This transcript was auto-generated by the webinar. Please forgive typos.

0:06
Good afternoon, Hi, my name is Amy Blyth and I am with Trihydro Corporation. I'd like to welcome you to our presentation today Key PFAS Regulatory and Laboratory Method updates. Today we have three speakers Andrew Pawlisz, who will be covering regulatory updates, Mitch Olson, who will discuss ..., chemistry and laboratory updates, and ..., Erin Novini who will talk to us today about turning regulatory orders and to work plans.

0:38
Before we get started, I would like to go over a few housekeeping items. This webinar is being recorded and will be available via our website after the webinar. All attendees are in listen only mode. If you have questions at any point please use the questions form in your GoToWebinar Attendee panel. We'll save time at the end of the webinar for Q&A after our speakers have presented. If we're unable to get to any of your questions in our hour together, we'll answer them via e-mail after the webinar.

1:13
Also in your GoToWebinar Attendee panel, we've included a copy of today's presentation in the Handouts tab. Finally, you'll have an opportunity to complete a very short survey when you exit the webinar. It will take just a minute of your time, and we really appreciate your responses. So we hope you can take time to go ahead and do that. Alright, let's get started.

1:38
Today, we'd like to give you one hour of what's happening in terms of the latest developments in the ... world, specifically, we will be covering regulatory updates, chemistry, and lab challenges, and updates. And we'll go over the Work Plan Case study, that demonstrate some of the implementation challenges.

1:58
In the past, we've conducted a handful of webinars that cover the extent of PFAS problems, data interpretation, remediation, and legal issues, and a variety of other topics in today's Webinar will provide updates on recent regulatory actions, newest, analytical method, and What to expect in 20 22 through 2024. With that, I'd like to introduce our first speaker. Mister Andrew Pawlisz is a board certified toxicologists with experience in industry, consulting, and government. He has been working on ... issue since 2005, focusing on due diligence, regulations and effects on human health and environment.

2:47
As mentioned, he'll be sharing insights with us today regarding PFAS Regulatory Update, Andrew, with that, I'll turn the presentation over to you.

2:59
Thank you Amy, and welcome everyone and thank you for attending and participating this webinar.

3:06
As indicated, my par three panel presentation will focus on a quick summary of the recent developments in terms of regulations that are taking place currently.

3:24

And that's being led by the federal government, specifically a US EPA, who is the administrator, for many of these programs. Next slide, please.

3:37
Before we start with the regulatory out phase, I think that, if someone were to ask you, so what does the Professor shuh, really, I think you may be able to think of key concepts.

3:51
And the one concept is, there's no doubt, this increased attention PFAS compounds in the group of compounds currently, because so show, next slide, because these chemicals are fairly Protracted history.

4:12
They've been around for several decades.

4:16
And because of this, they found their way into the environment. Or also, to a point that they have been in contact with human or scientists and wildlife.

4:27
So if you were to test the populations to detect precisely frequency and because of that, and because of certain indicators, PFAS may have with various impacts for humanity environment, then it deems it necessary by the regulatory community or the state and federal level to do something about that.

4:54
Because exposure may or may not be associated with adverse impacts. And that's where the regulations could come in handy. So if you look at this timeline, by no means this isn't new group of compounds dating back to 1930s, to eve on their invention, and then secret application in the nuclear program.

5:16
As part of a Cold War and Defense strategy, and fast forward to 50s, is the consumer use.

5:25
And then, the last two decades, there's no doubt.

5:29
it's easier to find materials, see, an exposure media, Do not have to catch the levels of PFAS. And they may do, particularly to very, very low levels.

5:42
The analytical methodologies, which will be covered by the next speaker, Mitch Olson, can protect and particularly, just want to look at it.

5:58
The last decade or two, and this is where the regulatory, that's where the regulatory activity is taking place the most, and especially the last 10 years.

6:12
and then, now, this year, where's the delayed rollout of the ..., as their strategic roadmap, by EPA, and also, the signing on November 15, the infrastructure bill, which has PFAS provisions.

6:31

Now, assign to November 15th.

6:34
So, next slide.

6:38
If you had a chance, you will have a chance to read.

6:42
The latest piece has documented, has no strategic roadmap.

6:48
But quickly realized that this is a very sizable document, and there's a law cover in that document.

6:55
But, nevertheless, if you were to digest it, I feel that we can summarize all these activities and actions, and proposed rules in search into four categories.

7:08
Then, we've been down into four titles under construals, administrations, accountability, compliance, reporting, and enforcement. Next slide.

7:22
So, then, if you zoom out, so to speak from each of these categories, um, you can look at what specifically is being covered. Kind of goes.

7:33
Categories 1 through 4, and I realize the slide is very busy, but I think that's precisely the point.

7:41
There's just a whole lot going on, the EPA is setting out to do and very short-term.

7:51
Mentioned, or Amy mentioned, you do have a copy of the slides, if you want to click on the link right now or later, this could be a reference.

8:00
But in terms of highlighting under the grouping one.

8:06
You can see that the first thing the EPA we're looking at is to look at the existing PFS chemicals, and uses, and re-evaluate them almost immediately.

8:21
Next to us, you've probably heard in the press is a great interest in developing some typos or inequality, limits or criteria.

8:36
And that could be for either drinking water or for receiving more.

8:43
And beyond the two ...

8:45

species initially cover health advisories, people, and people's. Now, the age is just looking for health advisors for two additional compounds.

8:58
..., then in concert to protecting the receiving bodies of water in the United States, there's the aspect of the program for Clean Water Act for AMP, is permanent.

9:16
MPs have been and will be added, is a great extend to those permits. And ... should also talk about the various methods, specifically EPA 633.

9:28
We're now potentially monitoring up to 40 PFAS compounds.

9:33
And beyond that and the other, very important development, is a designation of PTAC individually as a group as hazardous, surd Club, breadcrumb, substances and materials, or the Clean Air Act, hazardous air pollutants.

9:53
Now that's 1 number 2, it's also important to know, that EPA will be looking at, oh polluters to be brought to the table and somehow be responsible for permitting PFS into the environment. And it's not just the manufacturers, about the whole range of processors, distributors, importers, users, and even waste facilities will be looked at as potential responsible parties.

10:27
And I'll move on quickly, just to keep things moving, and also allow sufficient time for the next speakers. But the message here is that, definitely, there's a lot of EPA's play.

10:44
It has to be processed your time. Next slide.

10:48
This could be another reference slide for you. So, the same way, we have categorized all these actions according to type of impact on the regular community.

11:03
Here, we have resort to these activities in terms of timelines, starting with this year.

11:11
Then, just around the corner 20 or 22, to 20 24, as you can imagine, an intuitive, to most likely will present the greatest announcing developments on the action items under the roadmap, And I believe the EPA is required to report on this in the first annual progress report.

11:37
So, methods, application applications will be fairly clear coming out in 20 22, and then 2024 may ultimately change with time. Next slide.

11:55
So, in summary, this is rather unprecedented, in terms of the extent EPA's intend to cover so many different environmental regulations.

12:09

Also, the amount of resources to be applied to all the action items.

12:15
In a very short time, the community probably is asking themselves whether EPA has sufficient resources to do all that, the jury's out on it, nevertheless they intend to certainly there.

12:30
So what it means, in terms of the impacts regular community, is that it would be advisable for anyone that has been dealing with P files or could be pulled in, should perform some type of due diligence, just to stay ahead of the curve.

12:51
And then finally, and Erin will cover this in her presentation.

12:55
This may have waterfall are triggering effects on some of the activities in your area geographically, or state wise.

13:09
In terms of what will be required.

13:12
We're here to, for example, start sampling, providing data results, additional toxicity testing results to EPA or say Go, man.

13:21
So definitely, this is not the end, and things will, sort of, you pick, as expected in S three years. So with this, I would like to thank you for your attention, and I'll hand this back to Amy. Thank you very much.

13:38
Thank you, Andrew.

13:40
As mentioned, we're holding questions until the end. So if anything, Andrew covered sparked a question, please submit your question in the attendee panel at any time. Also, if there are other topics you'd like to hear about in future webinars, please place them in the questions panel, as well. Next step from tri hydro, is Mitch Olson.

14:02
He'll be sharing information regarding the laboratory methods and up and the update. Doctor Mitch Olson of Trihydro Corporation is a professional engineer with 20 years of experience and Environmental Engineering. His background includes hands-on experience with complex environmental issues at multiple scales of application.

14:23
Doctor Olson provides technical advisement on a variety of projects involving hydrocarbons, chlorinated, solvents, and emerging contaminants, including ... since it's.

14:37
Mitch. I'll turn it over to you.

14:40
Thank you very much, Amy.

14:43
Well, Andrew spoke about federal updates and subsequent to this talk, Erin will be talking about state level updates and more applied, how to sort of a case study, in terms of responding to state orders and stuff, my part in this Webinar today, I'll be attempting to fill a middle ground here, in the spirit of this webinar, focusing on PFAS updates. Next slide, please, Amy.

15:06
Some general topics from previous webinars and related images are shown. here, won't be covering these topics in detail during this webinar, but we'll be alluding to some of these through some of the upcoming slides. If you're interested in these topics, please feel free to reach out to us or the previous webinars, as Amy had mentioned, are available online for, for viewing at this time as well. This Webinar focuses on providing updates, and this particular portion of the Webinar provides a brief discussion. A brief discussion on sort of a hodgepodge of topics here each, of which really could be expanded into a webinar of their own. So we'll attempt to high level discussion on each of these, and potentially, some of these could be presented in more detail in our subsequent webinars.

15:49
The topics I'll be talking about here today that include updates related to analytical methods, and these related to drinking water, as well as other environmental matrices and air as well. Also provide a brief discussion on PFAS fingerprinting techniques and quality control pitfalls.

16:09
Next slide.

16:12
Now, speaking to EPA updates, starting with drinking water, This is an area which, in fact, there aren't any updates, no changes in this area, as compared to information that's been presented in the previous webinars, but did want to speak briefly to this area, just to provide, where things stand from our perspective, in terms of the, the State of the Science for Analytical Methods, for Drinking water. There, are at this point two viable methods. On the table, there's EPA 557.1, and 5 33, 5, 57, or 5 to 7.1, Is really, it's the original method. This is the method that was originally published in 2009, updated in 20 18 to include a few additional PFAS compounds of 18 compounds currently on that 557 list By comparison in 533. As was released in December 2019, more recent method, slightly longer, analytical lists, targeted, more towards short chain and replacement type PFAS compounds, Some compounds that are more recently on the radar screen. I guess you could say there are some compounds and the 537 List that aren't on the 533 list, though, as well.

17:14
And speaking briefly to the advantages, disadvantages to each of these Methods 5, 37 is often used, because it is kind of the classic, it's the stand-by method to 18 compounds in that list. Or are fairly well known. And guess, in terms of interpretation. in such one disadvantage of 537 compared to 533, Is the quantification technique. 537 is based on an external standard. Versus 5, 53, which uses an isotope. Dilution, which is an internal standard technique.

17:44
Without going into that in detail, it is another topic was covered in more detail in previous webinars. But it's really isotope. Dilution is the gold standard for quantifying the samples. The

difference between the external standard isotope dilution is less important for drinking water samples.

18:01
The simpler matrix has less of a, A chance of causing Matrixx interference type issues. But this is a much bigger issue.

18:08
A potential concern for non drinking Water Matrices, I'll talk more about those on the next slide. Both of these methods use solid phase extraction. For ..., sample prep, solid phase extraction uses a solid adsorbent to process relatively large water volumes concentrates, the PFAS compounds on that ..., which can then be extracted into a solvent. This cleans the sample, also concentrates PFAS compounds along for much lower detection limits. Both of these methods use that that preparation technique, which is a good thing. So in summary, here, 537, really, is that that consider that default goto method.

18:45
Personally, I may have a slight preference towards 533 because of the isotope dilution. But for drinking water, it's not as critical, and there's other site specific factors, that can be part of the decision as to whether you use ... versus 533 in the upcoming analysis. That's going to be part of what EPA's pushing for upcoming EPA Analysis. The uncontaminated Unregulated contaminant monitoring rule, Version five sampling will be conducted in 232023 to 20 25. This will involve sampling of public, water systems across the country, will include a list of 29 PFAS compounds, it's going to require both Methods 537 and 533 reason being that neither of these methods includes all of the methods included ... and their analyte list.

19:30
Next slide, please.

19:34
For a non drinking water matrix see such as groundwater, surface water, wastewater, and soil, there are some method updates, which we'll speak to, but kinda start from the beginning here and work our way across.

19:45
This table shows a summary of methods, primarily focusing on methods, EPA methods, and Department of defense methods. And in terms of analytical methods, for these non drinking water, more complex shapes, Environmental matrices, it all started with this 537 modified. Which, I mean, this goes back to the Wild west PFS analysis, when there was a time when there was no methods available. There was 5 37 as a drinking water method. And that was really what labs had as a starting point to try to develop methods to analyze for these other matrices. So the 5 37 modified is the term that grew out of that. It, from my perspective, it's a term that's somewhat dated, and obsolete, because we do have other methods to refer to now. Although it is still widely used.

20:28
Term used to refer to just that, a general method for PFS, although it really doesn't, isn't defined in any way in terms of how it, maybe the approaches that would be taken for P fast analysis?

20:40

So, again, stated early on it was kinda that Wild West every lab had their own methods. The Department of Defense got a little tired of that, the key. they published this quality system manual table B 15, the most recent version of that published in 2019.

20:55
This is a method well a quality control protocol, in fact, for various matrices, aqueous matrices, including surface water, groundwater, wastewater. And solid 25 compounds are listed the method, although that can be expanded and still remain compliant with the ....

21:11
Table B 15 method uses isotope dilution for quantification, which is a good thing, solid phase extraction for aqueous sample extractions. ... was was brought to the table then to provide some sort of organization, some consistency with with ... our sampling and these other matrices.

21:30
Recent updates include these 2 methods 827 and 633, which Andrew had alluded to, and in his talk as well, both of these 827 finalized in July 2021.

21:42
This is a method that's written just for aqueous matrices surface water, groundwater, wastewater, 24 analytes.

21:50
Um, biggest downfall of this 827 method. There's really two big drawbacks to this. Method.

21:56
Uses an external standard for comparison, which, as I mentioned, the previous slide for drinking water, that might be, OK, it's a bit more of a challenge as it pertains to these more complex matrices of other water types, and uses the direct injection.

22:11
The sample is really just directed, injected directly into the instrument, which doesn't provide the means for lower detection limits. These simplifications the method it makes for a simpler method. But at the cost of reduced accuracy, it's really considered as a screening level method.

22:27
And 633, the other method, which is now been published by EPA, I'll say, published. But not promulgated. It's a draft method. It has undergone part of the process, but not the complete process for EPA finalization. The single lab validations of incomplete, it still has to undergo some older lab validation.

22:45
It's been published, an EPA even says it's recommended, is, as they say, for an NPS permits, At this point in time, the 633 method is not. It may become the goto method at the end of the day, but at this point, it's still a draft. So it's something that's on the table, and we'll wait and see how that progresses.

23:07
At this point in time to summarize all this, really that goto methods, the primary method that we'll use for water, for groundwater, drinking water, wastewater, non drinking water, take samples and soil is referring to this ... method. It's kinda this hayne's statement, that has to be made, but a laboratory specific method compatible with Department of Defense ... as stated at

the bottom of the table. Some labs do refer to 537 modified and if that is used, if, if that's a term that's used references to the SOP, that's a term.

23:36
It can still be used, but generally, try to avoid using that term because it, because of its ambiguous actual meeting.

23:44
Next slide.

23:49
Also wanted to speak briefly to this method for PFAS in air. This is O T M 45, O T M stands for other test method. This is not a, that what will consider a finalized method.

24:03
In fact, this other test methods to each statement says they're neither in the by publishing it as an OTA. It's neither considered endorsement nor regulatory approval for use of this method. It's really being a trial balloon kind of method it split EPA size the best available methods to try to bring some standardization to analysis for PFAS in stack emissions.

24:25
It's something of a curious concept the Idea PFS and Stack emissions PFS are thought of as being volatile constituents. But, ... emissions from Stacks is, in fact, a very big deal. And the degree to which this can be a environmental problem is is still emerging, but it's become a big problem in terms of incineration of ... being a final destination alternator to destroy PFAS compounds. Because of the stack emissions and not having a standardized way to analyze for PFAS being emitted from these incineration.

24:56
And incomplete incineration has led to local impacts And PFAS.

25:01
Also, potentially part of stock emissions in plants where PFAS are produced are also used. And there's been several well documented instances where there's been, impacts, background impacts, to PFS in, in local soils and water that have related to air emissions PFAS.

25:20
Before moving on from this discussion on P FAFSA regulations, I also did want to make a quick mention about additional methods EPA is looking into.

25:28
These are, there are methods for total PFAS, total ethos or total oriental flooring type of analysis. These are methods that are commercially available. And the EPA is looking into.

25:44
Developing standardized methods for some of these total PFS or, or methods that may analyze PFS by category, as opposed to individual PFAS compounds, which is the case. All the methods that we've mentioned here in, just now, quantify PFAS on an individual compound basis.

26:01
So, why don't make that statement about the progress towards sottile PFAS compounds, as well.

26:07

Next slide, please, Amy.

26:11
Very good, on a somewhat related topic to laboratory analysis, we wanted to speak to PFS fingerprinting fingerprinting of PFS in environmental samples. This is an emerging field. It's changing rapidly. There are quite a few tools that have become available over the course of the last year.

26:30
The tools are available to conduct analyzes, how best to apply these tools, is something that's still often figured out on a site specific basis, And that's part of what's gonna I think, an area to keep an eye on religious fingerprinting is as more general data becomes available. And we have more kind of reference background information to fall back on to compare this fingerprinting data to. So a lot of what I'm speaking to now is how to collect data, and, to some extent, how to analyze it.

26:56
But ultimately, having something to compare to how to draw this back to is going to be one of the emerging areas in terms of making this these fast fingerprinting techniques more widely available and able to be used.

27:10
So, for PV ... fingerprinting, why conduct PFS fingerprinting many of the sites that were conducting PFS analysis that they aren't isolated professor used in so many different processes and a lot of these industrial sites where they may be use are clustered.

27:25
So, being able to differentiate sources is one of the key ideas by PFAS fingerprinting may be useful, these techniques can also be used to evaluate P phosphate and transport within a given site.

27:37
Um, as things are developing, there are really three levels of P fast fingerprinting, starting with a basic level PFAS fingerprinting techniques that can be used using just general laboratory generated PFS analytical data. Just the conventional data generated through a 537 or 533, or some of those similar types of analytical techniques. one of the simplest ways to evaluate these data that's become more and more widely applied as putting the data up and pie charts. These pie charts providers provide a simple way to look at how the distribution changes, and you get this pretty colorful images.

28:12
But from these images, you can see how different other people's signatures may change from different sources. There is information available on ... that was produced different generations of a triple F.

28:25
A triple F, as you may recall from previous webinars, is that the term for the firefighting form of which ...

28:31
is a, a primary constituent that has been used and applied in many sites over the years.

28:36
Um, the primary compositions, and he's a triple F's have changed over the years. Something early composition is produced through an electoral electro chemical fluoridation process. And this produced a large variety of ... PFOS. It produced both branched and linear isomers, as well as, even and odd numbered, PFAS change. So it provides a unique, unique signature, that can be a pod it up and these pie charts.

29:03
The second generation, a triple F type products, these were produced more in the, starting in the 19 seventies through a ... process.

29:12
And as noted here, quite a notable, different signature, both first and second generation, PFAS compounds, or ETFs, included long chain as well as short chain PFAS compounds, but leans towards the long chain compounds. And the more modern ACCC compounds are also produced using a ... process but do not contain significant quantities of the the long chain compounds.

29:37
And there's some, some pie charts shown here on the lower part of the screen. This is just kind of an example. Not a detailed case study, But from a site where we have collected some ...

29:46
data, some cherry picked data points from probably a couple of dozen actual monitoring wells, which illustrates how we can see the signature changing from near the source area on the left-hand side to being a more and more simplified, fewer constituents present on the right-hand side as we move further from the source. We also see in the service area, kind of the signatures of different generations of a triple F being used.

30:11
Where the at the upper signature shows more of a second generation type of an E triple F, with a greater quantity of 6 to 4 telling yourself and 8 6 2 FTS.

30:21
And the bottom is more a first generation a triple F, with a higher constituent component of P foss PFOS.

30:29
So that's one technique that can be used to analyze these just General Allen analytical data from the laboratory.

30:37
There are other, more detailed investigation steps that can be used, one, which can also be done using laboratory General Laboratory analysis, which is a breakdown of the chromatogram, which the chromatogram is the the instrument response versus retention time.

30:54
Next slide, please, Amy.

30:57
And how that can be used as is shown here. Different products have different ratios of the linear versus branched isomers. And so, by breaking this apart, it provides another tool that can be used

to differentiate different sources. There are also different advanced methods available. A few of those are, are shown here. one is AI.

31:15
Qualitative time of flight instrument, Q tof MS, which is non selective, non quantitative. It can be used to quantify samples, but really, the primary purpose of the purpose of this technique is to be able to identify many more compounds.

31:29
Typical Ebert Libraries that a Q tof, may be able to compare two, would be hundreds, or maybe even thousands of individual compounds. The top assay, as a tool that we've talked about previous webinars, the signature generated through top assay can also be used.

31:44
And finally, there's some statistical analysis that can be used. one example is principal component analysis. Which provides a way to combine multiple sample data, from multiple samples together to see how, in a visual format, how samples may compare or be different from other sources.

31:59
So, again, as I noted at the beginning, talking about fingerprinting, the one of the primary limitations of these techniques. It's, there's this growing tools that are effective for generating data that are useful for fingerprinting. But having some kind of a source material or library for comparison is that the next step to be able to really take this to?

32:20
It's final level.

32:22
Next slide.

32:25
And, finally, wanted to speak briefly to quality control pitfalls related to PFAS, Sampling, and analysis will speak briefly to these. These are all concepts that have come up in previous webinars as well, but there's a few points here that I think we're worth re emphasizing as we're talking about updates related to the PFS area.

32:44
We can't emphasize enough the importance of training and preparation, um, but, somewhat related to that, the second bullet here, the idea that PFAS sampling is not difficult. And I think that's one idea, that people get to hear all this complexity about PFAS sampling.

33:00
But at the end of the day, once you see a person that's out there collecting these ...

33:03
samples, a person that knows what they're doing, they're gonna, should be appearing calm and confident. And just just going about their business collecting the sample is there's nothing mystical about the procedure. But most of the extra work that needs to be done happens upfront, and just really requires that the right planning is done, and certainly the right attention to detail.

33:23
A few ideas also worth considering here, one is the analyte list.

33:28
Because what the growing number of methods, the analyte list, every method has a different analyte list.

33:33
And so that's definitely an item for, for attention. Worthy of concern is making sure the analyte list is selected that best meets the site specific goals.

33:42
Using correct equipment haven't brought up the the compatible and incompatible materialist in this webinar. But we've talked about that, I think, several times in previous webinars.

33:53
The list hasn't really changed over the course of the years. So I think the, but the number of vendors that are making PFS compatible equipment has changed. So being, paying close attention, making sure using a vendor that's trustworthy is important.

34:06
Um, quality control sample balance is another item to bring up here.

34:10
The same old quality control approach just isn't going to cut it for PFS. But you can also get a little carried away with quality control samples. Can't collect every sample under the Sun.

34:18
So paying close attention, part of the planning process, Making sure we're looking into collecting the right PFL, the right samples, and that they're being done in the right ways. And the whitewater is an important thing.

34:28
A final note, your state specific methods versus general methods. More and more states are using their own method documents. From our experience, they're really very similar. There's not any gaping differences between what we're seeing in different states, but if we're collecting a, say, do make sure that you are reviewing any available guidance documents that are produced in that state.

34:49
And, from our experience, as well, producing a field memo as a, as a final check, as a way to document that we're pulling all the pieces together, showing just put the right procedures to be followed by the field, are a way to try to sift through the noise and figure out what's important, has been an important part of that process.

35:04
So for time purposes I'll wrap up there and we'll move on to the next speaker.

35:15
Thanks match. Again don't forget to submit your questions in our questions panel on your goto Webinar Info Center. Next we have Erin Novini who will share a case study on developing your ... work Plan. Erin is a California license, Chemical Engineer, project manager, and team leader with over 15 years experience. She has experience in soil and groundwater quality assessment, monitoring and remediation, groundwater extraction systems, operations and maintenance, vapor

extraction systems and hydrocarbon recovery systems, Environmental site assessments, Regulatory Agency communication and negotiation, and regulatory reporting.

36:01
Erin, We look forward to sharing more about developing your Work Plan.

36:07
Thanks, Amy. So, keeping everything in mind that we just heard from Andrew about PFAS, regulatory movement at a Federal level, and then niche, about ... progress with our laboratories. I'm going to take a closer look at what's been happening at the State level, in California, with the ... Investigative Borders, and walk you through the steps you can take if you find yourself with an investigator ordering your hands.

36:32
Next slide, Amy.

36:36
So as we move from the federal perspective that Andrew provided down to at state level you will take that will take for the remainder of this presentation we thought it best practice to provide a brief review of the PFOA and PFOS levels recognized by each state. The numbers you see on the slide are a combination of action levels and education levels, reading levels, or aqueous medium. The lowest value on the left is the lowest level and these values are all in parts per trillion.

37:09
And the value on the right is the lowest PFOS level, and the compounds you see in parentheses, or other compounds, which the state has developed levels. And these values are published by the TRC as part of their key technical and regulatory guidance document, and are regularly updated. And this was just updated, again in October. So taking a look at California, we see some of the lowest levels in the nation for these two compounds, called out specifically in this text box here.

37:40
Are the public health goals currently proposed by the Office of Environmental Health Hazard Assessment, or which brings us into the parts per quadrillion level there are PF OA Which side now are not measurable using the lab methods that Mitch discussed.

37:56
So ready or not, the race to zero continues.

38:01
Next slide.

38:05
And as you may have gathered from Andrew's presentation, that PFAS Movement is a multi agency effort and that is no different in California. Cal EPA involve. the State Water Board. It's just to name a few of these California agencies are ultimately progressing toward a maximum contaminant level for drinking water.

38:25

This particular trajectory you see on this slide here, and the State Court, presented this back in March, what began as advisory levels, like the 70 parts per trillion set by US, EPA, and then the California specific medication levels and response levels.

38:41
We'll transition to regulatory levels and even with the MCOs in 20 23. That's where the State Board has had this. Where do we currently sit on this trajectory? Or, in this third stage, with the proposed public health goals I mentioned, on the last slide.

38:57
The move along this trajectory in California is being informed by a massive statewide P plus data collection effort that State waterboard is driving that effort by issuing investigative orders, but also general orders and sampling orders, which they began issuing in 20 19 to specific industries in the state. And the water boards intent is to use this data to inform additional public water supply wall sampling or Ukraine, inform future investigations, and then inform the development of the ....

39:31
Send a tee up, tee us up for the case study that we're going to discuss today. Let's start by taking a closer look at those investigative order specifically and what each one required.

39:42
Next slide.

39:45
five investigative orders are issued by the watercourse, two airports, landfills, Chrome plating facilities, publicly owned treatment works, and fuel storage terminals and refineries.

39:57
Why these specific industries, small for airports, landfills, and upgrading facilities, and the terminals and refineries?

40:04
These facilities are believed to have accepted, stored, or used people's containing materials, and that the image is baked into each of the orders they received, Word. That publicly owned treatment works are included because they are believed to be significant receivers and potential distractors people to the environment.

40:22
Waterborne is clearly casting a wide net here. Take no on this slide of the number of facilities that were included in each quarter. Also, note, that the number of required PFAS compounds continues to increase with each order, and let's not forget, that only three P plus compounds in California right now, PFRA PFOS, NPM BS, actually publish notification levels. So what were seen as a waterborne keeping up with the laboratories ability to analyze for PFAS compounds and then including the whole lot in the borders. We can imagine that as laboratory technology, that future orders could require an ever increasing number of compounds.

41:04
You may have also noticed that I titled this slide with one time in quotations of each order, acquired that these facilities perform a one time investigation or a one time site assessment.

41:18

And I put that in quotations as we are already seeing the waterboard come back to some of these facilities, and it started sampling and request further investigation or site assessment, and are there sampling.

41:30
So that one time claim and that original order, it's not necessarily holding true.

41:37
Well, let's not get too caught up in what might happen, let's look at what these five investigative orders actually required.

41:43
Next slide, maybe.

41:46
So, here we have the five facilities across the top and the required work plan components listed down the side with the X, indicating the components required for each facility type. If you take anything away from this slide, it's not responding to an investigative order.

42:02
When they compliant one plan, takes a multi-disciplinary approach, you're going to need folks intimately familiar with your facility in its history, experts in sampling and analyzing P Boss, and an experienced team that can build thorough work plan.

42:17
So what I want to talk with you about the rest of today is eight steps that you can take to go from an investigative order to a complaint or plan. Before we jump in, I do want to make one note at ease eight steps are really tailored to facilities that were issued the orders, because of their potential or storage needs us. So that's the airports in the landfills, in the planning facilities, and the terminals, and the binaries.

42:42
The investigative order for the treatment works was just a little bit of a different animal, but most of the steps that we will cover today would be applicable.

42:51
So, you're a facility that has an investigative order. Where do you start?

42:59
You start with Step one.

43:00
You get the right people involved. I just mentioned that responding to these orders is a multi-disciplinary approach, so don't try to do this all by yourself.

43:08
People, you're gonna get involved, they're gonna fall into really three categories, facility personnel, expert consultants, and experienced and trusted vendors.

43:18
The facility personnel will come from either an environmental department or whichever department at your facility is going to really manage that order response, your legal team and

your facility operators and historians. So thank those folks that have been out that facility for, like, 30 years, you want them involved.

43:35
Your consultant team will be your ... experts, your regulatory experts, and the work plan taskforce team. We're going to talk more about that in a minute and then qualify people samplers.

43:45
And your vendor team will include qualified drillers for laboratory partner and your suppliers.

43:51
So that's your team.

43:53
Let's talk a little bit more about that more plant task force.

43:56
Next slide, Amy.

43:59
So as the second step, I offer that you can find taskforce together. When these investigative orders came, our clients turned to us to develop these plans. It just made sense to have one team at the helm of that effort.

44:13
The task force's goal was ultimately to provide cohesiveness across our California project teams and consistency in the final deliverables. And those deliverables for a work plan template that each project team could adopt and a standard operating procedure for people sampling.

44:31
All told, you probably had about seven folks in the taskforce that included our coupon exports, regulatory experts, qualified people samplers and then some staff researchers.

44:43
So it wasn't a terribly large team were able to work really well together and quickly in response to our clients' needs.

44:51
The responsibility of the fantastic course was therefore to communicate directly with the vendor partners we just talked about and then relay that information to our project manager.

45:01
So it was kind of that 1 1 line of communication or planned task force really kind of held the information and then disseminated to the project managers, who could then communicate directly with our clients personnel, And that's why I'm conveying care with the chart on this slide.

45:18
A few other items from our Task force playbook, we met biweekly, from receipt of the order to the work points and then all, we kept track of client needs and questions. We provided resources to clients, one of those in the P site questionnaire, and we'll talk about that next. We kept abreast of regulatory movement. And we also managed a schedule of all of the metals, as we've had

quite a few that we were managing. And that schedule. Included research progress, internal, review, client, review in the final deliverable submittal. We made sure to stagger our internal reviews and the review team wasn't overwhelmed.

45:59
So, again, I offer that you get a taskforce together because they're really going to keep you focused as you go through responding to these orders.

46:09
Next slide, Amy.

46:12
So steps three. and then step four, really two sides of the same coin, but worth discussing separately.

46:16
So, I call them part one and part two of engaging facility personnel, for those facilities that received orders, because of the potential of people have been accepted or use of storing it.

46:29
It was important to first understand the history of that people friends plant taskforce team developed a ...

46:37
site questionnaire that our project managers can then provide to their clients onto listed here on the slide. The facility then had to engage the right internal personnel to research their peak usage and then identify those patients on a map.

46:54
And that's sitemap's really important first step for part two of this and facility personnel engagement.

47:00
Next slide, Amy.

47:03
So once you have that marked up math, it's time to get into this field. So step four is really that sidewalk and operator interview component.

47:10
The facility operators and historians are really important part of this step.

47:14
And what you'll be identifying in the field with your operators or the sampling locations. We'll take a look at access concerns for those locations, health and safety concerns, for those locations.

47:27
And the historians will really bring that aspect of remembering where there had been on-site buyers, where materials may have been released, or start, and where historical operations may have been relevant research. And so, again, getting getting those folks that have been there for 20 or 30 plus years, really critical to this step.

47:47

As a note, for those listening today, that have not yet received, or wondering if there's something they can do now to get ahead of it, these steps 3 and 4 would be good steps to, consider.

47:58
Perform your site research, know where your facility has used, or stored, or potentially releases, material.

48:04
That'll help you get ahead of it.

48:07
Next slide, Amy.

48:10
Alright, step five is selecting your laboratory partner, Laboratory analytical technology on the ..., it's advancing, just as rapidly as P, fast, regulatory levels are changing. It seems like we give an update on the laboratories, and almost every presentation, we've given them, because there's always update again, and so, thank you for providing that update today.

48:32
So what you want to do, when you get that order, is make sure that your chosen laboratory has the required qualifications, is certified to sample for all of the compounds in the order.

48:43
The lab meat reporting limits, you can meet the detection limits, if that's stated. In the order, the other best practice that I have listed here is to consider vetting more than one lab.

48:55
Real or perceived.

48:57
concerns didn't arise around labs, either running into P plus contamination, and having to add shut down for an extended period of time to contaminate.

49:07
Or running into, just capacity issues with the number, the magnitude of samples that labs are expected to receive.

49:17
So it real or perceived wasn't concern, and it provided our clients peace of mind to know. that means that didn't work.

49:25
Next slide, Amy.

49:27
So step six, Select your equipment vendor. We all have our favorite vendors that we'd like to use. So I won't say much here other than it did seem that overnight, every vendor was advertising ... compatible.

49:42
And Mitch mentioned, briefly mentioned this in his slide deck as well. Make sure you're using a vendor that you know and trust, the equipment needs the material compatibility requirements for

us, and we have provided those lists of acceptable and unacceptable material for equipment in previous webinars.

50:00
If you'd like to go back and take a look at those.

50:05
All right, Amy. Next slide.

50:08
So, for these last two steps, Step 7 and 8, these are the final deliverables coming out of your work plan task force, the SOP, and then the final work plan, so let's start with the S&P.

50:18
The SOP was intended to provide ... specific sampling guidelines that would be relevant regardless of varying conditions.

50:27
Mitch mentioned, making sure to review state specific guidance as a best practice to avoid anything else.

50:33
So, we did the same here, actually modeled much of our SOP after the California State Water Quality Control Board sampling guidelines for non drinking water And portions of our SOP were adopted from other people, sampling guidelines published by other prominent think tanks and the P plus here.

50:51
The SOP, we, we didn't include that as a, as a final component in the work plan, it's included as an attachment.

50:59
However, we were careful to craft the SOP in such a way that it included all of the necessary information, but without being burdensome and did not include information that was necessary for a specific site.

51:12
For example, we NSLP sections prepared for Sampling, stormwater, but, this, I didn't need that, we weren't going to include it in the S&P. So, it was a really flexible document at the end of the day.

51:26
All right, Amy. Next slide.

51:29
So, here we are in our final step.

51:32
You've made it, you got the right people involved, you've done your records, research, you've walked to every square inch of your facility, and you feel confident in your laboratory and equipment selections.

51:44

What I have here as a bulleted list, recommended more comments. But really, it's in the hands of your task force to carry you, cross that finish line compliant work plan for agencies.

51:58
And those are your eight steps.

52:02
Thank you, Amy.

52:04
Thank you, Erin.

52:08
Now, let's move on to the Q and A If you haven't already typed in your questions, go ahead and do that in the questions panel.

52:18
We'll get right to those in just a second. There we go. Alright, We had a couple come through and if you guys give me just a second, I'll get organized over here. Let's see.

52:36
Bear with me, my computer is not co-operating. Alright, so, the first question considering that ... will be categorized as a circular hazardous substance. Do you have any suggestions on how to approach due diligence for property acquisitions using a S T M standard for phase 1 and 2? And then they continue on to say there are obvious concerns over when, where, how to investigate for ..., since it's practically everywhere in the environment.

53:12
Who wants to take that one?

53:15
That's me, and that's a very good question, very comprehensive, and it shows the understanding of the issue that it's everywhere. So, mission to the insurance industry, many other committee members struggle with that.

53:34
Maybe the agencies probably don't seem to be concerned with the assured, because if you detect it detected pretty well everywhere.

53:45
So, I think in terms of due diligence, it will be critical, critical to look at the property or facility records.

53:56
If there's any clear slags pass to actual or incidental use of any materials that could have had PFAS compounds in it, for example, there was a hydrocarbon fire and a turtle or film forming bomb was used both, the legacy formulation, with PTS chances are it has persisted remain uncertain soil.

54:25
So sorry souls in groundwater, so something like that.

54:29
Also certain uses uses are well known to have had you speak out.

54:36
So if there's electroplating shops or even textile manufacturing, so that history research, so would it be the first step?

54:50
And then, there's somehow, data are available for a region, or nearby A property, or just like Erin mentioned, through, state order, issue, state ordered sampling, where you might want to look at, what's around you.

55:09
And Dan mentioned, indicated that, are ways to distinguish someone else's PFAS from from Europe.

55:19
So, no doubt, it's going to be complex and difficult.

55:25
However, it performs at a time, IT, we think it's good to be manageable way too.

55:35
Move to manage that risk and perform the due diligence ahead, regulations in any transaction that may involve PFAS question, thank you.

55:49
Thank You, Andrew. Any other comments from the rest of the speakers?

55:56
For me.

55:57
Alright, moving on, do laboratories plan on continuing to use our regulatory Science lab project managers for planning and executing the PFAS sampling effort? Or is a separate PFAS team being deployed at this time?

56:18
I can speak to that for, for my part, our experience working with laboratories is, um, both, in a sense of the words, the projects are still being managed.

56:28
Generally, I think I would say, by, by the, the same project managers that we've been working with, but they do have a ... team that's involved into play, and that's not all that different from ... approach. And our projects are, same project teams are our boots on the ground, conducting work. But then we have a PFAS team that's providing support from a different level In the kind of the concept that we've used to previous webinars, idea of Bridging the ... gap, that we have some folks that are spending more time staying up to speed on all the, how things are changing and the ... world.

56:58
And, then, bringing up the folks on the folks on the ground, who need to get things done, making sure that they're able to accomplish things in a way that's consistent PFS compatible. And, so, I mean, I think that's, that's why we've seen that being done in the laboratory is saint project manager, but with the other folks involved in providing.

57:18

Some oversight guidance.

57:22
Thanks, match. I think we have time for about one more question. Can we get preliminary P Fast Laboratory Results Report prior to a final submittal?

57:36
We've generally been able to do that, yes, really similar.

57:41
two similar procedures to other types of analytes, where when some of the processing may still be in progress, that when, when asking the question, generally, it's, it's been available ahead of time, when needed Yeah, and I'll add that, it's highly recommended, that you do that, You have the opportunity to get the pulmonary laboratory.

58:02
You do want to make sure that, particularly if you're sampling for investigative, or not, that your lab is providing you the analytes, that only the analytes you're looking for.

58:16
And not being overly zealous there deliverable to you.

58:22
Thank you. All right, Well, we're reaching the end of our time. Please, be sure to fill out our exit survey and help us target and tailor these webinars better for you in the future. There's an opportunity in the survey, to request some one-on-one time with our subject matter experts. You see in front of you a link today, excuse me, a link to the recording of today's webinar will be sent to you via e-mail. And we'll also be up on, try hydro's website. Thanks for joining us, and don't forget to let us know about what future topics you'd like to see in our webinars. Please submit.

59:01
Via your survey at the closing of this webinar. And thanks, everybody, for joining us today.

59:12
OK, thanks, everyone!