

Paul: Over the past several years, there has been a surge in regulatory interest to address the public health and environmental risks from releases of per- and polyfluoroalkyl substances, otherwise known as PFAS, including the use of aqueous film forming foams, or AFFF, [00:00:30] for firefighting or training. This call to action has resulted in rapid development of regulations and guidance at both the federal and state level, which are impacting the airport community. Airports are faced with addressing PFAS concerns resulting from the long term use of AFFF and firefighting, that was mandated by the federal aviation administration. In fact, they are still mandated to use new foam mixtures that contain PFAS, until new fluorine [00:01:00] free foams are accepted and mandated, despite the reality of the associated liability. While the regulatory environment remains fluid, and the technologies to cost effectively address PFAS are evolving, airports are challenged to account for PFAS impacts through their operations.

These can include a dizzying array of issues that range from impacts to ground water, to increase costs associated with construction soil management, costs of equipment cleaning and replacement, [00:01:30] to storage of remaining AFFF until it can be safely destroyed or processed. All this while performing normal operations, implementing long term growth plans and maintaining strong community relations. Hello, I'm your host Paul Teese. And in this episode of If/When, we explore the environmental presence of PFAS at airports from such things as emergency response, activation of fire suppression systems and hangers and firefighter training exercises. [00:02:00] I'm joined today by Steve Pelham, Jacobs' Vice President of Aviation for the Americas, Bob Cipolletti, Principal Hydrogeologist, Jacobs' Aviation Environmental Lead, and Bill Diguiseppi, Principal Hydrogeologist, Jacobs' PFAS Global Technology Leader. So Steve, Bob, and Bill, thank you all so much for joining me today. Bill, I'm going to start with you and, PFAS have many commercial and industrial uses, [00:02:30] but the question is, what application do they have in the context of airports?

Bill: Well, in addition to what you mentioned about AFFF, firefighting foam, which again was in training and in storage and usage, in hangers and elsewhere, there are a couple other places where PFAS show up. One is the aviation uses of lubricating oils that can handle extreme changes in temperature are often [00:03:00] fluorinated, hydraulic oils within aircraft maintenance are fluorinated lubricants. And then also, there are some applications in chromium plating. So, if a maintenance shop was big enough and had a Chrome plating capability, the mist suppression blanket on top of the Chrome plating bath, would've had PFAS in it over the last 30, 40 years. So, those are a couple of the principle areas.

And then of course, there are tenants on the property who might have used fluorinated materials. There are paints and other coatings [00:03:30] that are shed dirt really readily, because they're fluorinated. So, a lot of those other paint and coating type applications could be possible as well. And one thing is, that even though a lot of these materials might be small quantities, like those lubricating oils might be a five gallon drum or something, the standards for PFAS are often really, really low, and they're very recalcitrant compounds. So, even a small spill volumetrically, could in fact lead to a problem.

Paul: Yeah. [00:04:00] And it's quite a nettlesome environmental challenge. I understand that, trying to clean these contaminants up and trying to manage them. Steve, what are some of the challenges that US airports face in managing PFAS contaminants?

Steve: I think one of the big challenges is, just being aware. I think some of the large airports that usually have staff members on the environmental side, but the 450 odd US airports that do commercial service, [00:04:30] many don't have the staff to be able to take this on. So, that would be the first thing, is awareness, and then two is, to start realizing where has a AFFF been used on site and then we can go from there.

Paul: Okay. And then Bob, within the first couple of months of the Biden Administration, we have seen a high level of attention on PFAS with potential federal regulatory actions pending, states are also demonstrating [00:05:00] increased engagement. And it's likely that several bills will be presented in state legislatures to address PFAS. So, how are airports responding to these regulatory challenges?

Bob: Well, the regulatory situation is very fluid, which makes managing PFAS particularly challenging for airports. And they're faced with a need to balance, moving forward, their every day aspects of what they do in airport operations. It could be a capital improvement project, tax away reconfiguration, ongoing [00:05:30] fire training, while trying to keep an eye on how the regulatory changes could impact their environmental liability and the reputation, the community, which we know is important to airports. Airports are responding in a whole lot of different ways that depend, for example, on the regulatory framework where they're located, while they wait around to see what happens in Washington. And some highly regulated states, such as California, PFAS investigations have been going on for several years now and [00:06:00] airports, they're complying with the sampling mandates. They really understand what's going on in those states. Some airports are addressing PFAS management as part of their risk management strategy.

So, they're documenting past use, they're looking at what their current storage is, are there known suspected releases of foam in the past. Well ahead of any kind of regulatory push or requirement, the lack of soil standards though, in most states combined with that uncertainty around the potential hazardous substance designation [00:06:30] at the federal level, as resulted in many airports, really deciding just to stockpile their soils after site, assuming they have the room to do so. Many airports don't have that room. So, they're having to send their soils and construction debris and that sort of thing out to their current stable of landfill providers. And that can be challenging, because a lot of these landfills are not necessarily going to be taking PFAS soils, or they may start requiring sampling, prior to acceptance, but really all in all, there's [00:07:00] not a whole lot of consistency across the industry. Other than that there's an awareness of PFAS and how it might impact our operations.

Paul: And I imagine, I don't know, but I imagine that there's probably a scale of airport readiness, where perhaps some facilities are more ready than others. Steve, from a planning and operations perspective, what actions do you think airports should consider in preparing for PFAS related [00:07:30] concerns?

Steve: So, going back to the awareness piece, I'd be looking at operationally, where if they had an incident, where's the fire pit on an airport. Just kind of documenting what you know, but one never knows when you're going to get a phone call regarding PFAS, whether it be from the press, whether it be from city council, from your authority board. So, it's nice to have that file folder handy, of here's where we've had engagements. Here's [00:08:00] the age of our trucks. This is how we clean our trucks. So, operationally is one, then two, who do you have on tap that is assisting you, and/or your city on legal matters. Then I would be looking at again, environmental health and safety areas and how to manage the overall approach. All those things, we all kind of know, but to have them in a file folder so that they're ready, then we can move to the next [00:08:30] stage.

Paul: And I suspect that it's most efficacious if you have a partner, I'm going to assume like Jacobs, who has experience in this space, to be able to help an airport partner walk through this and knows what questions to ask and what mitigating activities to take. And so, I can only imagine it's invaluable to have someone like a Jacobs partnering with the airports to help mitigate PFAS. Would you agree with that?

Steve: I'm [00:09:00] glad you said it. Yes. And it goes to, "What are you looking at?" And I know Bob and Bill have a lot of intel and insight onto this, but where are we looking at from mitigation? What are we looking at as far as dirt management, what are we looking at of identifying and where and when? There's a bunch of things to be looking at. And I guess, at the end of it all, there's also that CapEx piece. How many [00:09:30] dollars are we looking at for said airport and it differs across the board.

Paul: Gotcha. So Bill, what are the options, risks and liabilities, associated with storage and disposal of AFFF contaminated soil and storm water, construction, debris, and other PFAS containing materials?

Bill: Well, that's a really broad topic. A number of different points there. Related to the AFFF, a lot of airports [00:10:00] now are starting to convert and change over to the fluorine free foams, or they will, as soon as FAA fully authorizes that change over. The US air force has taken out older foams and put in C6, a different foam that is thought to be less toxic. So, once you remove that foam, you have to do something with that old foam, that is the one that has been most identified as a problem. So, pretty much incineration is kind of the only [00:10:30] destructive game in town. And even that has been sort of called into question recently, because there's not a ton of data demonstrating complete destruction in an incinerator. After all, these are chemicals that are made to throw onto a fire and still hold together.

Some people are stabilizing it, by mixing it with carbon based materials and sort of binding it up and then sticking it in a landfill. So, as far as the foam, there are some options out there. The soil... Yeah. Another [00:11:00] thing Bob mentioned about soil management and options like taking it to landfills, some landfills are no longer accepting soils, EPA has recent guidance that just came out in the last six months, actually kind of recommends stockpiling it on site until better options are available, because the options are pretty limited and they're fairly expensive and a little bit uncertain. Related to storm

water, that's really kind of a new topic. There's only beginning now, to be people looking at that. I do know some more [00:11:30] regulators are looking at that more heavily, and I expect to see changes at the state level in the coming years, there are some passive treatment methods that we're working on in terms of engineered wetlands, sorbtive underflow, carbon systems and other things with sorbtive media to bind it up and prevent it from migrating offsite with storm water, because that's actually going to become more of an issue.

The construction debris, it turns out that PFAS settles into concrete, pretty solidly, [00:12:00] but can be leached out later, so even concrete fire training pads for instance, need to be handled as if they are a potential source. So, sealing them in, putting them in a lined landfill or some other controlled environment is the best way to handle that. So, for right now, a lot of these materials, there's sort of a lot of bad choices, I would say. The things that are sort of developing in the industry are soil washing, for instance, separating out the PFAS from the soil materials [00:12:30] and then treating that wash water, or thermal treatment, thermal absorption at lower temperatures, driving it off of the soil and then capturing the vapors and treating the vapors. And we've done a number of studies with that. And we actually have one coming up this year, in Situ looking at soil source areas to drive the PFAS out of the soil. So, it is no longer a contribution to groundwater. So, a lot of things is in development, but right now they're fairly limited selection of choices.

Paul: And then Bob, what is your perspective on [00:13:00] PFAS impacts to an airport's desire to redevelop portions of its property as a new avenue for revenue generation?

Bob: Well, the airports took a hit, so they need to be really creative in how they make up for loss and revenue due to the pandemic. And their property is an asset that absolutely has to be part of the conversation. And I think the environmental industry has had a long history of how to redevelop impaired properties. And PFAS is, while it's a unique [00:13:30] set of compounds, a lot of the challenges are similar. One key for success is understanding if you have PFAS or frankly, any constituent present in your soil or groundwater within the parcel of land being considered for sale or lease, before you move forward with anything. It allows for proper planning to occur, so that the airport will understand any of the potential impacts that PFAS may have for repurposing a property. And then you can account [00:14:00] for them throughout the process, which is really important.

It's important to remember that buyers or lessees will likely do a property assessment, ahead of time, well before they enter into an agreement, so accounting for PFAS allows the airport to avoid surprises and nobody likes surprises during a negotiation. So, during both the sale or lease agreement negotiations, and certainly down the road during construction activities, surprises are not what you want to be having. There's cost schedule issues with that and potentially even [00:14:30] liabilities associated with it. If impacted soils are found, where are found, as Bill alluded to, there's lots of different things that can be done. There are the right combination of technologies, if you use them properly, that can address PFAS concerns in a way that's very compatible with redevelopment scenarios. And we'd like to put disclaimer right here to some degree to

say, of course, engage with your legal counsel and other key players, because they are really crucial for successful redevelopment projects.

Paul: Now, my next [00:15:00] question is for both Bob and Bill. And Bob, I'll start with you. And then Bill, I'm going to ask you to the same question, but Bob, what are the current best practices and approaches that airports should consider for managing soil and other media as part of their construction projects? And how is that different from remediation?

Bob: Well, I'll take a shot at sort of the soil management and I'll let Bill talk about the remediation, because that's more of his field of [00:15:30] work than mine. Okay. Well, the good news really is, that there's a lot of existing best practices out there for soil handling and stockpile management that they're protective of human health, the environment, workers, et cetera. And those work for PFAS as well. It's a new contaminant, but the concepts are the same as things we're very familiar with. You do things like cover the ground before you put your soil down, covering with sheeting, cover the soil pile itself. So, you don't get soil eroding off and getting into [00:16:00] storm water. You don't allow infiltration of rainwater through the pile to get the groundwater. The airports we work with, they're very familiar with those approaches and many of them have that built right into their existing soil management plan.

So, you can modify that to account for PFAS and some of those unique aspects of PFAS. I will say, thing that we need to be cautious about though, is spreading soil around during construction activities, you should avoid that. Because, what you don't want to do is, spread potentially impacted soils [00:16:30] to clean areas. Because, then you create new areas of impacted soil, and we don't want that. Potentially new areas for leaching to groundwater. And when you're doing construction dewatering, which commonly happens, there are also common approaches for addressing that, that are similar to other types of contaminants and they're easily applicable to PFAS contaminated groundwater. Then Bill, I'll send it over to you for the second part of that.

Paul: Yeah. So Bill, the question was, how is it different from remediation?

Bill: Yeah. So, fundamentally [00:17:00] managing the soil is allowing you to keep up with the construction project and get the soil out of the way, so that you can get accomplished what your top priority is, which is the various runway and tarmac modifications and other things like that. So, doing that in a sensible way, like Bob said, there are a lot of best practices making sure that you're managing it in a responsible way, I think is important right now. There's not a lot of regulations directly applicable to it, but there very likely will be in the future. And so, [00:17:30] I think if you can demonstrate that you did the right thing and what you did made the most sense when you did it, like putting it on plastic sheeting, covering it with plastic, or sending it to a lined landfill, as opposed to just a construction dump, you're showing that you at least did what made sense at the time to limit its exposure or whatever.

But then, from a remediation standpoint, there are some states that have promulgated soil clean up standards right now, Alaska is one for instance, where any soil that you do

turn [00:18:00] over, dig it up for a construction project has to be dealt with in accordance with the state regulations. So, remediation treatment of that soil is pretty much mandated. In other cases, you may have a groundwater problem that is fed by a soil source area. And the regulators may look at that source area as requiring remediation. So, that's where you have to go in and do something about that soil that you might not otherwise have bothered disturbing, it's under a hanger, or [00:18:30] next to a hanger or something that's not being constructed. And there you then have to go in and figure out the best option for handling that soil.

And the options are limited, as I said before, there's not any perfect solutions actually, but there are some reasonable ways to cut the cost and make it more viable. And one of them for instance, is to separate the coarse soil from the fine grain soil, because PFAS tend to stick to the fine grained clay and [00:19:00] organic material and not the pebbles and cobbles and coarse sand. So, if you wet sieved away that larger fraction, that would reduce the volume that requires treatment, substantially in some cases. And then you could do something like thermal treatment or something for the remaining soil that does need some level of treatment to eliminate liability.

Paul: And then finally, Steve, my last question is, is there anything else you'd like to add about PFAS and AFFF, that our audience might like to know?

Steve: I [00:19:30] think as kind of a summary piece, we've been involved with Bill and Bob and PFAS and Aviation for over 12 years, we're watching what happens with joint DOD and commercial use air fields. So, we have a little bit of a precedent in those things, there's a little bit of a leg there, but would also say encourage a base of knowledge for one's airports for when action is necessary, get your team assembled and familiar. [00:20:00] Don't be ignorant on PFAS. If you're in Aviation, your airports have got something. And we will continue to work with industry, on best practice for measurement, remediation, containment management and regulatory involvement, and very much willing to be engaged.

Paul: Well, Steve, Bob, and Bill, thank you so much for joining me today. I know PFAS, it's a topical subject. [00:20:30] There's a lot going on and airports are obviously very concerned about PFAS and how they mitigate it and deal with it. So, I really appreciate you taking the time to share with me your expertise and kind of diving into this topic further. So, thank you very much.