Paul Thies: It's among the most essential components for life on the planet. And while many of us take it for granted, for others, it is a daily struggle to obtain. We're talking about clean water, and what needs to be done to ensure that people around the globe have the access they need [00:00:30] to sustain themselves. Hello, this is your host Paul Thies. And on this episode of If/When, we dive into the topic of clean drinking water with Eleanor Allen, Chief Executive Officer of Water for People, and Dr. Russell Ford, Jacob's Drinking Water Global Solutions Director.

All right, well, Eleanor and Russell, thank you both so very much for joining me today. We've got Water Week upon us, and focus is [00:01:00] providing clean drinking water to people. And obviously some constituencies, depending on where you live, can probably take that for granted more than others. So I think it's a very fascinating and onerous challenge that the world is faced with, making sure that everybody has access to this life essential service. So I want to start with you, Eleanor, and just set the table for our listeners. What are some of the greatest challenges we face now in ensuring people [00:01:30] across the globe have access to safe, clean drinking water?

Eleanor Allen: Well, thanks, Paul, and thank you for the invitation to be here today, and hello to Russell. Interesting question. The greatest challenges we face, and I'll answer that we face now as sort of an addendum to the answer. Well, one greatest challenge we face that there's still over two billion people in the world that don't have access to reliable, safe water. So [00:02:00] that's a lot of people, and it's interesting because it's not impossible situation, right? We know how to do it. We know there's a solution. We all work in the water sector. We know there's the technical solution and it can be done, and the resources are available financially in the world.

But what comes in the way is people. And so really, why everyone doesn't have the ability to turn on a tap in their homes, or not worry about if they're going to get sick, or not have to walk to a stream, is [00:02:30] just failures in leadership and governance in policy, and just getting those services to people. And there are a myriad of reasons, political will, having the right policies in place, getting the resources to water versus somewhere else because countries do have limited resources. But all those things have to do with decision making, leadership, and governance and guidance. Interestingly enough, being an engineer, we could engineer all we want and we could solve these challenges, if just people wouldn't get in the way.

Paul Thies: Yeah, [00:03:00] for sure. So as a follow up to that, what needs to be done to future-proof the accessibility and safety of water, especially in the near future?

Eleanor Allen: Yeah. Well, that comes to the now part, and what needs to be done, and how do we actually solve this crisis, the global water crisis? Well, now is an interesting time because more people are aware of the issues with not having access to water because of COVID. So I want to take the opportunity, and we

are taking the opportunity to leverage that ability, [00:03:30] to get some news that, yeah, people can't wash their hands because they don't have water. Oh, and you know what, if they don't have water, their health is impacted. Kids don't go to school. Your ability to make a good living because you're all taking care of six people, are looking for water instead of working. So let's get people water, and have the basis of the foundation of sustainable development solved. And then we can future-proof this.

So things that we're working on at Water for People is building that [00:04:00] political will. So making sure politicians and leaders, Ministers of Finance for example, are understanding what it takes to get enough investment in their countries, whether through loans or grants or people paying their rates to get people water, and why that's important. So education advocacy, and influencing those national level policies towards the sustainable development goals is part of the future-proofing. But to do that, there must be a plan, right? There has to be a master plan and investment plan, and how are [00:04:30] you going to spend the money, and how we're going to make sure it goes to making sure the water isn't just infrastructure, but the sustainability is built in that we have the service providers and service authorities.

So that's a lot of what we're working on at Water for People, and what I personally work on is getting that knowledge and understanding to the people who can make those decisions and change the future of their countries, in this case, having those right policies in place. And, one country at a time, it depends a lot who the president is, and if water is part of their personal [00:05:00] national agenda, and then putting all the pieces in place to make it happen.

Paul Thies: Mm, interesting. So obviously the will needs to be there, but also, the technology needs to be there as well. So Russell, to bring you in on this, what are some of the innovative technologies that Jacobs is deploying to ensure drinking water is clean and accessible?

Dr. Russell For...: Thanks, Paul, and hello, Eleanor. I would say, it's funny about technology, what's old is new again, [00:05:30] and what's new is old again in terms of technology. We've been treating water pretty much the same way, pretty much since the 50s, 60s. We've figured out filtration, we've figured out disinfection, we've added new tools, the UV disinfection for things like Giardia and Cryptosporidium, we've done that. So that's from an innovative standpoint, that's not really innovation, but the technology changed, like membranes. We're going, instead of using polymeric membranes, we're doing [00:06:00] a lot of work with ceramic methods. They last longer, provide longer, better operational costs. They remove better, you can put more pre-treatment in front of them.

But I think one of the more innovative things, and it goes to Eleanor's point regarding the people without water, is we're doing a lot of water reads, and we're integrating technologies that by themselves, didn't have to deal with reads, but we're looking at the biological side in terms of filtration and ozone.

We're looking at the phys-chem side [00:06:30] in terms of membrane removal. And we're looking at taking water that's been used once somewhere else and trying to bring it to people who need water.

And I think that's one of the areas where we truly are excelling in, looking at different solutions. There are solutions for the coast, where you can discharge your concentrate to the ocean, and solutions inland, where you can use a process to use waste water and then make it potable. And there's a big move afoot to make it [00:07:00] potable. In all parts of the world, we're starting to see people looking at how can we reuse the water, instead of just sending it to their hose back to the ocean, making more use of it. So I'd say that's really where we are in the innovation. To me, that's really where we focus on innovation.

Paul Thies: That's interesting. And it kind of follows suit with a lot of the efforts that we see in sustainability and circular economy, and that whole idea of not just a one and done, but finding [00:07:30] ways to reuse the water. Right? Because it is a limited resource, especially clean water. Now I've heard the term digital water, which is, I think, really fascinating. So can you describe what that is?

Dr. Russell For...: So digital water, it's an interesting way. The water industry takes lots of data, lots and lots of data, collect data on, used to be when back when I started, we collected on circular [00:08:00] charts. Now it's all in the computers and SCADA systems, and all this data just sits around and nobody really did much with it. But now we're starting to look at that data and figuring out ways to optimize the facilities, optimize energy consumption, give us a better product for less money, for our customers. The value of water, it's important, people still want water, and there's a cost to it. But we can reduce the cost, make it more sustainable. We're looking at that. So that's [00:08:30] part of the digital, is how do we table this information we have in this world, and with the new tools and technology available, and make the utilities more efficient, the ability to treat the water, and deliver the water to the customers.

Paul Thies: Well, and I imagine that if we can make water even more financially cost beneficial for providers, then that feeds into that will, that political will, that Eleanor was talking about earlier. It makes it easier for finance ministers [00:09:00] to get behind it. I mean, that's kind of the reality that you're faced with. So Eleanor, let me ask you, let's talk about the environment and environmental impacts for a moment, because obviously everybody's very keyed in on the things that are going on in the environment and how it is impacting us, such as climate change, carbon emissions and whatnot. What kind of impact did they have on the globe's clean drinking [00:09:30] water supply?

Eleanor Allen: Quite a bit of impact, actually. I mean, first I want to mention that most of the countries we work in, low and middle income countries, are often around the middle of the world, the Equator, so highly susceptible to extreme weather events. So we have flooding, we have droughts, we have melting glaciers, so

pretty much in all our nine countries, we have some sort of climate response that we're dealing with and will continue to deal with. That means we need to find redundant water [00:10:00] sources. Water sources are drying up. Eventually I think it will mean population migration, although it's hard to imagine that the populations we work with will have the means to migrate, and where would they go? So that's a question for the future. It is building more resiliency into the water system, so we don't lose them to flood route hurricanes. We lost $6 million worth of infrastructure for the two hurricanes that hit Honduras last November, one after or the other, and so those things are just devastating in the countries where we work.

[00:10:30] So looking on the positive side, what are we doing in our programs to adapt to this? Well, we are doing much better on building water resources management plans. We use whatever water resources are available. So whether it's ground water, surface water, whatever's there. So just building resiliency into when we do the master planning. So we do our best to provide sufficient water sources for future population growth, is one. Rain water catchment, conservation to the extent possible. We [00:11:00] don't have that much reuse, as Russell mentioned, because we are non sewered areas, so generally there isn't much gray water that gets recycled, but sometimes in household situations, we do have some reuse, or the gray water gets put into family gardens.

And lastly, on carbon, interesting, we talked a lot about that recently. There are definitely programs about measuring the carbon offsets, averting using firewood for boiling water, [00:11:30] for non-potable water. And when you put in a drinking water system that has safe water, you have that offset. So that's something that we're looking at. I mean, not everyone boils their water, right, because they don't have the firewood. They'll just drink poor quality water. But that is something that's coming more and more into our world where we work to avoid that, those carbon emissions.

And also just reuse of biosolids from fecal sludge management, whether it's through compost or using sludge briquettes instead [00:12:00] of charcoal is another way, small carbon mitigation in reducing deforestation. So there are lots of things we're looking at in that area. And then of course, reducing our own carbon footprint as a business, but we really want to look at more the holistic areas and where we work. And then if there are benefits to carbon credits, that would go directly to the districts where we work as an income in perpetuity over time. It would go to Water for People, but it would be that carbon offset would be to that community, [00:12:30] which would be really interesting as we look at the ability to sustain enough income through rates, to continue to upgrade and manage their systems. So different facets of climate coming into our world.

Dr. Russell For...: Hmm.

Paul Thies: Now Eleanor had mentioned, you mentioned migratory patterns, and I'd seen, in some bodies like the UN and others that study population growth, they're predicting that really the globe's population is [00:13:00] going to be moving more and more en masse to large cities, super cities, I think is what they call them. And so, we've got the population is obviously pretty big, and people will be moving more and more to cities and conglomerating there. And so, I assume that gives rise to some interesting challenges in terms of contaminants and offsetting those things. And so [00:13:30] Russell, what are some advances in contaminant detection that are being deployed in support of clean water?

Dr. Russell For...: So yeah, there's a few things, but I wanted to just answer and talk a little bit about what you mentioned about the big cities. I would say that prior to the year of 2020 and COVID, that was definitely the case. And what a lot of water utilities are seeing right now is a move away from the cities. But people realize they were trapped for a year [00:14:00] in their home or their apartments without a lot of access to people, and they're moving away. So the water utilities in a lot of the world, they are looking at trying to adjust their water supply and demand to get people to where the water is. And so that does impact the contaminants that we're seeing, and how we treat for the contaminants. I mean, I think the best advances, we have a contaminant detection for some of the stuff, we're using a lot of spectral analysis, [00:14:30] looking at devices that can measure without reagents, so computer based devices.

Traditionally, we would have to measure stuff. You'd have a reacting reagent, discharge the reagent down the sewer or down the street. Now we have devices that can do that without that. We're making use of surrogate parameters, with these spectral devices to try to mimic what's happening, to predict what contaminant is in the water. So things like algal toxins, where [00:15:00] it's something that forms in the water when harmful algal blooms happen. We are looking at using this technology to predict when those blooms might happen, so we can then get ahead of the treatment and have the treatment plan be prepared for that bloom before it happens. So you don't have situation where you have to shut down the entire water system, because you weren't prepared for the bloom, or the changing water quality with climate. The way the climate's changing, predictive, the source water monitoring is really coming into play for us to look at [00:15:30] how that impacts treatment and ultimately finished water quality.

Paul Thies: Now you had mentioned water utilities, and I'm assuming that Jacob's partnership with the water utilities is really important in these efforts. Can you talk a little bit about how Jacobs is partnering with water utilities to provide safe and clean water and sanitation?

Dr. Russell For...: Yeah, yeah, definitely. We pride ourselves on being a solution provider, working with utilities to provide the solution to what their need is. [00:16:00] So it's not like we're looking to put a technology in. It's, what do you need? So right now,

depending where you are in the world, there's different regulatory drivers. There's aging infrastructure issues. We're really trying to work with utilities to bring the whole thing together, the whole one water solution. Trying to look at everything, not just the treatment plant, not just the waste water, but the source water distribution, and trying to get them to build that integrated approach to how they solve their water needs. [00:16:30] I think Eleanor mentioned it earlier about people, policy, that's one of the challenges we have even within water utilities in the world, is getting everybody to play nice in this sandbox, with the neighboring water utility, so that they can see the same solution might be better on a larger scale and a smaller scale.

So that's what we do. We provide solutions, we try to provide low cost sustainable solutions that are lifecycle based. So we might look at convincing somebody to put in a little higher [00:17:00] capital cost project that's going to be more sustainable for 30, 40 years versus 20 years. But you need to have the right mindset to understand that you may pay more now, but long-term, your people who are going to use this facility, they're going to benefit in terms of your constituents, and people who get the water will not pay that much more for it.

So that's how we try to work with the utilities. We can bring a lot solutions to the table. We try to get everybody to understand, [00:17:30] we do a lot of cost-benefit analysis, and I think now we're adding a lot of cost benefit with a lot of socioeconomic issues and equity issues to that too, and societal issues. It's like, sometimes, one water utility I worked within years ago, we worked about, how do you... The water has to be the same, no matter where you live in the service area. So you have to bring the same solution, and there's equity, and now it's a [00:18:00] bigger deal in terms of people really, really understanding the significance of this equity. So we're working with them to provide good equitable solutions to all of their constituents, not just the ones who can pay more money, but the ones who all need safe drinking water to sustain life.

Paul Thies: Eleanor, Russell touched on this, that need for collaboration and getting the players to all get along and be able to see the vision of responding to the greater [00:18:30] good, and aligning their efforts such. Then you mix in this COVID-19 pandemic thing that people are talking about. So what are some of the success stories of collaboration across various water industry players that you're seeing in responding to the pressures caused by COVID-19?

Eleanor Allen: Well, that's a great question, Paul. A year ago, after we found our way from swimming underwater to figuring out, "Okay, now what do we actually do now that the world's turned upside [00:19:00] down?" Now I would call it a silver lining. I didn't really realize it was happening at the time, but in our COVID response, we've grown a lot closer to the global health sector. And how this manifested itself was, we got a lot of requests from our district governments for help with immediate response. So we developed a program about readiness response and then resiliency. So how can we just help get out PPE, spread the

word on [00:19:30] using soap and sanitizer, get masks distributed, so really basic stuff. We had, through our district service wash offices, with basically the rural utilities, we had a network that really connected everyone to the last mile.

So that became this network of communication that hadn't been used like an emergency response before, super effective. And then we realize that this isn't just a one time thing, right? This is about learning [00:20:00] from COVID to get ready for the next epidemic pandemic, because there will be one. So the first responders are the people who are at the water points, like either the community service points or the wash offices, and then really learning what worked and what didn't work when people couldn't, if they were sick, they didn't have the revenue to pay their rates. So how did communities deal with that? And each community's a different story about deferring rates or having different ways to keep the system running. So they still needed revenue coming in, [00:20:30] but they were also able to adapt to their communities.

And then on the bigger picture, we've traditionally worked at the national levels with Ministry of Infrastructure, Ministry of Water, Ministry of Environment, Ministry of Finance, but now, and then health was always about getting service to health clinics, but not working with the ministry. It was just about clinics and schools, and same for Ministry of Education. But now, moving forward, it'll be a lot more about not just hygiene, but health and hygiene, and how do we have a much more encompassing approach to global health? And this [00:21:00] has led into our tenure vision Destination 2030, which Jacobs has been part of as one of our supporters, looking towards the end of the SUG phase. What does this look like for the world?

And on the health side, it's really about measuring our success through better water and sanitation service delivery, not just about access and sustainable access, but about the more nebulous metrics, like improvements in health, and improvements in ability to stay in school. And those are where we [00:21:30] don't directly measure that, because we're not directly responsible, it's more contribution. But we're trying to figure out how we can show how communities improve, because we know they do. It's just about, how do we show that that economic and health impact of improved water services can improve entire communities? So that's a shift we're making as well.

Paul Thies: OK. And then in terms of shift, how is the water industry leveraging things such as circular economic thinking to increase water reuse and sustainability?

Eleanor Allen: [00:22:00] Well, again, for us, it's more on the fecal sludge reuse, because we do a lot with the non-sewered systems. And that is a huge opportunity, by the way, because most of the world doesn't have sewers, but those of us, including myself, who grew up doing sewer systems, it's pretty nice to have a sewer, but most of the world don't and probably won't ever. So really thinking about how do we get services to non-sewered areas, a lot more complicated.

And then in water reuse, I would say along with that, since we don't [00:22:30] do a lot of water reuses about water conservation, which we do a lot of, especially India has a whole program right now on getting the national government, pushing getting household connections for water, but they don't have enough water. So it's also about raising awareness on conserving water and reusing water and becoming water aware, which is what we'd like the whole world to do, because I grew up in Michigan taking water for granted because I lived down the street from a lake and from the water treatment plant. That's a nice little bubble, [00:23:00] but it's not most of the world. So water awareness conservation, then reusing gray water in our case, and then also reusing biosolids, and then really leveraging that across the countries where we work, not just the rural areas, but we do a lot of work now in the periurban slums, which don't have great services. Those will continue to grow in the circular economy thinking as well.

Paul Thies: And then Russell, finally, where do you see the drinking water sector headed in the next decade?

Dr. Russell For...: [00:23:30] I'll jump back on the circular economy thing in terms of, is it more sustainable? So we're looking at a lot of alternative energy, renewable energy sources to help power the water utilities, because water utilities use a lot of power. Unless you're fortunate enough to have a lake on a hill where you can flow that gravity to everybody else, you're usually pumping a lot of water around. We have to add chemicals to remove the contaminants from the water, [00:24:00] and we formed this residual process that we had to dispose of. So looking at renewables that can help power these facilities that really go a long way to do that.

I think the other part in the future, as I mentioned earlier, the digitally, talked about the digital market, is the ability to utilize data, to be more predictive, more machine learning, more artificial intelligence, more optimization. There's a shortage, not so much a shortage, [00:24:30] but there's a deficit of people going into the water treatment in terms of trained operations personnel on all sides of the water industry, and that institutional knowledge, that's going away as people retire. So we're doing a lot of machine learning, looking at the data, using these spectral analysis to optimize coagulation and show utility. They can use 10 or 20 percent less, or make a predictive change because the water quality changed. And although you did it this way for 20 years, maybe if you do it this way, you'd [00:25:00] still get the same result, and actually spend less energy or money doing it.

So I see a real strong focus going down more sustainable, more machine, more digital path, more artificial intelligence. We're doing a lot of predictive modeling inside facilities in terms of just doing predictions, which is critical, and I think that's where the industry's going. And obviously we still need address the regs, and I think Eleanor said it best. We still need to help address the world water [00:25:30] problem, which is a shortage of water. People who live in countries

where there's abundance of water take it for granted, and what you need to do is see happens when you lose power, or when you travel somewhere and the country doesn't have water.

So, as an industry, I think we're going to look... Looking at, as it goes back to the one water approach of it's all connected, and we just can't ignore... I can't ignore waste water. I can't ignore storm water. I can't ignore water [00:26:00] resources and reservoirs. It's all connected. And there's only one drop of water, it's the same water that we've had for millions of years, didn't go anywhere. So we just figure out how to use it more efficient. So that's where we're going.

Paul Thies: Fascinating. And it's interesting how it all is coming together, the power needs and the environmental needs. And then, ultimately, it's that political will to make sure that people have access to clean drinking water. If we start [00:26:30] there, then we can make it happen. You know, we have the wherewithal, we just need to do it. Eleanor and Russell, I really want to thank you both so very much for joining me today. It's been a fascinating conversation. There's a lot of great work being done in the water industry. And so I really appreciate your time and insights, and really look forward to seeing all the great work that you're doing in the years ahead.

Eleanor Allen: Thank you, Paul. Thanks, Russell.

Dr. Russell For...: Thank you. Thank you, Eleanor. Thank you, Paul.