



TWV Podcast #025

Rolling Out AMI in San Francisco with Alison Kastama and Heather Pohl (Part 1)

Show Notes at <http://thewatervalues.com/pod25>

Intro: Welcome to The Water Values Podcast. This is the podcast dedicated to water utilities, resources, treatment, reuse, and all things water. Now here's your host, Dave McGimpsey.

Dave: Hello and welcome to another session of The Water Values Podcast! Thanks for joining me.

Joey just sounds so good doing the intro voiceover that I've decided to give him the job, so make sure you stay tuned until the end of the podcast to hear Joey's outro voiceover and the all-important disclaimer.

Well, I hope you're all doing well. My oldest returned to school last week and started his eighth grade year. I can't believe he's that old already and he's almost in high school. And my wife and I celebrated our 17th anniversary this weekend. So we've had a lot going on. The younger two kids start school next week, so before we even knew it, the summer's gone and at an end. And I hope you all had a great summer and maybe you're even able to extend it a week or so.

I'm really excited about this week's podcast. It's the first part in a two part series speaking with Alison Kastama and Heather Pohl of the San Francisco Public Utilities Commission about their roll-out and implementation of an advanced metering infrastructure, or AMI, project for SFPUC's water utility. I love what AMI can do for utilities, and the SFPUC is doing something really cool – it's using AMI to help reduce water consumption during the drought in California this summer. Alison and Heather give a great account of how the drought is affecting SFPUC's water system and how they chose the AMI system they ultimately went with, along with some tips for deployment of the system. It's really a fascinating discussion and story to hear, and one every utility should listen to, especially if the utility is considering an AMI system. So enjoy!

With that said, let's get on with it. Open the valves, fasten your seatbelts and here we go.

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Dave: Alison and Heather, thanks so much for coming on the The Water Values Podcast. Greatly appreciate your time. To start off, why don't each of you tell us a little about yourself and how you got interested in water.

Alison: Sure. Well, my name is Alison Kastama. I'm a communication manager here with the San Francisco Public Utilities Commission. We operate the Hetch Hetchy Regional Water System serving about 2.6 million people here in the San Francisco Bay area. I actually have a background in a couple of things. I did some political campaigns supporting health districts, hospitals, healthcare districts and schools. So I did a lot of the public infrastructure side of the



world, and frankly, I have a degree in French and Classical Civilization, and today I work on basically what is a Roman aqueduct. It's kind of a very cool thing.

Dave: And Heather, how about you?

Heather: I'm Heather Pohl, and I'm the project manager here at the SFPUC for the Automated Water Meter Program. I started my career out as an environmental engineer working on remediation projects in the Bay. I had just moved to the Bay Area and got very interested in this climate and this area. And my career path changed kind of suddenly when I hit a permitting delay and so filled in for a colleague working on projects for the SFPUC involving water supply planning and developing demand and conservation potential models for future plans for the SFPUC. So ultimately, the contractor brought me over to work for the PUC directly and ultimately to managing the Automated Water Meter Program.

Dave: Terrific. Well, you can't talk about California these days without hearing about the droughts. Alison, could you talk a little about the California drought and how it's affected SFPUC?

Alison: Absolutely. You know, California is now in the third driest three-year cycle sort of in the history of the Hetchy Water System at least. We've had bad droughts in the 70s and in the late 80s-early 90s. So we've had worse years where we've had less precipitation, but this is definitely a stretch of three years that's been the driest.

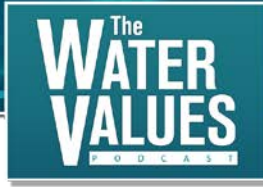
The Governor has, of course, asked for a 20% reduction voluntary amongst anybody and everybody in the state. Luckily, the Hetch Hetchy Regional Water System, we've managed our water so well and we've got great conservation occurring with our customers, that we're asking for 10% voluntary, and we've been asking since January.

All of that is about making sure we stretch our supplies as long as we can. If it's still dry into the winter and into next year, we're going to have to keep looking at other measures and other things to do. But right now, we're doing okay with our customers and asking pretty much everyone in our system and that includes the cities and agencies we actually wholesale deliver water to, to reduce use across the system by 10%.

Dave: What are some of the tools you've used to try and get the word out to your customers about usage reduction?

Alison: We've done a number of things. We, of course, have done a lot of media response. It's a very prominent issue in California. People ask us all the time. Newspapers and T.V. channels and radio ask us for updates on the system and how people are doing in terms of use. We, of course, have also done outreach through our regular mechanisms to our customers, letters to our

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wholesalers to let them know that they need to aim for a 10% reduction, but also sort of messages on our bills, messages in our customer newsletters. We've reached out to community groups to let them know if they have their own little community newsletter to hopefully put a little blurb in about conserving water. And then one of the bigger things we've done in addition to our automated meter program and giving that information to customers is a very bold marketing campaign we've just put out in the last few months to just sort of remind people of the different actions they individually can take.

Dave: And you mentioned your automated metering program. When did that take shape and start?

Alison: Well, we've got kind of two things when we talk about the automated meter program. One is our MyAccount website application, which is a portal for our customers. So if you're customer account holder in the City of San Francisco, you can go online and look at your bill and payment history, as well as now with the automated meters that are installed, you can look at your water usage. We provide them basically a daily snapshot. We've started this in about early May. So they can look at their water use from the beginning of May on a daily basis to see where they are, what happens every day, does it go up on the weekend, does it go up on Tuesday. So it's a real great way to use what is basically automated meters and collecting that information through an automated system that we haven't had previously. It's been manual reads for a long, long time.

Dave: What was the tipping point in terms of when SFPUC decided to move away from manual reads and go to automated metering?

Alison: Heather, that's definitely your question I think.

Heather: I'll take that, sure. So it was right about the end of 2007 when the SFPUC became interested in some kind of automation, and it was becoming more widespread at that point, even with water utilities. So we had about 4,000 or so basement locations that we called lockouts that were difficult for our staff to get inside for collecting the manual reads. And for those locations if we couldn't get in, first of all it was very resource-intensive to continue to try to get access to some of these locations. And then when you couldn't get in, you were left basically to a bill estimation, which is based on usage from previous bills – I don't know even like back to years before that. So it's not really good for anybody because we really want the customers to pay for their water that is being used, not an estimate of what we think the used based on a completely different time period.

So our customer service director had gone to some conferences and heard about meter automation. It was sort of becoming hot in the industry. And so she was looking to do a pilot to automate this with the drive-by system. So there's a couple different kinds of meter automations

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in the industry. Earlier versions of what we installed were drive-by systems, which is where you install a radio on the meter, but you still have to do a truck roll. You still have to send your staff out when you're ready to bill, and you drive-by with an antenna in the truck and that's how you pick up your billing reads.

So she was looking at trying out that technology just to see how effective that was in our basements with those lockouts. And then it just became a bigger project. She worked with our commission, and they decided to actually do a business case and look at the whole city at that point. The business case evaluated drive-by systems and the fixed network system, which is ultimately what we installed. We put up data collectors throughout the city that collect data on a regular basis daily. Our meters send four times a day, hourly reads, to our collectors.

A business case analysis was done to evaluate the benefits of both types of systems against manual reading. At the time, we were also billing every two months so customers were getting bigger bills six times a year, and we decided to go to monthly billing. And that also played a role. So the business case ultimately determined that we had between an 8 and a 10-year payback over a 20-year system life for a fixed network.

In addition to what you get from billing reads, which wasn't really quantified – utilities have a hard time quantifying the conservation and additional benefits of having hourly reads back in 2007. I think we're getting better at that now. But the unquantifiable stuff such as now you've got all this data; you don't just have to use it for billing. There's other things you can do with it that we're still trying to figure out. That was about 2007. We invited manufacturers in to learn more about the products out there. We went straight into developing project specifications in a competitive RFP process through which we selected our technology.

Dave: You said a couple things in there that I think are interesting. Did you say hourly pricing?

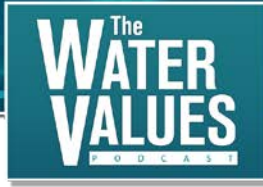
Heather: Hourly reading. We get reads – we basically get your meter read every hour, and it's transmitted four times a day to our system.

Dave: For a second there, I thought you might be doing hourly pricing.

Heather: I know some utilities if they're interested in that, that is something that you can do when you have that hourly data. And I know in the gas and electric side, obviously, that's out there. No, from our perspective, we're collecting the hourly meter readings, but we haven't changed our pricing structure.

Dave: And so you had this RFP process, chose your technology. What were you looking for when you were choosing the technology? I know you said you were looking for the fixed network, but what were you looking for, what features stood out to you?

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Heather: We had a set of minimum requirements that we knew that a lot of vendors could meet. It was actually pretty challenging for us to go through the selection process. Typically, you've got a service contract or a construction contract or a design-build contract, and they're all evaluated differently. And cost, obviously, is a big factor. But the AMI systems aren't really apples-to-apples when it comes to the architecture of the network, the requirements for the collection systems.

The two different systems that we had, for example, the two top bidders for us – they worked on very different radio frequencies. The way they collected their data and sent it up through the networks and the redundancies within the system were very different. And then the number of collectors that you needed were also quite different. So at the end of the day, that kind of built your story. The RFP was really a series of asking the same kind of question about six different ways to really understand the technology that you're buying.

Dave: Understood. It sounds a lot more complicated than one might think.

Heather: We had a consultant that helped us through the process that was very familiar with the technologies, as well.

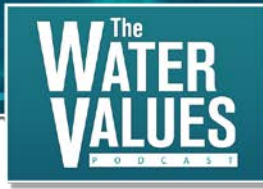
Dave: You get to the point you've selected your vendor, what's involved in the roll-out?

Heather: Oh boy. Well, we selected our vendor around 2009. We just finished our deployment last August as far as our contractor being deployed. We haven't finished system testing and close out yet. But there are four or five key phases that I would point out as far as roll-out goes.

The first is really designing your project. Now you've decided you're going to deploy AMI. We spent about a year-and-a-half on all of this. That included the RFP and writing the contract. But before you do all that, you have to decide how you're going to structure deploying this with respect to the contracts.

Some utilities actually buy the equipment. Because you've got two different vendors, you're marrying essentially two different technologies: a water meter and an AMI system radio. And you're marrying those together, and then someone else is installing them. So some utilities actually buy the equipment from the two different vendors, and they install them internally.

That's not what we chose to do for various reasons. One, our size, obviously related to that. We don't just have full-time resources sitting around waiting to go deploy this equipment and that aren't doing anything otherwise. That, then what are you going to use after-the-fact. It's a temporary service that you need to fulfill during deployment. It is not a long-term program.



So, the other reason is really just going with the turn-key solution, if you have delays on either side. We had a couple delays on manufacturing on both sides, actually. One of them was the floods in Thailand. There was a microchip. And so those kinds of things are excusable, but they hold one side or one of the three sides back, and then you start thinking about liquidated damages for delays, people that are brought on-site and don't have equipment.

So for us it was really obvious that we wanted to do a turn-key solution. And to have, I don't want to say one throat to choke but that's kind of really what it is. You are marrying two things together, someone else is installing it. If you don't get your read at the end of the day, it could be a number of factors involved. You really just want to point to one party that has been involved in managing the whole thing and say, "I don't know why we're not getting the reads. It could be this piece. It could be that piece. It could be the installation." So you really have to think that out and how you structure your contracts and what internal resources you need.

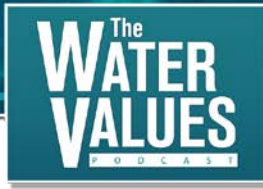
The other thing you need with internal resources are the roles and responsibilities of your utility and the utilities definitely that I have talked to have all chosen a little bit different approach based on their internal resources as they stand before the project. It's a cross-departmental program. You're marrying operations, customer service, finance, billing, and IT. I mean there's just many different departments that are affected by deploying AMI, and it changes the way you do business in many ways.

And so, who is really ultimately responsible for that? I've seen meter shop supervisors take on the role. I've seen customer service directors take on the role depending on the type of a deployment. And I've seen utilities where they just have a stakeholder group, and they don't have enough resources to really have good oversight onto the contractor and the installations as they're going on day-to-day.

What my utility decided to do was bring on a project manager to coordinate everything and to make sure all the departments were covered and didn't have to take a big piece out of their current existing jobs to manage this, two-, three-, four-, whatever it ended up being-year deployment. You're going to have to think that out and decide who you need involved in the project. And then from there, you're developing an RFP and writing a contract in accordance with those plans. So like I said, that took us about a year and 1/2 of just kind of thinking about how to do it right, writing the contract and the RFP.

And now you've got a contractor and your next phase is planning that deployment because now you get this team that comes in with a contract that's been written by others, by their marketing folks and their legal. Now we go, how do we really deploy this. You write some things in the contract. You do some planning during contracting but how do you guys do this? What are the process flows for you to go and install a meter? What are your communication pieces? What are the QA requirements that we're going to agree to? How do I issue work orders? What tools do I

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need to do that? We had things in our contracts such as, we're not going to let you move on to the next route until you finish 95% of the previous route because we don't want to be having half routes all over our city.

Also, we have blackout window for routes. We can't have them changing meters when we actually need to manual read them because we have to download the existing reads and existing meter information to our meter readers. So you have to plan around all of that, and until you actually sit down and you meet the experts, those people that you have hired, the people who have done this and accomplished it, you don't really know how it works even though you've written a contract. You have a general idea. So that really took us four to six months. We signed our contract in January 2010, and we didn't install our first meters until June. So, there you go, now you're in deployment. This for us was almost a four-year process depending upon what you consider being completed with deployment.

A few different things to touch on there. You've got to repair your systems, and I can't stress how important it is to have IT on board. They're very dedicated to your project. We built an entire work order management tool that helped the project management team manage the contractor because the work orders to go change a meter come from our customer service department. And we couldn't just have our contractor saying, "I want a work order from the customer service department."

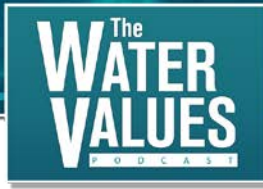
We had a couple different types of work we were doing. We were doing full meter change-outs on most of our meters, but on a portion of them, we were just retro-fitting them for various reasons. So we had to decide what kind of work order. We had to make sure that it was appropriate for us to send the work order based on, as I was mentioning before, had they actually finished the previous route. Had they met all of our requirements for new work? We needed a tool to help us do that.

In addition, we changed out 170,000 meters. This tool allowed us to understand for all 170,000 meters, real-time basically, what status was that meter in. Had we not issued a work order? Had we issued and they haven't completed it and they are waiting for us to do a QA approval on it? Have they invoiced it? Is it now in warranty? You get invoices for millions of dollars for saying they changed out X number of meters. We felt like you had to have a tool. You can't just depend on your contractor to tell you they've changed these meters without seeing one gear system and that you've actually witnessed it from cradle to grave. So development of that tool was a big deal for us. I've seen smaller utilities work off Excel spreadsheets, so that was very important. That turned into a big deal for us.

Dave: I was going to say that the Excel spreadsheet approach didn't work for SFPUC?

Heather: No. I just didn't feel like I could handle that, that I could manage that.

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So you also have to develop interfaces with existing systems. So we had just completed an upgrade to our billing system, went to a new billing system. And they weren't even recovered from that and then we had to come get in their face and say, "Ok, now we need to pull data from it to populate our meter reading system so we have synchronized account information."

We had to build an interface so that they could use our data for billing. That stuff is pretty straight forward, and the vendors know what they are doing. But that stuff takes dedication and committed staff and documentation and planning.

And then deploying the meter reading system as hardware and software – so it's a whole new software system with multiple server environments. So you have test environments, development environments, disaster recovery environments, web applications, databases that you work with your vendor to basically set up. And all this data that comes in has to be parsed and kept somewhere and kept synchronized and managed and maintained, and you're going to have software hot fixes and upgrades. So back to what I first said is that there's a lot of IT work, and we were told that from the beginning. We started off a little light, I'll put it that way. Like every other utility, you have resource issues, and then when you really realize that you need it, you bring it in. But the sooner you get on top of that, the better and get that in the planning stages.

Dave: Sure.

Heather: After you've got your systems all set up, what we did first is we deployed our network, which are the data collectors and the fixed network that we deployed them all around the city. And then we deployed 10,000 end-points surrounding them so we could actually test the network and the software so that everything worked before we did a full deployment.

And we had a full systems test of our systems specification that was like read reception. Did we get the percentage of reads we were supposed to get? Were the reports coming through as planned? If we switch your meter with your neighbor's and reprogram them, did all that go through systematically the way it was supposed to? So our network deployment was about six months and then we did a full test on that before we actually allowed the contractor to continue. So that's just one of the few quality assurance phases that we incorporated into our project. When I talked about the planning of all of that, we thought about all those different phases and the milestones.

And then from there, we went into full deployment. And you get into just really doing everything you can to help your contractor get the meters deployed: access – parking in San Francisco as you can imagine was a real challenge for our contractors. And so we helped them block streets if we needed to on certain occasions for some of the installations that were more challenging.



And oversight on their operations. We did a lot of field QA, and we provided emergency response in events where there would be a pipe break, we had staff ready to respond to that. The contractors find things in the field that you know are out there, but you don't really know where. Meters that are crossed and have been billed inaccurately that you have to go and fix. Unexpected deferred maintenance in the field. We found a lot of our meter boxes were offset to where we actually couldn't get to the valves and change the meters, so we had to go change meter boxes first. Sixty percent of our meters were more than 20 years old when we started the project, so we hadn't been out to some of these and changed the meters in so long that we really had a lot to deal with as far as deferred maintenance.

So we tried our best to let the contractors know that up front so they could bid accordingly and fairly amongst them. I recommend that definitely rather than just – we gave them some of our problem installs, and we asked our field staff to show us the worst ones you could think of and that they're going to have problems with. That really helped all of us.

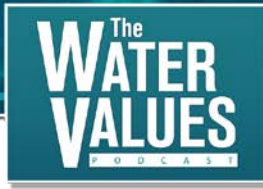
Then there's just going to be – it's managing all the locations that the contractor can't exchange where you've got other service issues that you don't want them working on your service lines if there's broken valves or customers that opt out. That was such a big issue for the gas and electric utility here in our service area.

But we really had great customer reception. We had about 350 customers out of the 170,000 we deployed that are currently on our parking lot, and we're still developing plans for re-contacting them again and explaining the benefits to see if they have changed their minds. We did some homework on that ahead of time because we did radio frequency settings that we posted online where we actually tested our meters, and that gave a lot of people assurance. And we had a really strong quality assurance program that we assured before we moved them to billing off of our AMI system. We did full parallel read analyses with manual reads next to our system reads.

So we have about 5% leftover at the end of the project as return to utilities. That's one of the phases we're in now is we've got those 5% left. They're not the low-hanging fruit. There the ones that are going to take us some time to exchange, and they're the ones we have to do internally. But it's managing all that. We wanted to make sure that there really was no way for the contractor to get the installations done before we actually accepted that back. Like I said, we're not really staffed to change out meters as regularly.

From there, we're transitioning to internal deployment, which is the phase we're in now. Training staff that doesn't change meters all the time - leak trucks that are out there fixing leaks. They might have to change a meter due to a pipe break. The technology is really new, learning it and making sure that it sticks with you with the electronic entry and programming - that's the challenge most utilities have when they get the system turned over to them. The turnkey is done, contractor is out of here, which we're getting close to. Now it's our job to maintain it.

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So that's kind of where we are now. We're done with the project. How do we get into a maintenance program? What resources do we need to support this so we don't have to go back to manual reads because that happens? If you don't have a way to really monitor the health of your equipment and your network out there and you need to get the reads and you don't have a way to get work orders out there and staff that's trained, your system going to fall apart.

So we're planning for that right now. We're trying to make sure that we can get that covered so that we have all this data. We get customers to sign up for MyAccount and wanting to see their data, we want to keep that continuous. We don't want to have breaks in that.

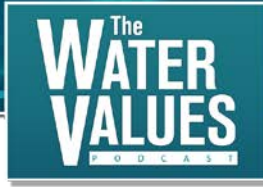
Also, we're at this point where our focus is really on getting the meters in the ground and applying it and testing it and releasing the contractor from their duties and their responsibilities except for warranty. Now, how do you use the data? The business case is for billing, but we've got all this data, MyAccount and the drought. We're at the end of the project now. All of a sudden, you really start thinking about the systems that you need to put in place to use that data because we have such more frequent data, more precise data, and we want to offer it. So that's where we've landed. As Alison was saying, it's very timely given the drought. What we're asking our customers to do now that we're able to offer this data to them.

Dave: Your customer opt out rate is phenomenal. That really surprised me that you had that few customers that wanted to opt out. Can you talk about the outreach program a little more? You mentioned you did the radio frequency testing online and things of that nature, but can you talk about how you interacted with your customers and explained the benefits of AMI to them so that your adoption rate would be fairly high?

Heather: Our customers were pretty educated about automated meter reading because of the effort that they already had heard about. What we focused on was that there are differences in the technologies and that we had – I believe that PG&E offered a lot of feedback and information about radio frequencies, which I think was one of the big hurdles for them. We went out in the field, and we hired a contractor that physically took tests at our location. We didn't just use reference data. I don't know if PG&E went that far or not to my knowledge. But for customers, that really helped.

We also selected proven technology as far as water meters go, and the water AMI system, we could point to it very easily. The technology that we selected had been deployed for more than 10 years on the East Coast. Several utilities had been using it for billing. There were no issues with accuracy. Those are some of the perceptions. We really talked about a robust QA program, and we spent a lot of resources on doing the QA from the field installations, through the parallel read, through ultimate billing and scrubbing of our data before we share it. That's been on the forefront all along.

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So we communicated in various ways. Our communications department where Alison and her colleagues, and she can talk to you probably as well. They went to community meetings. They created pamphlets. They went to street festivals. They gave out information. We had a website set up. We had a video that we made on what to expect from water meter exchange – how long would my water be off? I actually found that for the customers that wanted to opt out, it was more of an inconvenience of getting the water meter changed. They just didn't want their water to be off for a half an hour because they had to give their kids a bath.

We really didn't have that many that were concerned about accuracies because of our robust QA program. That may also have to do with the variance in what your water bill typically is versus what your electric and gas bill is. So there was good outreach from that. We put our QA programs and our RF studies and stuff online. We had a communications person always available dedicated to the program to answer questions for customers that had any kind of questions or issues with the installation.

Dave: Well, that was the first half of my interview with Alison Kastama and Heather Pohl. They were awesome and as you'll hear in Session 26, they keep it up. I hope you agree with me that their discussion was absolutely fascinating. Learning about the nitty-gritty details of AMI deployment was absolutely awesome.

There were lots of takeaways in the first portion of the interview, but I'll focus on two. First, I thought the way SFPUC was really honest about its system and the challenges a contractor might face when installing the system was incredibly important. They were up-front and let bidders know what they'd be getting into. I'm sure that was a key element to the success of the project and hopefully, provides a good lesson to any utility considering AMI or any other type of project – if you're honest about the work that needs to be done to deploy, you're probably going to get a better project.

Second, the work SFPUC did on a customer education and outreach level was top-notch. From the field RF readings, to using the internet to make that information available, they just did a great job. And it's not easy to do that – if you've read any of my blog posts, you know that in one of the cases I worked on, we spent a lot of time on customer education in a rate case I was involved in, and the result was a 50% rate increase that was approved by the regulatory commission without much opposition at all. So kudos to Alison, Heather and everyone at SFPUC for their public outreach work to lay the foundation for AMI deployment.

Well, you can check the Show Notes out for this session at <http://thewatervalues.com/pod25>. And please don't be bashful in letting me know what interested you about the interview by leaving a comment on the Show Notes or by emailing me at david@thewatervalues.com. You

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In closing, please remember to keep the core message of The Water Values Podcast in mind as you go about your daily business. Water is our most valuable resource. So please join me by going out into the world and acting like it.

Outro: You've been listening to The Water Values Podcast. Thank you for spending some of your day with my dad and me.

Dave: Thank you for tuning in to the disclaimer. I'm a lawyer licensed in Colorado and Indiana. And nothing in this podcast should be taken as providing legal advice or as establishing an attorney-client relationship with you or with anyone else. Additionally, nothing in this podcast should be considered a solicitation for professional employment. I'm just a lawyer that finds water issues interesting and that believes greater public education is needed about water issues. And that includes enhancing my own education about water issues because no one knows everything about water.