

>> **Dr. Henderson:** I would like to welcome you guys all to our Corrosion Webinars Series. I am Dr. Chrissy Henderson and I will be your host for today. We are with the Reclamation Denver Office, Technical Service Center, Materials and Corrosion Laboratory. Three of these Corrosion Webinars are typically put on annually in order to share with you special topics in corrosion mitigation, through cathodic protection, coatings, and hazardous materials. We want to thank you for joining us today as we talk about hazardous materials in coatings. We are hosting today's Corrosion Webinar using Microsoft Teams Live Events and we will be recording the presentation. If you would not like to be part of the live recording, I would ask that you please leave at this time. We will have a recording available afterwards. During the presentation, we encourage you to ask questions as they come up. There is a live Q&A chat feature, so you can click on the Q&A icon, the chat bubble with a question mark inside, to access this feature. We will be monitoring the questions and at the end, we will have the Q&A session. The recording, as I already told you, will be available at a later date. I might actually be able to send the link shortly after our webinar today. I would ask for your patience if there are any technical difficulties or delays in content delivery. We are working with a live sign language interpreter for this webinar. So with that, I would like to welcome our presenter for today, Dr. Kevin Kelly. Kevin is a research chemist with our Materials and Corrosion Laboratory group. He obtained his Ph.D. in environmental chemistry from the University of Colorado Boulder and entered the federal service right after graduation. He has worked on many environmental compliance and management projects over the years, including establishing the invasive mussel research laboratory in 2006. More recently, Kevin was responsible for establishing hazardous material service in the TSC, six years ago. Focusing on performing hazardous material surveys in Reclamation facilities in support of construction design specifications and construction oversight. He is currently project manager for four environmental research projects, and continues to provide hazardous materials support for construction projects. And with that, I would like to hand this presentation over to Dr. Kevin Kelly.

>> **Dr. Kelly:** Good morning everyone. I'm Kevin. Everybody should be able to see a slide up there saying "webinar will begin at 11:30 AM mountain time," so make sure you have all your connections ready to go. I'd like to thank Chrissy and Grace for having me here today to talk about hazardous materials in coatings. You know, eventually, sooner or later, all existing old coatings will need to be replaced. You may have a need to apply a fresh layer of new coating. Or you might be doing some kind of repair/ renovation work where you need to take some of the coating off for welding, replacement, variety of different kinds of work. Well, what we're going to talk about today is: what do you do with that old existing coating? That would be the topic today. Okay, now we want to talk about four objectives for this webinar. The first thing we want to do is understand: what are hazardous materials? What makes the coating material hazardous? We want to understand what kind of hazardous material that may be present in the existing coating in our facility. And then want to catch you up on the regulations and directives for the removal or disposal of hazardous materials in existing coatings. And then last, I would like to share with you the evaluation process for: how do you identify/ document potentially hazardous waste that may be generated anytime you are removing or disposing of the coating or equipment with existing coating on it. But first, I'd like to

give you a little bit of a historical perspective. The Bureau of Reclamation has been building facilities for a long time. We started in the early 1900s all the way up to about 1980. Many wonderful materials were used back in the "good old days" that lasted a long time. Things like asbestos, PCB-- polychlorinated biphenyl, a lot of metals in paint, coal tar. Wonderful material as far as physical property, but now the EPA came along in 1970. Before that, we didn't have a whole lot of environmental regulation. But then after the EPA was established in 1970, there was quite a bit more environmental compliance required. Anytime we are disposing/ removing of material that may be hazardous to the environment or hazardous to people. And so, we are now having to face a lot more reg-- uh, processes and evaluation surveys to try to determine if existing coatings may be hazardous. I have a working definition for hazardous materials. When I'm talking about a coating that may have hazardous material, I'm not talking about whether or not you must remove that coating immediately, by the way-- no. What I'm talking about is: if we were to remove that coating and generate a waste stream, is there anything in that coating that might cause that waste stream to be classified as hazardous waste. So anytime you hear me say the word "hazardous material," it doesn't mean there's anything wrong with that, anything wrong with the coating, as long as the coating is in good shape and well maintained. You can leave it. You don't have to do anything to it right away. So I'm only talking about hazardous materials as far as the potential that when it would be removed, it may cause or generate a hazardous waste stream. Okay? So solid waste can be generated one of two ways from coatings. You remove the coating itself and the coating itself is the waste stream. Or you might have a need to remove a piece of equipment. Maybe a radial gate, maybe an air housing or a control panel. All of these different features have coating on them. So that if you're removing the equipment, the coating is also being removed with it. So there's one of two different ways how a coating might become hazardous waste. One thing that we're not going to discuss today is OSHA regulations. We're not going to be talking about safety and health when it comes to worker protection. The TSC does not have any safety and health professionals. So if you have any questions about personal protection equipment, hazardous energy control programs, that kind of thing-- you should talk to your safety and health professional in your office. But we're more than happy to share with you our experience. That we do follow the same thing-- PPE, hazardous control programs, like anything. So we're happy to share with you, but we're not in the position to advise you on safety and health regulations. So first of all, there is one federal regulation that is the primary regulation that we follow when you have to remove/dispose of old, existing coating. And it's called the Resource Conservation and Recovery Act. We call it "RCRA." And it was established in 1976 and you can find it in 40 CFR 239 to 282. There's a website for them. Basically, this is the primary federal regulation that governs the disposal of solid waste and hazardous waste. A lot of people know about this regulation has-- that hazardous waste-- "cradle to grave." And that's because it covers everything from the point of generation, when you make-- when you remove the coating and you make the waste stream-- to the transportation of that waste stream, to the final disposal of that waste stream. The disposal might be a recycling or it might be a treatment. Maybe it's like incineration, you burn it. Or it might be a landfill. Through this regulation, RCRA is the primary regulation that we follow as far as the basic regulation for how do we handle hazardous waste streams. So the first thing you have to ask yourself is: are you generating a solid waste? You know, solid waste could be anything. It

could be [inaudible], it could be concrete, anything that you're gonna get rid of... could also be coating. And the EPA has come up with four primary definitions for how to determine if you have a solid waste. So the number one way to know if you have a solid waste is: is it abandoned? We don't have anything like that at Reclamation. We do not abandon anything. We don't dump it, you know in a landfill, or side of the road and so forth. We never abandon, we always do a good job of keeping track of everything. But #2: inherently waste-like. That's the most common type of solid waste that we generate. Generating materials that may pose a threat to human health and the environment. So anytime you dispose of something that is not supposed to go out in the environment, not supposed to be dumped in the water or out in the environment, but we are getting rid of it, we call it "inherently waste-like." There's also discarded military munition. We don't have anything like that. And the last one: recycled. So sometimes you might have a radial gate or some kind of a feature that has mostly metal, and you want to give it to a scrap metal recycler. That's also called a solid waste, even though you're recycling it. But it's still called a solid waste by the EPA. So after you say "yes, I have a solid waste," the next step, then, is to determine if that solid waste will be a hazardous waste. So hazardous wastes are solid waste that cause or significantly increase mortality or serious, irreversible, or incapacitating reversible illness-- one that poses substantial present or potential hazard to human health or the environment when improperly managed. So, what you have to do then is follow the cradle to grave tracking. And the form that you see there on the left-hand side is called the Uniform Hazardous Waste Manifest. And basically, that's the tracking form. You keep track of what happened to the hazardous waste. The top half of that form is for the generator to fill out. You have an EPA ID number. You have to characterize what kind of waste you're generating. Where is the waste being generated. And you have to sign off on it. The middle part of that form is for the transporter. The transporter has to be a licensed transporter because if he has an accident-- what if it doesn't have the proper warning label? Then he's not gonna be able to transport hazardous waste down the highway. And then the last part of it, down the bottom, you have the final disposal site. It might be a scrap metal recycler. It might be a landfill. Or it might be anybody, but they have to sign off on that form for acceptance of the hazardous waste. So that's how RCRA-- that's why RCRA is called cradle to grave. So all hazardous waste are solid waste. So anytime you have a hazardous waste, you already know it's a solid waste. But not all solid waste are hazardous waste. So if you're just throwing away office paper supply, you could put it in the garbage can. You don't have to follow the Manifest. You don't have to follow the form like you do for hazardous waste. Well, Reclamation takes this very seriously. We actually do have a directive at Reclamation. And it's in our ENV Policy #15. "ENV" stands for environmental. So if you have a Reclamation manual, you could look that up. But I want to call your attention to the paragraph in there. And I want to call your attention specifically to the last sentence of that paragraph where it says: "Whenever the generation of hazardous waste is unavoidable--" like, for example, you have a construction project, you need to get rid of the coating, so you are going to generate a hazardous waste stream-- "...Reclamation will ensure effective management is employed to minimize potential releases to the environment and any long-term liability." So, our management requires us to do something about old existing coatings that have the potential to become hazardous waste. We also have a Federal Executive Order, that's a Presidential Executive Order, 12088. And it has to do with compliance with pollution control

standard. And basically what it's saying is that all the agencies in the executive branch need to take all necessary actions for the prevention, control, and abatement of environmental pollution anywhere in our federal facilities. That means being compliant with RCRA-- that also means being compliant with any local/state regulation. So it has to be applied to work the same way like it would apply to a private person. So what you have to do is, we have to look at all the regulations. Not just simply the federal RCRA regulation, but also the state regulation. Maybe sometimes local regulations by the county or the city. So you do have to be in compliance with a lot of different regulations when you do this. So the EPA, they do have a flow chart that explains: how do you know when you have hazardous waste? How do you identify it? First of all, you have to ask yourself the question: is it going to be a solid waste? Are you throwing it away? Is it inherently waste-like? Are you gonna recycle it? Okay, then it's a solid waste. Then you want to know if that waste might be excluded from the regulation. For example, if it's radioactive, it might be covered already under a different act. That might be regulated by the Department of Energy or the Nuclear Regulatory Commission. Then it might not be a RCRA waste. Or it might be used oil. If it's used oil, there's another order that covers the recycling or the disposal of used oil. So when you come down to #3, that's where, most of the time, we have to answer that question about our coatings. When you remove the coating and you generate a waste stream, the question becomes: is that waste stream a listed waste stream? Listed would be that they have a specific listing of chemicals. So you already know what's in the coating-- all of the ingredients in that coating. If anything in the ingredient list for that coating is on one of the lists, it would be hazardous. If you don't know anything about the coating, which is usually the case for us at Reclamation, then you have to do what's called "characteristic." And there is a test which you need for that to determine if they meet any of the characteristics of hazardous. And then #4: sometimes a waste might be delisted. So the administrator, the EPA may occasionally, sometimes delist a chemical. This very rarely ever applies to us. So the vast majority of the time we're trying to answer question #3: when you generate the solid waste, how do you know if it is hazardous waste or not? So what we do then is we take a sample of that hazardous waste. And then we test it to see if it meets one of the four characteristics. The four characteristics are: ignitability, corrosivity, reactivity, and toxicity. Okay? And ignitability is fairly rare. We don't have coatings that just ignite, even with coal tar. Coal tar has a fairly high flashpoint. So very rarely do we ever have coatings that are ignitable. Corrosivity-- that's usually things like acid, base, stuff that will corrode. Again, that's very rare. We don't normally have coatings like that. Reactivity-- something that might explode or it might be [inaudible]. Again, that would be very rare, so the vast majority of the time when we are testing coatings to see if it might be hazardous, we look for toxicity characteristic. So, how do we do that? Well, the way we do that is: we go to a coating, we take a little bulk sample of the coating, and we send it in to the lab. And we take that sample and we ask the lab to perform one of two things. If you already have a waste stream, you take a sample of the waste stream and you send that to the lab. And you ask the lab to perform a method called Toxicity Characteristic Leaching Procedure. Okay. That's a test method-- 1311-- it's called TCLP. So, the lab will take your sample and will put it in this apparatus, which is a rotary device. And it will mix your sample with 1:20 ratio of water acidified with acetic acid. And then it will tumble. It will rotate. And then after a while, it will stop and it will collect the leachate from that sample. And then it will test the leachate and find out if you have

anything in there that might be hazardous. So what it's supposed to do is, it's supposed to simulate a landfill condition. It's supposed to simulate rainfall. If you got rainwater coming down, and the rainwater is leaching out material out of the landfill, the EPA wants to know if that leachate has anything in there that might classify the waste stream as hazardous waste stream. And this is the target analyte list under TCLP. So if you look at the very top, you can see the very first one up there is arsenic. And this is in alphabetical order. So, arsenic has a waste number, D004. And the third column, the regulatory level, milligrams per liter, has the action level at 5 milligrams per liter. So if the lab takes that leachate analyte for arsenic-- if it's over 5, then you know your waste stream is a hazardous waste stream. Okay. So normally when we take the coating sample, we usually test for stuff/ things on that list that are often found in coatings, which are usually at the metal. So we take it in to the lab, have them analyze it, and look at all the different metals like mercury, lead, cadmium, barium, arsenic, silver, selenium. You have all those things tested, and see if they meet or exceed the action level. That's how you know if the waste stream is going to be hazardous waste. In the last column, if you were to take a bulk sample of the original paint or coating, and you take the bulk sample itself, you have not yet generated any waste stream. That might happen later on down the road by a contractor, but you want to give the contractor a heads up. You might want to take a bulk sample and send that to the lab and ask the lab to do what we call total analysis. No TCLP, just analyze the sample directly. Find out the total amount of arsenic, for example. If the total amount of arsenic in the sample is over 100, then it potentially would be a hazardous waste stream. Okay. If it's less than 100, it will never be a hazardous waste stream for arsenic. And the reason for that is because it's a 1:20 ratio when they mix it with that acidified water. So even if 100% of the arsenic leaches out, you're never going to exceed the 5 milligrams per liter regulation level. Okay. But that's how you determine if your waste stream will be hazardous or not. Now we talked about RCRA and we talked a little bit about state. States also have their regulations and the state has primacy because the state has an EPA approved plan. And it's very important you find out who has primacy. But keep in mind, there are other regulations in place also. One of them is the Toxic Substance Control Act. We call that "TSCA." Okay. Now that covers wastes containing PCB equal to or greater than 50 ppm. So anytime you have a coating and you have PCB in the coating, then it might be regulated also under TSCA. We also have an Asbestos Hazard Emergency Response Act-- AHERA. And that one has to do with asbestos and focuses primarily on schools, but they later amended that act with ASHERA: Asbestos School Hazard Abatement Reauthorization Act. What that's saying is that AHERA now applies to all public and commercial buildings, including Reclamation facilities. So now we need to be in compliance with AHERA. So we have to analyze the coating and see if it contains more than 1% asbestos. If it does, then it might be regulated under AHERA. Another regulation we'll often come across is called the National Emission Standards for Hazardous Air Pollutants. We call it "NESHAP." That has to do with anything you might release into the air. It's under the Clean Air Act, and usually deals with things like renovation or demolition. So you want to be very careful that you don't blast coating and let it release into the air. You often have to have some kind of a containment Maybe a filter, a vacuum system, anytime you're trying to remove coating. And the EPA does regulate for what they call hazardous air pollutants, for example, asbestos. So if your coating has asbestos in it, then you may have to file a notification with the state

agency. And you have to follow work practices that are designed to minimize the release of hazardous air pollutants. It also deals with the packaging of the material, the transportation, and the disposal. I would like to emphasize again that there is a thing called state authorization. So just because the federal government has regulations, you need to be very aware that there also are state regulations that very often can have primacy, meaning it has priority. Now, we have 17 states. We don't have enough time to go through all 17 states and talk about how they compare with the federal standard. So when I talk about RCRA 8 metals, keep in mind some of the states might be more. Okay? They might have different rules. But all 50 states are authorized by the EPA to have a base RCRA program. During the point of our construction design specification, we need to know which regulation takes priority. And if you have any questions about that, always contact us. We can help you with that. So it does require a lot of researching the regulation. So even though you hear a lot about the base federal requirements, keep in mind that might not be the regulation that applies to your project. You still have to be aware of the state regulations. Let me give you a good example: California. You know, everybody knows that California is very proactive about protecting the environment. The [inaudible] RCRA 8 metals-- arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver. But California has 17 metals under the regulation. And it's called the California Administrative Manual 17. So we have to analyze for 17 metals to determine if there is a potential to generate a hazardous waste stream. Okay. So it could be different. So keep that in mind. Any time you have a construction project or doing any kind of work where you have to remove/dispose of the coating, probably the first place you're going to look at would be the state regulation. Okay, what kind of hazardous materials are often found in coatings? This is based on experience, we've done this many times, and these are what we usually often find. I mentioned the RCRA 8 metals. And we find them because they're added to the formulation of the paint. The paint has a pigment or sometimes has a biocide. So, like for example, arsenic. Arsenic is there to prevent algae growth or a biocide growth, or any kind of organism-- microorganism-- growth on the paint. And we do have to analyze for those RCRA 8 metals plus whatever the state might require. We'll also find, oftentimes, asbestos. And the reason for that is: many of the paint formulations have a filler where they used talc powder, like baby powder. When they mine talc, sometimes the asbestos is a co-occurring metal. So up to a small percent of that makeup of the formulation may contain asbestos. Or sometimes they add asbestos on purpose to the formulation to strengthen the paint. We'll also sometimes find PCBs-- polychlorinated biphenyl. It's usually called Aroclor, which is the trade name made by Monsanto around about 1930, all the way up to 1977. So Monsanto makes a lot of these Aroclor. Some people put that in paint because it's used as a plasticizer. [inaudible], many coatings that we find are coal tar. They're usually pretty easy to identify. It smells like asphalt. If it has an odd naphthalene in it, it smells like mothballs. But we still take a sample and send it to the lab, confirm that it is coal tar. So those are the four main coatings that we-- the four main ingredients that we often find in coatings that we need to watch out for to determine if it's hazardous or not. Now I'd like to talk a little bit about common misperceptions. Who is the generator of the hazardous waste? Therefore, who is responsible for the hazardous waste? Well, the EPA has a definition for it. So it means anybody-- a person-- who actually created the hazardous waste. Or it could be based on a location. So like, our facilities, if the location is Grand Coulee. Well, then we're on the hook. We're

responsible for that. But if you have a contractor that actually removes it for us, they're also on the hook. They are a generator. So it's pretty common to have co-generator status. So we need to ensure and fully document that the hazardous waste is properly identified, managed, and disposed of.

Another common misconception is lead-based paint. If you were to read the CFR and understand the definition of lead-based paint, it only applies to child-occupied facilities. That's a whole different regulation. Our dams, our powerplants, are not considered child-occupied facilities. So, technically, we do not have any lead based paint. Okay. Even with all the lead-- I mean, the paint that we have in our powerplants might be 1,000,000 ppm-- That is not lead-based paint because a child is not living there. That's the definition of a child-occupied facility. So anytime you see regulation of lead-based paints certified inspector, it does not apply to Reclamation. You have to be talking about something like family housing, childcare, school, any kind of child-occupied facility. So the regulation governing lead is different. And keep in mind, it's not just lead. It's also arsenic, selenium, mercury, all the other metals. So a lot of people try to put lead-based paint-- hazardous lead is the only thing you look for. That's not true. We have to look for at least 8 metals to determine if it's going to be hazardous or not. And the last one we'll talk about is X-ray Fluorescence Metal Analyzer. Some people have this-- what they call a "gun," you know an "XRF gun." It's only good for doing screenings. It will not meet the requirement of RCRA. So it's only a screening tool and it should give you how much lead or how much arsenic or whatever it might be per square centimeter. It does not give it to you on a per volume basis. But it's okay, you could use it for screening purposes, but you cannot use it to determine if you're going to have hazardous materials in the waste stream. It does not penetrate far enough to give you the full concentration of the metal or whatever might be present inside the paint. So, we do have an evaluation process. If you have a need to remove/dispose of coatings. First, contact us. And then discuss with us: what is the purpose of why you want to evaluate the coating and maybe what you would prefer. Maybe you have construction coming up. Maybe it's a comprehensive review. Whatever the reason is, have a discussion with that. And then we would do data collection. We would go ahead and do some kind of a hazmat survey. We'll perform an inspection. We would do research, researching through the relevant environmental regulations. Maybe there might be some old specifications from a long time ago when the coating was first applied-- find out what's in it. And what we might need from you is understanding what scope of work-- why are we doing this, how are we going to apply the data? Maybe you have some photographs. Maybe it shows multiple layers of the coating rather than just one layer. That would be good, you know. You might have some historical data. Maybe you have some drawings that specify exactly where the coating is going to be removed. Because not all coatings are the same inside our facilities. It varies a lot from one feature to another feature. And then when we have all of this information-- go out, do the survey, get the lab report, put everything together. You can generate the lab report or the survey report, construction design spec, or maybe a quantity estimate. And we have a couple of people and they can help you with that. Myself and Lise Pederson. These are our email addresses and this is our phone number. So please contact us. So we'll go ahead and go through the process of doing the hazmat survey, sending the samples to the lab, the lab doing the analysis. And this is what a lab report looks like. You can see how it has a lot of lead, it has a lot of chromium. Then we put that together. And then we generate a report-- a survey report. It might be

a standalone report or it might be a report that gets put in, like a comprehensive review or something else, where somebody needs to make a Safety of Dams recommendation. How the coating needs to be replaced, or something like that. Or we might use the data here at the design construction specification. So we need to be able to tell the contractor, "hey, look, this coating is old. It's got stuff in it that might be hazardous. You need to take that into consideration in your cost [inaudible]." So we'll want to put that in the specification. We'll also want to put it in the quantity estimates so that our cost estimator can come up with an independent government cost estimate. So there are different reasons why we need to do the evaluation process. So... That's basically about it. And please feel free to contact us. We have a lot of wonderful people in my group. My group is the best group anywhere in the world when it comes to coatings. We have coatings specialists. We have chemists, professional engineers. We have AHERA certified inspectors. We have a Certified Hazardous Materials Manager. We all know how to do safety and health-- got a Hazardous Energy Control Program, confined space, fall protection, personal protection equipment. We're all well-prepared and well-equipped to do coatings inspections. We even have special access surveys. We have scuba divers, we have a rope access team, to reach out to that hard-to-reach coating. Maybe a trashrack, maybe something on top of a crane. Different places. So we are well-prepared to be able to help you out to do coating inspections. And these are all the people that I have in my group. Here we have people that are focused on cathodic protection, some people on protective coatings, some people on hazardous materials. Our group manager, the picture down at the bottom, is Jessica Torrey. Feel free to contact any one of us. And we all know each other, we all work in the same group. And we should be able to help you-- you know, refer you to the right person and answer any questions that you might have. So, that's all I have right now. I'm gonna move back to one slide so you could take a look at the email addresses and contact list. And then I'm going to turn this back over to Chrissy. And Chrissy might want to open this up for question and answer. And thank you, I appreciate your time.

>> **Dr. Henderson:** Yes, thank you very much, Kevin. Um, for the-- for all of you that are in attendance, we do have the Q&A box. Please feel free to ask any questions of Kevin in the Q&A box. You should see the little bubble for it. And, uh, once some questions start showing up, we will have Kevin begin answering them. We'll give you a few minutes to ask your questions... And now I will, uh, hand over to Kevin and have him begin answering the questions that are showing up in the Q&A box.

>> **Dr. Kelly:** Yeah, thank you for your question-- I have one question here. The question I got, it says: during which stage of a design project should a hazardous materials survey occur, and how do we set this up? That's a very good question. If you are doing this for a construction project that might be coming up, and you have a design flow process-- if you're familiar with that flow process, we have a thing here called "30%." And we would like to have the survey done by 30%. Okay. And the reason for that is: you need to have enough time to prepare specifications. You need to prepare the survey report so you could put it in Division 51, information offered to potential bidders. So we do need to have enough time to prepare a specification, get it all ready to go for what we call Spec

D-- "90%." And the review of that occurs pretty soon right after that. And it's getting ready to go out for bidding. So we want to have our survey done by 30%, but keep in mind, many times we need to do hazardous energy control programs. We need to turn things off. So if you're gonna go inside an air housing, we have to turn off the carbon dioxide. We have to turn off live wires so we can take samples inside the exciter or a governor system. Radial gates have to be lockout/tagout so we could get the coating off of a radial gate. And you know, some facilities cannot always do outages right away. Sometimes they only do it once a year. So if you know you have a construction project coming up in like a couple of years-- two or three years-- but you got an outage happening this year, then you might want to consider getting ahold of us right away. Don't wait for a service agreement or don't wait for a design project team to be formulated/set up because we want to take advantage of the outage. And then the way you could set this up is: contact us. Call Lise Pederson. Call me. Email us or anybody else in the group. You can see my slide up there, all the contact information. Contact Jessica Torrey, our group manager. Any of us can help you out. We'll make sure you have the right person working with you. Okay. Then I have another question here. It says: "do you have any stories about unexpected hazardous materials you find in a coating?" Yes, we do. We have a lot of stories about unexpected hazardous materials. I've already mentioned asbestos. And we did not think that there would be asbestos-- we didn't know that asbestos could be in coatings. And we talked to people in my group that mentioned that yeah, sometimes asbestos is found in talc powder. And I read up on that one-- realized that, oh, we better look for asbestos in coatings. Back then I thought it would just be-- maybe just metal, and that's about it. Because of the pigment or because of the biocide properties. So it was a surprise, you know, to find out there would be asbestos in coatings. We're not talking about a whole lot, maybe like 2%, maybe 5%-- a small amount. But that's still over 1%. So it still classifies as asbestos-containing material. So it was interesting. So you do want to be aware of that. Another one that I want to mention is coal tar. Everybody knows that coal tar is mostly polycyclic aromatic hydrocarbons. But there are a few items there like creosote or heterocycles-- pyridine for example. There are some things that are on the TCLP target list that can be also in coal tar. So even though the polycyclic aromatic hydrocarbons by themselves may not be on the TCLP list, nevertheless there are some other ingredients in there that might classify as hazardous waste. So we had to study it some more and put coal tar on our list of samples that we should be collecting. So there were a couple of stories there. I have another question. The third question I have here: "do new coating systems have hazardous materials in them or is this only a concern with coatings applied before a certain time?" The short answer is, yes. New coating systems often have barium. And barium is one of the RCRA 8 metals. But just because you have something that might be hazardous in new coatings does not mean you cannot sell-- or-- sell paint. You can use hazardous materials in new formulations. That's okay. But it comes during the time when you might have to remove/dispose of it. It will be hazardous waste. So, you want to keep that in mind. There is no, like, nice easy cut off date like "1979." That might apply to maybe PCBs or something else, but when it comes to metals-- when it comes to coal tar-- you know you have new coal tar. Maybe epoxy coal tar. You could still have some new coatings in there that could still be hazardous if you were to remove/dispose of it. So the regulation for what you can sell is not the same regulation for how to manage hazardous waste streams. Okay? So you still have to watch out for it, even today-- if you

apply a brand new coating today. But you want to document it. Because probably thirty, forty, fifty years from now, another person like me or Lise Pederson-- is going to be answering the question. Even coatings we apply today, hazardous or not, so please save all your specifications from the manufacturer. Please keep it in the group file. Because someday, sooner or later, that new coating you applied today will also be removed/disposed of. Regulations might be different. It might be more strict. So keep all the information you can. You know, keep good recordkeeping. Thank you, I really appreciate it. Oh, okay, I think I have more questions. Wow, I have quite a few more questions. I think what I'm going to do is, I'm going to try and pick on questions that I think would be the broadest application. And, uh... One of the questions is: "considering discussing who signs the manifest and why." Well, the manifest requires three signatures on there. The generator has to sign it. The transporter has to sign it. And the waste disposal or scrap metal recycler-- the final destination-- has to sign it. Those are the three requirements. All the three people have to sign it. So, the generator could be us, we are the owner of the facility. Could be the person who generated the waste stream. The transporter, of course, is the person who is going to pick it up and go down the highway and take it to the disposal facility. He will have a license. He will have an ID number of some kind that has to go on the manifest. And the disposal facility also has to sign it. They all have to have an ID number-- a license number of some kind that has to-- also has to be on the form. And the last question, maybe very quickly-- the last question I'm going to answer is: "can you please provide a reference for the comments on lead-based paint?" Yes. Lead-based paint, uh... I'm sorry I don't have a reference up there on the slide. But you can Google "lead-based paint," and you will find a boatload of information related to lead-based paint. The EPA has a wonderful website that discusses lead-based paint. Now, the EPA talks about lead-based paint for child-occupied facilities. It talks about a thing called "RRP." You know-- Renovation, Repair, and Painting program. Okay. And you could read up about lead-based paint on there. But remember, that's 5,000 ppm or higher, they're talking about protecting a child under the age of six. Because lead-based paint-- it tastes sweet. And it used to be that children would pick up a flake of paint that falls off, and they would eat it. And it caused a lot of neurological damage. So that's why the child-occupied facility became a very important definition. So you can look that up there. But if you want to learn about metals in general, all of the 8 metals plus whatever other metals the state might regulate, then you want to read RCRA. And I do have a website for RCRA on my slides. You can look that up and learn more about RCRA. Okay. So, thank you for your time. I will hand this back now to Chrissy. And I think that's about almost all of the questions that I have there.

>> **Dr. Henderson:** Thank you very much, Kevin. For those of you that are still asking questions on the Q&A, we are going to wrap up this live event. But if you still have questions that you haven't had answered, please send us emails and we will make sure to get them answered for you. Also, in order to-- if you want to hear a recording of this event, all you have to do is go back into the invitation and click on the live attendee link. And you should be able to hear the event all over again. I want to say, thank you very much for joining us for this live event. And next fiscal year we will begin a new set. So keep your eyes open for emails to come through regarding those as well. Thank you very much and thank you, Kevin, for your presentation.