project, looking at the coatings. And the different types of coatings and what we need to do with them. In this particular case, the gates had to be worked on on-site, which has another layer of regulatory... difficulty because you now have to deal with potential exposures to the environment. In other cases, they are able to take the coatings off or sort of take the gates off and send them to their shop. And in that case, regulatory-wise, it makes our work much simpler. And at the same site, an island has built up of sediment in the forebay area of the dam. And we're now looking at how to remove that sediment. Historically, that area had been used for gold mining, and the sediment carried down now has heavy levels or high levels of elemental mercury in it. And so now we're trying to-- we're developing a sampling and analysis plan to collect samples on that. And then dependent upon what those levels of metals and other materials in there end up being, we're going to develop methods and disposal options for the client. This one's still in the incipient stage. We're in the sampling and analysis plan development. The area has also been heavy agriculture. So, one of the other items we're looking at is the potential for pesticides and herbicides. Umm. It's the same dam, but entirely two different projects, both dealing with hazardous materials. So, here's a quick review. Knowing what you have and how much you have, you can save your budget, your construction schedule. Another take away, BOR owns waste generation responsibility forever. So document, document, document. And the common materials you'll find would be asbestos, PCBs, regulated metals, coal tar, used oil, elemental mercury, and other materials depending

upon what your state regulations require. And here's a list of resources. I added the URL for that SharePoint site. So, in case you need to use it or you've lost that e-mail that I sent to you, the results-- so, the pictures that we take, the reports we write, and the original analytical lab reports are all housed on this site so that they're not going to get lost in our e-mail. They're out there and you can download them and the pictures anytime you need to. Another resource are your regional hazardous materials coordinators. Every region has at least one. And then the areas may also have their own. And then there's Reclamation Manual ENV P15, which I read an excerpt from in the beginning. Thank you.

>> **Dr. Torrey:** Okay. Thank you, Lise. So I am going to unmute everyone. And we will take some questions. If you don't happen to have a microphone, you can also put your questions into the chat window in the Webex. So, any questions for Lise now?

[silence]

>> **Dr. Torrey:** Okay. I'm not hearing anyone. So, go ahead to the last slide. And so this is our-- woops. This is our group. We have quite a few new fresh faces, some new hires just in the past month. So, feel free to contact any of us. We'll hang on the line for another five minutes or so, in case anyone wants to have some questions in general or specific to your facilities. And also, you have my e-mail, so feel free to e-mail me. Here's Lise's e-mail, e-mail her with questions as you think of them. And thank you very much for your attention today.