# 2021 Design and Construction at Hazardous Waste Sites Virtual Symposium

## *Sponsored by: Society of American Military Engineers (SAME) Philadelphia Post, and US EPA*

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https://clu-in.org/conf/tio/dchws16_040121/

## Closed Captioning Transcript

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Good morning or good afternoon, depending on your time zone, welcome, you should be joining us for the third or final day for the spring 2021 virtual symposium . The broadcast is scheduled to begin in just a moment at 1:00 Eastern. We have opened up a preliminary audio feed just a few moments early to allow those of you who have connected to hear some sound, adjust your settings locally and be prepared to start the third and final day at 1:00 p.m. at the scheduled start time. For those of you who have connected early, I will draw your attention to a small Q&A window that you have access to. If you are able to hear the sound of my voice, I would greatly appreciate it if you could send a quick message into the Q&A window and just let me know how the audio and visual art through at your location. You are welcome to say hello. I love it when people say hello to me in these webinars. I'm seeing a lot of messages coming in, fantastic. Thank you so much. It does look as though we have reached the official scheduled start time so I'm going to go ahead and turn on the recording for our session and with that, I will officially welcome everyone , again to the third and final day of the spring 2021 design and construction hazardous waste site virtual symposium, we will become a concluding this week's symposium with panel number five . The sessions have been sponsored by Society of American military engineers, the Philadelphia post-and U.S. EPA. I will be serving as the technical moderator in the background for our session and I will be walking through some opening instructions and introducing you to our session before turning it over to our primary speakers and panel moderators. For each day, remember, you have been directed to the same seminar homepage and I wanted to remind everybody on the seminar homepage, is important information where you can download presentation materials so if you missed an earlier presentation or looking to follow-up, I encourage you to visit the home page to learn more about our presenters and access their materials as well as provide feedback for any of the days of the symposium. Just click the red button to join the webinar, I will walk you through the simple check-in process and join us in Adobe connect for the broadcast. We will be offering online through Adobe connect although we do strongly encourage you disconnect from the VPN or remote network if possible for an optimal broadcast. If that does not work, remember we have posted the slides and you can simply download them and follow along by phone. The audio should be coming through your speakers or headphones. I would encourage you to look at the speaker icon at the top of your device which has important controls

allowing you to adjust the volume level in which device is extending the sound in the Adobe platform. Take a look at that closely and if that doesn't represent audio problems you have, please let me know, I would be happy to troubleshoot or offer one of our toll-free calling lines. Everybody is automatically muted and I do encourage everyone to remain muted, and minimize any background noises or audio disruptions. While I would love to have all 300 of you talking with me at once, unfortunately with this volume, it's so hard to take verbal comments and questions so we do encourage everybody to please stay muted and take advantage of the Q&A window that you see in the lower portion of your screen to privately submit comments, questions and report technical difficulties at any time.

I just wanted to remind everybody, the window will be open throughout the entire session and you can use that window to send questions. You don't need to wait for designated Q&A breaks, you can send them at any point and when we pause , presenters and moderators will be able to read questions out loud on your behalf so they can verbally respond. Today's session is being recorded, just like the others in this series and you will get an email with information on how you can access and replace the symposium online in about one week. I'm going to ask you to stay with me until the very end of the session today because I'm going to walk through some very important final reminders about seminar certificates as well as PDH is, so please stay with me until the very end, so you understand the difference between

the certificates and the PDH. On the screen, you should be working with an interface similar to this although, things can change. I'm going to take an image of one of the actions that we have, we get to ask Paul questions. A number of you have said you really missed the opportunity to interact with your fellow participants in the panel. So I'm going to offer you an opportunity at the bottom of the screen to share a little bit with other members of the panel , as well as organizers and those who are joining us virtually. Some of the things that you have enjoyed in this virtual symposium. Go ahead and feel free to use the window, your answers will be visible to the other members . We will be taking advantage of some of these other virtual interactions, opportunities throughout the broadcast. I wanted to remind everybody to please be sure to keep your eyes peeled for different pop-ups and engagement opportunities throughout the broadcast. I'm seeing some responses coming in. It looks like people are very happy that they can attend and there's no travel and they like the topics, so that is great, feel free to continue to chime in . Remember, each of you have a button at the top of each window in Adobe, specifically the one that might be most helpful is the one that looks a bit like a box with brackets around it, that appears in the upper corner of each window on the screen and you can use it to make the window larger as needed. You may find it helpful to enlarge the slides and if you need to get out of the enlarged view, simply hit the escape key on your keyboard and that will allow you to minimize it back down. With those very quick technical reminders and some of these contested comments coming in, I wanted to remind everybody, for those of you who are popping on, if you were not here earlier, we did want to welcome all of you and just remind everyone here that the goal of the HWS platform is to facilitate open and frank formation exchange in the private and public sectors, they offer a variety of forums describing current practices, approaches

in the area of hazardous waste design and construction. This enhances communication networks amongst our stakeholders that are involved in the cleanup. We do have a fantastic turnout for this session. We've had over 415 registrations , I continue to get requests for people to join and you will see on the chart that a large sector coming from the federal government, we also have state regulators and members of the AEC community and other members of academia. There are nearly 90 members who have registered to participate in almost, part of me, 118 young professionals. Geographically , we have a nice division, we are happy to see the wide spread of participants including two international attendees but is helping to ensure that the DCHWS message is reaching a broad audience. For today's agenda, this is our final day and April fools, it's not really April 2, it is April 1 but, here we will be starting with opening remarks just as we have with others in the symposium. Then we will move on to panel number five, the topic will be improving stakeholder collaborations, looking at case studies. We will take another break, and you will be able to enjoy a word from some of our event sponsors before we move on to the final event in the symposium, and that is the young professional event while looking at moving up to project management. At the end, closing remarks. For those of you who have questions about PDH, I will be talking about those at the very end today. The panel format typically involves the moderator with three panelists, and they will be providing a short 20 minute technical presentation with time for facilitated Q&A at the end. As I noted earlier, you have that window, you can use it at any time in the lower right. And I do not want you to wait until the brakes, send them as soon as they occur to you and our moderators will try to get to as many as they can in the time that we have allotted today. I did want to be sure to thank the DCHWS symposium committee at our event sponsors, EPA and technology innovation and the Philadelphia post in the DCHWS committee. We want to say thank you to our event sponsors . We also have large business sponsors as well as small business sponsors who help to support the virtual symposium.

With those overviews , and I've had an opportunity to scroll through some of the dialogue that is taking place within our virtual participants hear about the things that you have enjoyed in the virtual symposium, this has been great to see the input. Let me go ahead and shrink things down on the screen and closeout the opportunity and it's going to be my distinct pleasure to introduce you to today's primary speaker, Rick is the chair on the community of interest, and project managers. He spent 35 years of experience in the development of implementation and management of site remedial investigation compliance and remediation projects. And has technical work develop an application of innovated coordination. He also has been involved in remediation technology development. He is currently serving as an instructor for the civil and engineering department in the gradual level of remediation at Carnegie University. As noted before, he is the chair for the environmental community of interest. With that, I'm going to turn it over to you to share your opening remarks. Thank you . Welcome everybody, it is an honor, because the DCHWS conference is exactly what our mission is at SAME. Our mission basically is to encourage and support the interchange of ideas in the industry and government and it involves standard for that collaboration . We bring people together to solve challenges of the environmental area and help the architect,

engineering and construction community. Meet our national security meeting needs. The mission statement is exactly what this conference is about, and it's exciting to see the Philadelphia post and EPA collaborate for this many years, so exactly what, before I say that, other communities of interest in SAME include international group and leadership group, and architecture group, resiliency group, a facility management COI and we recognize the important need for stem, so we also have a stem COI and engineering camps, SAME sponsors to the Marines, Air Force and Army and the Navy through the engineering commands, summer camps for high school students to go and learn what is like to be an engineer, and we also recognize the need for young professionals to be interchanged and interacting with more seasoned folks and develop their skills in networking. That is another COI that is really important to us. And I see a lot of young professionals attending this conference, which is great. In terms of the environmental COI, we have a steering committee which tries to capture the main focus areas that we are involved in. We are all volunteers, we have a cross-section of government as well as architect and engineering folks involved, and we deal with webinars as one of our major outreach forms for exchanging information. We sponsor quite a few webinars and as for the other COI's, and my closing remarks, I will get to that again, and we have the training and engineering conference, this is an annual event that is being held virtually this year and hopefully next year we will all be together and we get several thousand attendees. It is an overview of all the different COI's in SAME and some really super keynote speakers , many of them are from past

military experience and we also get to interact with some of the higher ranked in the engineering community in the department of defense as well as the Veterans Affairs that is involved, the U.S. Coast Guard, and the public health service. They also get involved. We also have a cochair for analytical services , we look at that as a very important area. In the problem, probably the biggest area we have is emerging issues, as well as other emerging areas, we have folks of remediation , new techniques , we recently had a webinar on horizontal wells and that is my background, we also have knee and compliance cochairs. Our focus is outreach, we have several folks who reach out to social media as well as develop a network of ECOI members , so we are using social media also. Our webinars cover a wide range of topics and we also have a monthly call, the third Wednesday of the month, we usually try to start off with a 5 to 10 minute presentation but it's not advertising but it gives folks the chance to reach out and tell us what they do. We also review the abstracts, anywhere from 30 to 40 abstracts and we review those and select them for the presentation conference as well as look at some of those abstracts, and if they don't make the cut to the conference, we welcome the submitters to maybe do a webinar. We have also started with the liaison program , having posts contact us and say, we need a speaker or what can we do to address PFAS or climate change issues, who do you know? Within the community, we will reach out and if it is a scenario that is not within our community, we will collaborate with the other communities like resilience and energy sustainability and recently, SAME started a task force which is kind of neat because it's not just occupational health, it is environmental health as well, it ties into many of the COI's together. One of the other things we instituted recently was having liaisons amongst the COI's. Resiliency

issues in terms of climate change and facilities also have a major impact on site compliance and remediation, so there's a lot of crossover and dialogue between the two. The same with energy and sustainability, we had some presentations on sustainable remediation in the past. So I guess the word would be cross talk amongst the COI's. We also have small meetings and community meetings set aside for an hour or so to meet in person, or at least in the current way we are doing things on the same website at the same time. The webinars as I mentioned, this is probably one of the biggest things that we do to reach out to folks. We had several PFAS webinars, we had a couple webinars on NEEPA and last fall, on COVID and wastewater, looking at wastewater as an indicator for COVID contamination and the most recent was a presentation by a vendor on horizontal wells for remediation. We get anywhere from 30 to 120 folks on the webinars, the PFAS had a little bit more , and the next webinar coming up in April is going to be the night United States Army Corps of Engineers, presenting what they do in the environment a workspace. Once again, for this information, it's not hard to find, you can go to SAME .org, communities of interest , the environmental COI is there, as well as the others that are available for members to participate in and if you have any six specific questions, please feel free to direct me , you can reach me , if you go to the COI sub page on the SAME website, my email is there and we welcome everybody. If you have an idea for a webinar, that is another thing we welcome, we can help arrange a webinar for you through the national SAME
network. I think I have covered it and I appreciate the opportunity once again and I guess this is really more than a gold standard, this is the platinum standard for the government and EPA and SAME interaction. Thank you.

Thank you very much. I appreciate those words and I have seen lots of comments coming in from people, appreciation the remarks , thank you very much. Let's go ahead and move on with the day , I will encourage our audience to go ahead and chime into the Q&A window and let me know if you can, if you're ready to go, you can type in a virtual round of applause for panel number five if you would like as I'm introducing them. It is my distinct pleasure to introduce you to your moderator for panel number five today, we are bringing being joined by Todd Bragdon, a vice president and federal client service later with 25 years of engineering experience in project management, environmental investigation and remediation. He is a professional engineer, with remediation experience including abandoned mine environmental assessment and cleanup projects for various government clients including the state of Colorado and the U.S. EPA
regions 6, 8 and 10. His responsibility is include directing projects that evaluate and select cost-efficient remedial technologies, pilot testing designs and implementation and designing, preventing and providing construction management report. He has a double major in engineering from the University of Colorado. It is my pleasure to introduce you and I'm going to turn things over to you.

Thank you. Welcome everyone to the third day of the DCHWS conference, I'm Todd Bragdon and I'm the vice president with CBN Smith in Denver.

It is a pleasure to be the moderator for panel five, our panel today will focus on the need to consider and improve stakeholder collaboration during remedial design and remedial action projects. I'm sure many of you have faced challenges with coordinating and managing multiple stakeholders during project execution . Stakeholder insurance can be varied, and include technical, regulatory, and other intangible challenges such as environmental justice issues. How you manage your stakeholder interest and concerns can be a critical success factor, for Superfund projects and there are multiple agencies, including redevelopment, reuse parties, active and concerned communities . And you are going to hear how some of the panelists today have some fantastic case studies on how they coordinated with and successfully executed projects with multiple stakeholders. So, to get us started, we have a couple of polling opportunities to kind of prime the environment and get the engagement going. So if you would, please take a look at the questions for the first one is, what are the biggest impacts to your projects related to stakeholder communication issues. There's a few options there for you, and again, we would love for you to participate in let us know some of the challenges that you have had. Our second polling question is more of a whiteboard sourcing question, again, it is open, and feel free to put that in as well. But, also tell us about your biggest challenges as stakeholders. Looks like many of you have had these challenges before with take holders -- stakeholders. As many of you can see, the various interests from stakeholders can really challenge project teams with technical needs that you may not have encountered before, or regulatory requirements from the local or state perspective, and perhaps you weren't anticipating . I like the polling technology by the way, nice work.

Thank you, and I will just remind my participants very quickly, remember, if you have gone full screen, you want to escape out of that so you can see them. For those of you on mobile devices, you need to click over to the pool window to open them up. And for the presenters in the background, you do not want to touch those, you want to leave them small so the answers can be shown. All right, go ahead. >>

Thank you. I appreciate everybody being active on the polls and engaging, I appreciate the feedback here about educating stakeholders to ensure they understand the process , and again, that is a very common challenge that many of us face, that many of these stakeholders may not be familiar with the process. They may have different concerns but, perhaps has been an issue for a long time regarding their concerns on the project area or other concerns within their communities. And it is important to have an educational discussion from the program's perspective and the requirements of the program, what the program can and cannot do, versus some of their concerns, so I appreciate you mentioning that. Let's move on. She has already cover the rules of the road once but let me mention it again, we very much want your engagement , the panelists this afternoon will consist of three presentations, and will each discuss a case study regarding stakeholder collaboration. Following the panel presentation, we will have a moderated Q&A session that I will lead. Please feel free to ask questions at any time, using the Q&A toolbar. We will be monitoring and collecting your questions to address them during the moderated Q&A

period , at the end of the three presentations. We encourage you to be active, please ask questions. We appreciate your active collaboration with us. With that, let me begin by introducing our first panelist. Our first speaker is Mr. David Russell, a senior program director with AECOM in the Philadelphia area, over 40 years experience in wastewater engineering, hazardous waste site characterization, wastewater and hazardous waste sampling and monitoring, innovative and alternative treatment technologies, design build for groundwater remediation and environment of compliance and permitting. He serves as a remediation area leader, at the AECOM Northeast region . In this presentation today, titled application of multiple remedial techniques and approaches at a former pharmaceutical manufacturing facility, please welcome David.

There we go. Good afternoon everyone, I'm really excited today to present to you a success story. Often, our goals and remediation are to remediate a site to the point where it is safer for the environment and public health and when we accomplish that, we feel it is a great accomplishment but even greater accomplishment when we can remediate the site to the point where it can be transferred to a developer and developed into a useful property. And this is a case study on what I'm going to present today, and what exactly happened at the site. We developed a strategy, applying multiple UNIX at a pharmaceutical manufacturing facility in northern New Jersey. What you see , the redline is the property outline of the plant. Then to the Northeast is a river that is adjacent to the plant and also brings your attention to the southwest, across this road, it is an active University that is thriving with college students and was very interested in this property once, we talked about development. So, those things will come into the case study. So we put a timeline together for the project when we were presenting it to the agency, it was a pilot plant facility with many buildings and square-foot of operations. There were expensive incremental resolutions that were already conducted over the last 30 years. The investigations were initiated in 1984 and another key execution of an administrative consent order with the state agency, which required a groundwater extraction and treatment city system be installed to prevent any migration to the adjacent river we saw in the previous slide. EPA region two was also involved and initially drafted a permit, but as the project proceeded, they referred to early monitoring and approving specific items, because this is technically a state led site, but we did have EPA oversight and conditions. So, AECOM became involved in May, 2000 , that was 21 years ago, so I have been involved for quite a bit of time. They were getting frustrated with the agencies because it seemed like they were focusing on the specific areas of concern as opposed to the site wide lists associated with the site. They put together what we call the company has of site conditions report that showed the investigations that were previously conducted at the site and try to focus on the risks so we could concede a remediation plan to bring it towards closure. So, we identified specifically the visual contaminated areas that needed to be addressed and those that were specifically and essentially in hotspots of the site that could be remediated and progress towards closure. So, we did pilot testing associated with those, we got acceptance by the EPA going forward, which was critical and then we eventually moved into full-

scale remediation in the mid- 2000. As we get further into the 2000's, obviously based upon some intrusion investigations, we identified an additional RCA that had to be added to the program. Eventually in 2010, this was all going on, the responsible party decided to close the plant and as a part of that, they were looking to possibly move the property so that development could occur at the site, so to do that, we had to move forward with the remediation program aggressively. This gives you an earlier view from the corrective action , and areas of concern. As you can see, most of the contaminated areas, where the chemical storage was occurring in the northern part of the property. You will see this orange, snake like groundwater extraction treatment system that was installed to prevent migration of groundwater into the adjacent river. So, this had to be on the system that used pumps that are spaced very closely together to be able to create and capture his own to prevent migration, and we confirmed that it was effective to prevent migration which was a critical factor to moving on. You can see down here, this area that is shaded, this didn't have any impact on the environment. Using the conceptual site model, we identified we had about 35 feet with approximately 15 feet of saturated zone, and another bedrock with a significant upward gradient and this is an advantage to us to prevent vertical migration and what was occurring at the ground extraction system, we saw that we were covering a separate gradient, that helped the flow direction to prevent migration to the river as well as across the river to the other side of the property. We got together with the client and decided, based upon what we developed, we try to develop a site remediation strategy, we presented this in a meeting to the EPA. And got their acceptance which was critical. We monitored it and updated strategy as needed.

There was an administrative consent order, we had to maintain compliance which specifically said the groundwater system had to be maintained and how to prevent migration so that was a creek critical -- key critical component. The typical ones you'll see, we had aromatics, we had significant alcohol concentration in the groundwater, including methanol , the solids were not in the driver of this site, they were minimal but we do see one emerging as a contaminant as we proceeded. This was a pharmaceutical product not associated with stabilizers in different sites, but in the pharmaceutical business, they use one in the manufacturing process. So we developed remedial objectives and screened different technologies that can use these. And reduce concentrations . This is just showing the different RCA's that came out of the CSCR , we used modeling to develop the objectives for each of these RCA's, and seeing that they were migrating for the river, those that are further away from the window, we need to have more significant remediation. As you can see, one of these hotspots of course was just adjacent and upgraded around the river, so that was the key focus and these three are the key ones were the main ones we had a focus on. These, we were able to quickly address through the program. Before investing in all of this, we have to do a cost-benefit analysis .

So we can presented to the higher ups in the company to demonstrate as well to do this. We did the evaluation and came up with the cost savings, we could reduce the operating period up to 15 years to prevent, get a return on investment. We did a pilot test to confirm the feasibility and develop costs, more defined costs. And we got together and realized that the ground extraction system has been operating for

many years and it was beginning to get to the end of its life. There were many upgrades needed, so anything that could be done in these areas to reduce the need of the extraction system was a bonus and more cost-effective.

We went out and conducted pilot testing of four of your conventional remedial technologies including dual faced instruction and enhanced prior remediation . At any time, we have our own suite of pilot testing units, so we can attach these units onto a pickup truck, take them out to the site and use the existing modules in many cases. We can run the pilot test very cost-effectively. The one on the left is the dual faced extraction unit, that is a pump that can back things up to 30 Mercury, and a separator as it is a multi-phased extraction pilot test. We can direct the streams to treatment units, as needed. The one on the right is the compressor trailer that we use, in that case, we would have to [Indiscernible] we can do that for the private testing in specific areas to develop design parameters. Following the pilot testing, we decided to use extraction , to address the area with high mass, including what was addressed immediately on the pilot study , and for those areas with alcohols and with other concentrations, we decided to go with enhanced sparging , from early two prevent the tie up , and as we proceeded, we came to realize that because of the tiling presence in the groundwater, it was by integrating which has been demonstrating . As the levels increased, it was interesting that we had definite lines of evidence that we were treating it [Indiscernible] then we used the enhanced sparging with the date of his attraction in a couple of areas where they have the high mass removed and moved into bio sparging as a policy technique as we move forward. I have a picture here of one of our trailers we designed and as you can see, there is one that we were able to apply

11 dual faced extraction wells in this manifold which is quite a challenge to design but, it was effective throughout the site and to be able to do it with one little pump was very effective at sites where they used it for multiple extraction wells. So, we constructed these trailers for the client and they purchased them and they were under their ownership. On the left is the dual faced extraction, the others were separated and we would just pull up two wells we installed, we would use pipe connectors and mostly a bunk around and were able to effectively apply this to various RCA's you would use for various units. We had a compressor unit that was able to apply to the compressed air and flow, and as you will see in the next picture, we used these carbon units for the Weber treatment of the dual faced extraction system, so we can easily change out the carbon units as needed. Then this is a picture on the right of the bio sparging manifold, with regulators and heaters so we could apply to multiple valves as well. And we also had the capability if necessary to add nutrients if we saw nutrient depletion during the operation. We can add nutrients to the airstream if required. When we were running dual faced extraction, not at this site, but this design was used at the sites we developed and other sites, we are running a pilot test with the dual faced system and with multi-phased extraction systems, it is adjustable, so you have product at the ground interface, you can split the product up and reuse that and as the product is reused, if you wanted to deliver the area to the high vacuum you would lowered to the point of the bottom of the well so you could pull air through not only this well and groundwater concurrently,

that would be one way of recovering it. Doing a pilot test , we were getting really good recovery of ground to air flow . We just decided to manifold that into the system to see if we could possibly increase the flow with displacement of air, similar to what you would do when you pull the vent up and get much better flow. We identified , when we would manifold this into the other weld, the extraction well that was primarily covering groundwater, we are pulling contaminated air , and we saw an increase in recovery and flow. This was a design we developed and we used it at the pharmaceutical plant to optimize the system. So, since the same extraction system for clean air but in this case, we were bleeding in contaminated air, which gave us a higher increase for recovery . So this was a custom design that we developed and implemented at this site. We would maintain the ground extraction system, and a few objections we developed so we would meet criteria and hopefully in the future we will be able to shut down the ground extraction system and go with an institutional control in New Jersey that identifies the contaminated groundwater that is present so that no portable wells are in use, so the institutional control can be used. And in 2010, the client decided to cease operations and look to sell the property and close it out, so we remediated things, and this checks into the New Jersey EAP , any facility that causes operations before can be transferred or sold needs to have a remediation program in place with the least financial insurance for the cost of the remediation. So that the financial insurance can make sure that when it is going through the remediation, that it gets remediated. Not only did we hit [Indiscernible] and our client very proactively, when they wanted to sell, decided to do a due diligence assessment and the primary reason they were doing their own due diligence assessment for purchasers, the clean portions of the property, that they really were clean. They went out and into phase 1 and phase 2 assessment of the area that were not part of the operation, to demonstrate to any purchases that they were clean portions of the property that can be developed very quickly and used as needed. So it's a very proactive and effective need of making the property more marketable. Because we are trying to sell the property, we had to close two for storage facilities as well as issuing response action outcomes, and you had to get New Jersey to assume permits for not only the sewer but the groundwater including the pump treatment system, so that the property would be for sale. We were continuing to do this while we were doing this whole process and essentially racing to the finish line to make this facility possible for sale. You know real estate, location is everything and when developers saw the University across the street that had invested interest, as well as the nearby New Jersey transit train station for commuters, they were very interested in it and we started to look at different systems . My client wanted to see if transfer was possible so we are looking at very sophisticated developers. In that case, the developer would end up assuming our strategy with the EPA. This developer was interested, and as you can imagine, we had multiple stakeholders and issues. We have the responsible party, EPA, the developer as well as the college that had the invested interest so we had to work with multiple stakeholders to get through. Demolition was a key issue because the property had significant asbestos issues, so it had to be worked out between the responsible party. Financial insurance was the main issue , and we would have to maintain the financial

strength that was in place for remediation and of course, the aromatics, labor was

[Indiscernible] this is a rendering of the proposed development. You can see, because it is in the college area, we are looking at a Panera bread and chipotle , there are some condominiums that were going to be installed and as you can see over in the back of the property, the college's investment, they wanted to have a hall that could be used and incorporated into the design and development so that was one of the requirements. This is in use, as well as other chipotle and other developments in the plant. We went out and took the pictures. This is the home that was developed for use by the college. This is some of the residential properties that were there. This was used by the faculty for residency for faculty that were using the college which is another nice incorporation for the college. One thing I forgot to mention, when the developer brought in this development, the groundwater treatment system had to be relocated. So, they located the groundwater treatment system so the northwest edge of the property blended nicely with the development, it is much more reduced system compared to what was used by the pharmaceutical which had a large plant associated with the industrial wastewater and this is now treating all of the manifolds leading up to this location and now being discharged for development. Just to summarize, some of the lessons learned, one of the keys of doing the site was strategy development, putting together the presentation and showing the agencies in a way that is understandable. We needed to be in concert with the extraction system, with the hydraulic control, we could then move forward. The mobile remediation trailers were made more cost-effective and at one point, we actually did some pulse operations where we would go through one area and once we would recover, then when we would move to the other . Looking at the status quo , they moved forward proactively and

they felt they could close the plant and by doing that, they could have a very effective petition. So it is a true success story from start to finish. Excellent, thank you so much for sharing your successful project with us. Quick question, we have received several questions, we will hold a majority of them for Q&A but there was a question regarding if you could let the audience know what the adjoining college was?

I cannot do that.

Okay, very good, understood. We appreciate it and thank you again. Let's move on to our second panelist, our next speaker is Amy, a project manager in Atlanta, she has worked as a project manager and project theologist for 15 years . Her work has involved site investigation and remediation and over 30 Superfund NPL sites, the Department of Defense facilities and Amy's area of expertise is in sight remediation and advanced site characterization tools. She received a bachelor's degree in geology from Georgia Southern University

and a Masters in geology from Texas Christian University. Amy is a licensed professional geologist in Tennessee, Mississippi, and Florida. In her presentation today is titled using adaptive management to overcome data gaps and stakeholder uncertainty during a complex remedial design. Please welcome Amy.

Good afternoon everyone, thank you, Todd. My presentation today will be about the American Superfund site located in Pensacola, Florida. Which you can see here, in the historical aerial photograph, you can see the past operational structures. Located here are the overflow ponds, if you can blow up the screen, you can still see a little bit of creosote here in the overflow ponds. These ponds were used for disposal of processed ways. Prior to 1970, wastewater and these ponds were allowed to overflow to a spell away through the streets and storm drains of the beach community into a ditch on Pensacola yacht club property. Which led eventually to the Pensacola Bay. The AC W facility treated products using creosote from 1902 until 1981. We used PCP after 1950. Site contaminants of concern are PAH, including PCP, large volume of creosote . There have been some laws for the site, groundwater rods for extraction of 1994, which ran intermittently for 12 years and will shut down in 2011, in order to , pending a selection of a new remedy. Stakeholders for the site include the Sanders beach community , which is surrounding the Pensacola yacht club. Pensacola, Gambia County, and the EPA. Due to the complexity of the ACW site, they have areas of common characteristics which is remedial alternative selection. This red area here is the main source area , which encompasses the formal waste pond. The stratigraphy of the site includes the low permeability clay at about 110 feet below land surface and the selected remedy for CMC 1 . During investigations, numerous borings were installed within the interior or along the alignment of the variable to concern the depth of the low permeability clay. The remedial design includes 1700 linear foot wall to a depth of 115 feet.

This is the extended [Indiscernible] and the remedy is for enhanced extraction, it is separated into two areas, this small area is CMZ 2A and the yellow is 2B which is off the facility. The treatment depth for this area will be up to 150 feet. The facility zone here, it is known to exist from about 25 feet, in the treatment zone, from 30 feet. Precautions in this area were taken to disturb the area as little as possible due to the residential nature of the neighborhood. The design team utilized horizontal lateral which will be required to collect contaminated vapors to prevent fugitive gas emissions to enter the building such as the condominiums which are located on the corner. The steam enhanced extraction design includes over 350 wells which includes steam injections, multi-phased extraction, temperature monitoring points and performance mock wells. Piping for the steam injection wells and multi-phased extraction wells will need to pass on to the road as seen here, for convenience to the equipment compound which would be located on site. CMZ 3 is known as the secondary source zone, located on the facility, which contains soils and soil concentrations for the PCP, selected remedy is a combination of enhanced bioremediation treatment barriers. Design includes the use of an upgraded Blue Line here on the northern boundary, and a combined treatment barrier along the southern edge of the facility. The barrier will provide immediate relief from contamination , effectively isolating the on-site secondary source from the down gradient plume and potential impacts to the Pensacola Bay. CMZ 4 is soil contamination, similar to 2, this is also

separated into two zones. Zone a is located on site and zone B is located off-site.

Soil will be encapsulated into the barrier wall or for long-term isolation in an engineered containment cell . The concentrations in the zone exceed those restrictions but are considered a principal threat waste. Zone B on site includes activation of all unsaturated contaminated soil from three feet, and zone B located off-site would be extubated anywhere from six inches to a maximum depth of three feet . Samples were collected from each parcel to determine the excavation depth. You can see here that the two, there will be two

capped areas and at the end of the action will be one level surface. Discussions with stakeholders throughout the project centered around the height of the areas, the city requested that the design incorporated single elevation surface to accommodate the site reuse plan. To accommodate the single elevation surface , it was determined that a portion of the excavated soil would be going outside the barrier wall, into the engineered containment so, the cap is estimated to be an average amount of 13 feet above sea level. The extended groundwater plume and the combination of bioremediation treatment, this zone was written in the rod as an interim design . As you can see here, the barrier wall is placed at the toe of the bay here. Groundwater would be monitored to assess the effectiveness. Groundwater monitoring will be assessed to the effectiveness and the groundwater treatment , this recommendation reflects the considerations that active treatment should not be necessarily if contaminant reduction is achieved following implementation of source area remedy . Based on conversations with the EPA in the state, the preferred sequencing is to implement the residential soil activation first to help maintain outstanding relationships with the community. Since remedial action is to be followed by treatment of the source areas. Which includes the steam enhanced extraction and the barrier wall, and the last remedy to be implemented is the groundwater bio barriers. During the design effort of the soil contamination area outside the barrier wall, it was noticed that this area overlapped with the proposed thermal treatment area. Due to this, the team had to revise the sequencing due to the remedy, sequencing of the remedy and limitation were the design team developed multiple implementations as discussed. The designed document was broken into three separate deliverables, corresponding to the likely implementation phases and stakeholder priorities. Once the collaborative decision was made regarding scheduling, the three designs were completed.

Shown here is a schematic of the site, this was just one of the ideas. It was known by the site team that the overall goal of the site was for reuse as a recreational park for the community. The team had multiple meetings with stakeholders to ask questions about the reuse requirement such as what should the end elevation of the cap be? Will there be lighting required ? Is utilities required? Where would parking be required? Any building foundation needed ? The city had pulled the surrounding local residents for ideas, they even held a local community college, they had multiple teams that did different designs. This is not the reuse, but it just shows one of the teams designs which included an amphitheater and a Park. It was just a very interesting project to be involved in to see all of the ideas that were considered. The beach has intentionally left the design as flexible as possible to

allow for enhancements by the selected RA contractor. Stakeholder engagement activities, which were held throughout the process include assisting EPA with property access, within the Sanders beach community, EPA and FEP throughout the FS and remedy selection process. Assisted EPA with a proposed plan and record of decisions and meetings with city officials to determine site reuse plans throughout the remedial design process. That concludes my talk.

Good, thank you Amy, wonderful. And let's move on to our final Spiegel for panel five today, our final speaker is Dr. Kim, a senior project manager in the Pennsylvania office. He has Masters and PhD degrees in environmental engineering from the Illinois Institute of technology in the University of Pittsburgh. His expertise includes landfill cover and gas collection system design , site remediation and regulatory compliance support. Dr. Kim has worked on many Superfund sites, emphasizing consensus-based solutions, publicly sensitive sites. He has extensive expense with remedial investigations, remedial design, water and wastewater treatment, and landfill gas management strategies for both public and private clients. Dr. Kim will present today on the design of the humid climates.

Thank you, good afternoon everyone. Today I'm presenting for one of multiple units for [Indiscernible] and talk about how we collaborated with the stakeholders to make the designs we start with a background.

Okay. The one area Superfund site is located in Philadelphia and other counties in Pennsylvania . It is not too far from the Philadelphia international Airport. What you see at the bottom of the picture is the airport . It was placed in June, 2001 in the landfills . The site has been investigated under three operating units, and it is being invested by a group of potentially responsible parties under EPA's supervision. In other operable units in the study. The activities are ongoing. The record of decisions for OU one, was issued in 2014. The remedial design was completed in December 2018, and it started in March, 2019. This presentation focuses on the work associated with RD , and also briefly touch on ongoing RA work.

Clearview landfill was a privately owned and operated without a permit from 1950s until the 1970s by the Clearview land developer and Corporation and used for disposal of municipal and industrial waste collected from the city of Philadelphia and portions of Delaware County. Former operations initially began in Delaware County land parcel , but also occurred on the adjacent property located in Philadelphia County. When the landfill was closed in 1973, it occupied approximately 65 acres. The historical footprint includes the landfill itself, the recreational park east of the landfill, and a portion of the east neighborhood. As shown on this slide, the landfill was surrounded completely, a large portion of [Indiscernible] therefore has high risk of inundation. One of the major challenges was to design the cover . In general, if we need to demonstrate those conditions , not within a 100 year floodplain. In addition, it is situated next to the creeks . As a result, the entire western bank of the landfill has been severely eroded. So, we designed each of these features to stabilize it and protect the integrity of the landfill. This is a snapshot of a remedy.

We needed to design components including the area shown in gray, two large wetlands which are being used during construction , and between the two wetlands to catch the runoff landfill. And restoration features on the quick bend. A large role on the quick side of the landfill. We needed this feature because the site is very stiff, as the gradients showed. We tried to avoid major cuts to minimize risk to construction and prevent filling in the floodplain. We also designed pump stations to capture shifts around the quick bend. Lastly, we designed all sides [Indiscernible] there was uncertainty on the emerging contaminants such as PFAS. EPA [Indiscernible] before I proceed, I want to acknowledge federal stakeholders that provided technical support for the project. Without their support, we could not complete the design. First and foremost, I want to say thank you to EPA, it was instrumental in our design and implementation. Specifically,

they helped in timing and establishing resources , and the engineers helped relocation of on-site and access easement for the parcels. U.S. food -- U.S. Fish and Wildlife Service provided technical support for each of these stabilization features. The commission allowed us to use land for resources. Lastly, EPA also started a waste and emergency response team, using incremental sampling technology, statistical data analysis and fingerprint analysis for determination of background contamination. There are more parties supporting the project than what you see here. I appreciate all their support for the project. Community involvement is an important element in the EPA processes.

They developed a partnership between the community and the agency. So we will evolve and be modified as the cleanup processes continue. In a similar context, we also developed the community health and safety plan to inform the community of the work to be done that is a part of the cleanup. So, there are procedures that are put in place before and during construction as well as contact information. The advisory group was formed in 2015. EPA also awarded technical assistance grants for the community . Currently, there are 15 resident members, six expert resources and [Indiscernible] they usually meet on the second Wednesday of every month, the members informed the other residents about the project and other information. The task group was informed about the engineering design. Lastly, they supported the EPA to [Indiscernible] it currently accommodates up to 1000 people and provides more project related updates by email, face call and text messages.

First, we should demonstrate ,

[Indiscernible] to maintain less than 33% for stability, while minimizing significant cuts to protect workers from exposure risk during construction. We also designed other features to avoid

[Indiscernible] the first pole of the water balance, the permeable layer , relying on properties to store water , either evaporated from sources . This is illustrated on the left. Compared to conventional systems, it is expected to be less costly and more importantly, more sustainable. As demonstrated by environmental analysis performed during the RD. To determine specific requirements for the EP cover, we round the water balance model with various combinations of parameters such as soil type and vegetation types, with an amount of precipitation. Based on this modeling result, the predicted EP cover with such a combination of two feet long and 700 hybrid trees for example, it would extend its performance over time. So, how do we know if it functions as designed? There are several ways. There are tree species that evaluate performance

of vegetation, and random crops also selected and examined on the ground. The use of the area index, each area index is defined as the area of activation to the land purchase area. The model estimated permeability due to various vegetation conditions that are represented by respective index values. It is the measurement of this area index that is confirmed, they can release area index values used by the water. Before the method abstracts [Indiscernible] products can be used to assess over time and depending the capacity . Lastly, a survey is conducted to check the survival rate of the plant community. Again, the hydraulic model focuses on the prone areas, and under certain proposed conditions. The model compared the water elevations under these conditions to determine whether the design has the most impact on the floodplain. We ran the model incrementally, then we completed preliminary, intermediate, pre-final and final RD. Shown on the right is a screenshot of the model for 90% conditions. Indicating slightly increased water elevations around the southern landfill and east neighborhood for 100 year and 500 year standardized. After further grading, we eventually got rid of all original lines at 100% commissions. As a note, although not required, we looked at 500 year studies then as a part of modeling to see potential impact due to street-level rise for the executive order 11988 and 13690. I explained earlier,

it requires specific vegetation to maximize evaporation and [Indiscernible] the design estimated approximately 46,000 trees and shrubs using the desired tools to show that it functioned as designed and to maintain long-term viability. Therefore,

[Indiscernible] we initially established the flowline from the previous landfill, then we later established the larger one, using [Indiscernible]

the fish and wildlife service helped the collection, planting and harvesting. The upper photo shows activity using space from the nursery. The photo shows one and a half years later. These trees are impacted now. As I mentioned before, along the western side of the landfill was nearly covered and had disposed waste at some locations. A photo in this slide shows the conditions of the quick bends. It is EP's policy to use sustainable cleaner , so we tried not to use house structures, but the project area was initially developed by U.S. Fish and Wildlife Service. In general, the plan did not propose changes to the overall pattern or vertical profile. Instead, focused on utilizing structures to stabilize the bank and reduce in critical areas. With that in mind, we used these three structures . Construction of these are presented in the following slides, you will see how the quick bend looks like now after construction. I will show you a few slides for ongoing remedy construction. This is an ET cover constructed in phase 1. As you can see, there are a lot of trees for those that look like sticks now, but I guess you have an idea from those photos I showed you earlier. A lot of trees are coming from two nurseries , the colorful trees and roots were procured and planted to mimic these conditions. Each tree is protected with a plastic tube . He learned this from research mostly. EPA started residential yard removal action in 2017 and continued only one RA. Basically, top two of contaminated soil are estimated and consolidated under the EP cover. Today, EPA remediated 167 homes and two open spaces in the neighborhood. What you can see here is two restoration features constructed around the quick bend, Mudville and

low wall. I showed you the conditions earlier, but I think you can see the difference. The mud Phil was conducted using untreated [Indiscernible] we set it at mid height elevation so it can be effective in both high and low tides. Each was constructed with topsoil , and wrapped around with coconut shell. It will grow well in wet environments. Mud fill Creates stability . The photo on the right , we used this to stabilize the bend with its own weight.

We also planted after completion. We are on pace to complete remedy construction by the end of 2023. Thank you very much. Again, I'm the project manager for the project I presented today . Those are the area sites, and responsible for overall construction. Now I will allow for open for questions.

Thank you, JC, fantastic presentation and a fascinating site. We've got several questions that have come in from the audience, I really appreciate folks reaching out with questions. We will address those. I had a quick question for you regarding the trees in the bracket flood scenario. Near my home in Denver, there are several golf courses that serve to protect communities. I noticed that when they serve their function well, which they have, there is severe damage to the courses after they are done, to the vegetation, both from the planning itself, you know, being inundated with water for two weeks, as well as a significant sediment on top of the vegetation following the flooding. I'm just curious, as a part of your design, was there some contingency planning or other thoughts as to if the flood would occur, given that it is brackish water, what kind of ONM or other needs might occur if there is damage to the water? If there is a flood, with the vegetation die?

Unfortunately, in our case, majority of the ET cover is located above the floodplain . So, there will be minimal damage in the event of flooding . However, you can develop a plan indicating how we need to maintain the EP cover, for example through more vegetation , for cover, thickness and all that. Still, I believe the main requirement for the cover is significantly less than conventional EP cover with a geomembrane type layer for example. I hope I answered your question.

Yes, thank you very much, I appreciate it and excellent presentation as well. We've got some questions here for David, one of the questions that came in for your site was the thickness of the [Indiscernible] and what were the cleanup goals, was it complete removal? Maximum thickness? Can you talk more about the issues at your site?

Yes, we have less than a foot, maybe two or three wells but what was amazing , we did a pilot study that evaluated the system within the multi- phased extraction and during the pilot study, we essentially moved all the product during the initial operation and never saw it come back. That was not a big issue at the site, we were able to actively remain with the multi-phased extraction system and move into addressing the solvents.

Excellent. Excellent. There was another question regarding vapor intrusion. Now, the audience had noticed the redevelopment of the residential areas and there were some questions regarding, what types

of vapor intrusion mitigation , if any, needed to be done regarding the buildings that were constructed, were there vapor barriers or depressurization systems can you speak to that a little bit?

They decided to put the residential in more of the contaminated areas which wasn't our approach we would have taken but they did incorporate the barrier as well as the system for recovery that could be pulled into an active system if necessary. So, that was definitely incorporated because of the residential use.

Okay, good. And JC, a question for you, is the project located near the John Heinz wildlife refuge?
It appears some of our audience members knows the area very well.

Yes.

Open questions from any of the panel? We have a question from the audience, what was the most difficult coordination issue with stakeholders? And what was a key lesson learned that you learned regarding stakeholder communication, were any of the three case study sites located in environmental justice areas?

I can answer that question. What was critical to our lessons learned was when you're dealing with a responsible party, a developer, we had the two agencies, we all had to cooperate in a very good way if it was ever going to work out. We couldn't get into arguments over remediation techniques, and the developer did his own due diligence so we could communicate. So the key was communication, being able to work together for a common goal which happened on this project but I have seen where it doesn't happen on other projects. So that was the key, making sure that we focused on good communication and cooperation.

Sure. Amy, how about you?

I would say that it was just getting an answer on final design of the site we used while we were actively working on the remedial design. You didn't ever want to stop work on our end, it was just making sure that everybody knew what our timeline was in when we needed answers by. So that we could all stay on target. And the site was not located in the interim until justice area.

JC, it seems like you had a lot of stakeholder cooperation from the various agencies. Was there any community fashion that was opposed to your work at this site?
>> As I displayed earlier, the community involvement activity has been extensively conducted , led by EPA, or the RPM , so the site was located right next to the residential neighborhood. So, the EPA thought that the best way to persuade this cleanup activity would be to inform the community early on. Of the process. So, there were a lot of residential members participating in the cleanup process in the beginning . They were well informed with what EPA plans to do and so

on. I think that was one of the key highlights of the project, so we can avoid any challenging issues later on.

Very good, thank you. Amy, you've got a question regarding your presentation. Was the ISEB barrier new or intended to optimize an existing barrier or
a substitute barrier?

The barrier that was proposed for on-site is written into the rod, the edge is the interim remedy to be implement it only as the source remedies are not successful and reaching remedial goals. So, I think it's important to also note that none of my remedial actions have been implement it, it's just that remedial design stage at this point in time.

Sure, when are you scheduled to do construction?

That would be up to when EPA puts it under
--

Got it, so it could be several years before construction is implemented.

Correct.

JC, we have a comment or question regarding the trees at your site. What can you say about meanness or replacement of the trees, and is this applicable in areas where the trees are dormant for part of the year?

Well, yes . We print hybrid popular trees , a lot of them, because they uptake water a lot. So that is good for EP cover . As I mentioned earlier, the goal of the remedy is demonstrating the annual average of the permeability of the EP cover, equivalent to title D . So yes, storm season, trees may not uptake the water is much as the growing season, but however, again, on average , annually, if we can accomplish the goal of the permeability , then we are good to go.
So again, we do some maintenance of the EP cover , we are planting trees and all that. So, that's why we established the research early so we have the trees ready on our hands, so we can cut them and plant on the EP cover when needed. Hopefully I answered your question.

Yes, very good. There is another question for you, on a similar type of question regarding the trees . The question is, my understanding from your presentation is that trees will be planted on top of the closed landfill. If this is correct, what is being done to prevent the tree roots from penetrating the landfill and compromising the landfill cap ?

I think the question was confused with the cover shift, we don't have the barrier layer needed to cover. It's basically a soil cover with vegetation on top. So as you know, the hybrid tree for example , the roots go pretty deep. So if you are penetrating to the landfill , it is fine. So, our purpose , they developed a healthy system as fast as

possible, and uptake the water as much as it could , so that the precipitation does not reach down . So, it is okay that the trees roots penetrate the landfill cover.

Okay, very good, thank you. Amy, we have a question for you. At your site, regarding creosote, there is a question regarding odor control associated with work at the site. Could you talk a little bit about how odor issues were evaluated regarding creosote , and how are cash levels achieved regarding odor control ?

Sure, so the thermal design does include a vapor barrier to control odors. And I would not be able to answer the question that was about action level. I'm not remembering any action levels for odor threshold. But again, it hasn't been implemented . So I can't tell you if we achieved them.

Sure, I appreciate it. So in general, the answer regarding the thermal, you're going to capture any odors associated with that through the vapor extraction system and the cover that will be placed down at the ground level.

Absolutely correct.

A question for David, you mentioned enhanced bio sparging . Can you elaborate on the treatment and how low concentrations of boxing you were able to achieve through the treatment options , or treatment approach?

Sure, the concentrations were in 100 parts per million, and that has been proven through different instances of investigations, one part of boxing will call metabolically biodegrade in an area of the environment which we were creating primarily for the medics which is tying in other compounds but as an added input, we also, because of the tiling, it actually decreased to single digits in that area , as long as the tiling was there. So it was a long process. It wasn't really a driver for the site because
it was being recovered by the ground extraction system but this is an added input we got from the others and we were also able to reduce the one in the RCA areas. So it was pretty interesting.

If I heard you right, you got down to single digits part per billion?

Yes. Less than 10 is what we were seeing. It fluctuates depending on tiling that was present but by the end of the remediation process , we were in New Jersey, the standard is 0.4 so we still weren't there but we were reducing through the metabolic process.

Very good, a question on the one part oxygen you did mention that there were solvents at the site, could you talk about that history and why it was one part oxygen present?

Yes, we did have some solvents, but they were minor, low concentrations. So let me clear that up. But, it is primarily used as a stabilizer,

but what also has been documented and you will see it in the fact sheet, in the front of the surgical process, the pharmaceutical process, they compound itself is not just a stabilizer, so you did see that here and confirmed that it was not associated as a stabilizer what , but would be used in the manufacturing process.

Very good, thank you. Usually everybody sees it as a stabilizer out there. But, I'm not surprised to hear that the pharmaceutical industry uses it for other needs. JC, question regarding the mud fills in the design . The general question was, are they resistant to storms and can you talk a little bit about how they are specifically anchored?

Good question. Frankly, we love the techniques from the U.S. Fish and wildlife survey regarding this Mudville construction. Basically , to install mud fill , you install the trench box 1st , and install the low log first. Perpendicular . The
log is about 12 to 15 inch in diameter and 8 to 12 inches in land. So we installed it two thirds into the bank , within the trench, and then backfill it. And that is the foundation of the Mudville -- mud fill. On top of that, we added the soil layer , multiple lifts on top of it. The log is also anchored with a five foot long rebar , so it can stand , so it doesn't wash off, that is what we did.

Very good. There is a polling question regarding some of the planning protection as well. Was there any net fill from the bank features and if so, did you need a compensating cut to demonstrate that some would be okay?

That is a very good question . As I mentioned earlier, the entire landfill is surrounded by [Indiscernible] and there is a floodway, meaning, there are 0% surface area allowed, so we already conceptually designed each restoration feature along the creek bank, so we incorporate that into the model, specifically for the elevation . So luckily, you are able to show the net zero
increase, but once construction is completed, we may need to rerun the hydraulic model to demonstrate
as conditions surely meet the requirements , net zero water surface elevation within the creek.

Excellent. Thank you JC, and thank you to all of the audience for some excellent questions during the Q&A period, we really appreciate the engagement . And thank you very much David, Amy and JC for your excellent presentations today. For panel five, excellent work and thank you for your time and sharing of the successes and challenges for your projects regarding stakeholder coordination. We really appreciate it. With that, I believe we are generally on time and I want to turn it back over to you.

Thank you very much. I'm going to echo your thanks, and I also want to say thank you to all the participants who have been chiming in with their comments and questions. We are just a few moments ahead of schedule, so we get a 23 minute break, if you can, or a brief intermission right now. I encourage everyone to stay with us and enjoy

a few words from our sponsors. Those will be playing here, and for my last panel of the day, for panel six or for the younger members, I will ask those panelists to stay with me on the line, I will be privately gripping you on a sub conference line in a moment and we will get ready to do our preevent check in with all of you privately. Panel six, please hang tight and for everyone else, enjoy a word from our sponsors.

[Captioner Standing By] [Captioners Transitioning]

Good afternoon ladies and gentlemen. We are getting to the end of our break time. I would like to welcome you. We will be gathering for our final session for the virtual symposium design and construction. If you are back to your device in fully connected to carry on with your last session in the virtual symposium, I will asked each of you to type in a message into the Q&A. Some of you are back with copy . That is a great strategy. We really appreciate everybody's involvement and engagement in the Q&A window. Remember, you will have the Q&A window open throughout the session. I encourage you to keep the questions and comments coming in. Our moderators will be reading through the messages. Please do not hold back. Is that space, share your thoughts, ask questions and we will have a great panel in her symposium. While I do that, I am going to call up a few things on the screen. You all now manually should be able to see our upcoming panel. Hopefully you can see some of this. I will move some things and change things around. I did want to introduce our speaker and main facilitator who is the chairman at the Department of operation management at Temple University. He is a registered professional engineer I can tell you after sitting in on the dry run, this group made me very excited to learn more about project management. With that Mark I will have you come off of mute.

I am glad we have such a big group. I am excited about it. I spent most of my time with companies and government groups and so forth talking to project managers hoping to make them better project managers. This is different. This is unusual. This is for people who are not yet project managers who are hoping to get into it. I am going to talk about that

I have been for 15 years and started as a entry-level engineer and worked my way up. I specialize and design and construction management of large-scale remediation projects running from 10-$50 million. I am also a project system manager. I will pass it now in alphabetical order over to Gordon.

We are a public utility that supplies natural gas to eastern and central Pennsylvania. My goal is to manage our manufactured gas plant program of which I got 69 sites and some out-of-state but I manage. I sorted out started out consulting myself and I found moves through various folds to become a project manager in charge of this program. With that I will pass it over to Monica.

Hello! I am Monica. I am a senior technical consultant design manager and project manager in our Charlotte, North Carolina office. I have more than 16 years of experience in federal and private clients specializing in site management and remediation projects. I am specifically focused on the implementation on innovative remediation . I will pass to --

Thank you, Monica. Good afternoon.

I -- I am back and forth in stepping up and project management panel . I am in environmental consultants and primarily a project manager. Work on several projects in New Jersey and Pennsylvania. I am really happy to be here today and excited to hear feedback from the crowd.

Thank you, very much. I was actually beginning to think of Jane as the project manager. A good percentage of our people are in that category. That is great. Everybody else, I am hoping you can learn about project manager in things about the field. In terms of the profession we see it is pretty much the same spread as the age group

It says first have a definite clear practical ideal goal and objective. That will be a part of our definition in the first place. Second, have the necessary means to achieve. That is what we have to do. Finally, put all those means to use. Adjust them to your goal. That is a long time ago. I don't think much has changed. That is what we do as project managers. There is a lot of discussion of key projects especially the whole discussion. Project managers have been around whenever anything needed to be done. And never found anything written on it but you have to think the guys who built the pyramids in Egypt were amazing project managers. The outline of our discussion today is for topics that are essential to the topic we are discussing. Why would I be interested in this at all? What kind of preparation educationally and practically would we need? At the end, I go into tools of project management a little bit.

I want to mention these tools and what they are. You will see the three major tolls essential to project managers. There are other tools we use as well within the projects. Let's go to why I should be a project manager. Before getting into that, we have some more poll questions. You are now aiming toward project management. What I see here is what I really hoped to see. I was hoping for a certain percentage to say yes, it is a start. A much bigger percentage to be interested in project management after starting your career and learning what that is about. That is what is happening. Is not double but it is almost double the percentage. This is going to be lots of different answers but I like some of them on fieldwork, experience things like an important skill. An important skill is different than saying I want to go into that as a career. We see lots of things are happening after we start work that influence us. The general direction is it influences us toward the direction of project management. Why do I think we should go into project management? First of all what is the project? How does it differ from other types of work? I want to say a project is

something special. I will stop I will start with that. Here is the definition of a project out of the book that is the basis for certification and project management. Temporary endeavor. If you thought by special I meant Eggsciting I think so, you may not. I don't know. It is special outside of the usual. It is something we start, finish and it is temporary. Temporary endeavor undertaken to create a one time thing. You finish the project you don't go back and do it again. Why not? There was a goal as Aristotle said. The product service and the result we are aiming for. When you achieve that result, you were done. It is a one-time effort when you finish a project I guess you could say you push yourself out of a job. What makes something different about projects? Most work is repetitive. Not one time. Most jobs are not projects. You are working in an industry where most work is projects. That is unusual. Usually most work is regular routine repetitive work. You're in a project-based industry. If I have reasons for getting into project management you are in a project-based industry. If you want to succeed in your industry the way to do that is to get into project management. Number two, I have here. It is the avenue for professional advancement. Ego from working on a project to being the head of the project. From their than maybe to higher positions in the company. Most important, because I don't want to say it is just a stepping stone for you. Projects are exciting. When I hear most works are not projects and most work is repetitive the words I would throw in there I would throw the word boring in their. Projects are not. Is always something new. Not always something nice and not very often stressful but exciting. It will keep your career exciting. What characteristic should we have in a project manager? You have to be very detail oriented. You have to be a good communicator. You have to be committed to goals and passionate about them. You have to be driven. You have to be tenacious and moving toward those goals. The first question I posted is what is most important to becoming a project manager? Far and away, your responses are communication skills. When I see polls and I see papers written and surveys of project sales, the number one list is always communications. When I have tools of project management that I want to talk about it shows. Communication is what is important. What are other characteristics needed as a project manager? Organized, patients. Able to manage time and people. Able to coordinate is a keyword. A lot of good response here. There is a textbook on project management that lists characteristics of a project manager. When you see the list, you say certain characteristics you have to have anybody who has one not going to have the other. You see the list none of us can have that. It is impossible. We are going to have many characters as we can but none of us will be perfect for that. That brings us to some comments I would like from the panel. We can go through in the same order every time rather than mixing it up. Dan, how does becoming a project manager move your career?

There are so many more responsibilities I think a lot of people don't realize. It is financial skills . It also makes your career as you're building up and learning skills. It is satisfaction. It is not only being a part of the team but getting a job done but it is becoming a part of the team and watching your team succeed. That is really a great part of it. You are no longer the person that is responsible for doing one thing and maybe doing it over and over but now, you're watching

other people within your group and your team and you have achieved a common goal and put together a good project. That it's really satisfying and rewarding.

I like that word satisfying. That is a good feeling you get from this. Okay, Gordon?

Becoming a project manager I guess the first time I actually -- I never have really had that title as a job title. My job title has never been project manager level I or something like that. In the role of project manager you do have your technical qualities. That is your toolbox. That is how you know how to look at data. You know how to communicate with others. The project management part is how do you get everyone to work in harmony with each other? In my current role I have a different programs. My strategy for all of them is they all talk to each other. They are all friendly with each other. They all share ideas with each other. On sites that may or may not be the site they are working on. That sounds really crazy if you are a consultant and you have an end-user, an owner that wants you talking to other consultants in brainstorming and collaborating. For me it is really exciting because I get to see innovation coming out of these conversations. If you put yourself in a room with really smart people that are smarter than you, most likely, you get them talking, you will come up with some really powerful solutions to problems. Sometimes it is also how do you handle regulatory affairs? How do you manage talking to the regulator about projects? It is really interesting to see everyone coming to the table and advocating for everything they know on your behalf as the project owner.

Great. Thank you so much, Gordon. That was good. Monica, do you have anything to add to that?

I do. Certainly being a project manager has added depth to my career. Growing from being a doer to a manager allowed me to touch projects. I had time to be involved in multiple projects at a time and that helped me grow my experience with different technologies which is where my passion lies. Now, I serve in technical and management roles and becoming a proficient project manager helped me to build the acumen needed to be successful

>> You're going to make this really tough for me during this whole session. I am only kidding. Those are great responses. To me, when I first started my career I actually always felt it was a pretty unappealing description to be a project manager so to speak. It is not Dr., lawyer or movie star. I knew I wanted to be successful and I knew I wanted to see things get done. You reference the temporary nature of the project which is really beneficial to get things done. Really, to do well you have to be led by those leaders. I have always taken leadership really seriously. I have come to realize to read you have to -- to lead you have to master the art of management and it only improves your ability to lead. That is what has added most of my career so far.

Great! Thank you, very much.

We have for people who are still in this category of young professionals on our panel but all who are experienced enough to move to project management. You can see how much they are enjoying it and are learning from it and are growing and excited about it. I have here, a slide which says why is this page empty. My feeling is you didn't have any of project management preparation school. It was more as a technical thing. We have simple questions here. I am just asking how many have project management as a subject in school. Had already discussed with the panel there, It is 50/50. From our panel, what kind of training did you have? Will the topic ever brought up even if it was in a class? Justin, do you want to start the time?

Sure, Mark. I can be pretty short and sweet on this one I think. My answer is no. I had none at all. If it was sort of implied or suggested that we would be working in groups are in class and in doing things I wish someone would have said this is about project management or the crux of this is obviously what you teach. I don't think I ever benefited from classical training although, I wish I would have.

Mark, I believe you may be muted.

Yes I am. The closest you get in school is the team assignments and team efforts you have to do during a class. It is really not discussed have projects.

Okay, Monica?

I think that was good inside. As many team projects as we do, it never occurred to me that that was a lesson in project management. My answer was going to be no, not really. I think the closest thing was taking an introductory construction management course . I remember talking about scheduling and looking at charts and that being the only real time in school I learned about a critical path and how to deliver. Beyond that, I would say no.

That is certainly the basis of project management.

Gordon?

Through college I can't say I have any formal management training. I had plenty of projects that whether chemistry or engineering or whatever it may have been there are often projects that as a teen you have to do some kind of task and report on that task. There is a planning phase or implementation phase. A lot of the times there was presentation that went . I guess from a college standpoint, no. There wasn't a formal project management training. Did that at least get across to you that when you got out of school working with teams would be so important?

Yeah, they did. They said you were going to be working in multidisciplinary teams that are doing different aspects of a project. Your team may be focused on one little segment and there would be a person that would be in charge of everything. They never really talked about who that person was or what they were like or how they got to where they were.

Okay, great. Dan, anything to add?

I think that is probably the closest we have. It is this a disguised project management training for group work. Generally, as people in science backgrounds, that is the thing you want to do least, collaborate in --. I would rather go and do this. I will knock it out myself tomorrow night and be done with it. I will do the whole project. That is the skill when you go through your career probably for science minded people like ourselves it is probably the hardest thing to accomplish. It was disguised all along . Get this project done and passed along to somebody else. It is an interesting progression.

I am so glad you said that, Dan. I am glad you brought that up. When you are doing them, you don't seem to like them. Then, you get out and what makes us like it and want to get into it in our career is because at that point we see the true value of.

Thanks a lot. That is great. Let's move on!

Our third topic in my outline is be practical with preparations. To get into project management I am sick testing here some things you can do. You're not going to sit around doing your job hoping someday somebody taps on your shoulder asking if you want to be a project manager. You want to be more proactive about it. The first thing you do to get into project management is learn about projects by working on projects. Industry is a project oriented you are almost doing that by default. Try to get involved with decisions on projects. Have discussions about when wing to do a project versus another way to do a project that learn what there is about project management. Work on a project team. Recognize and then you figure out what project management is on the job. At some point after that you take some training. It is mostly common sense. You can figure it out. Then, you get certified in project management. We will talk about credentialing ahead. I wanted to turn this over to the panel again. I think this is what the group is most interested in. When you come to a session like this what you want to hear is from real project managers who have experience. How did they get into this? That is the question I want to ask of our panel right now.

The thing that comes to my mind is time. People are motivated and interested in the work. We look at the clock and say why can't it happen faster than that? Why do I need X amount of hours and projects? Just looking backward

in hindsight I realize there are certain experiences you have to go through and growth periods that are critical to be able to get to

certain points in your career. It is sort of hard to realize that in the moment

Thanks a lot. Great!

I think similar to what destine said and see to move on and ambition. I did start as a field engineer fairly predictably . I think that is when I started to figure out what it was to be a project manager. I think there is an element of you don't know what you don't know.

I started out right out of college with my Masters degree coursework behind me. As an underachieving student I didn't finish my thesis right away. I have that lingering over my head for the first 4 or 5 years my career. I would advise anyone in the audience listening, don't do that. It is very hard to finish your thesis while you're working. That said, I found my role as a chemical engineer by training predominantly working with geologists and field scientists's. I didn't necessarily have a lot of peers that were engineers that were teaching me all of this technical stuff. Instead, I was learning the geology technical and not the engineering technical. I worked through my career. Unfortunately I felt there was always a glass ceiling preventing me from moving into project management. I raised my hand and said I would like to be a project manager. How to get involved in decision-making? Time and time again there was no response. It wasn't even know where you aren't allowed to. It was nothing. For me, that was frustrating. Here I am trying to learn things. I am trying to expand my horizon. I am not getting the support I needed. My career kind of took a detour from the technical engineering world. I went into technical sales for number of years. I was working with consultants all across the mid-Atlantic looking at radiation technology. For me that was really important in my career because I got to talk to engineers and geologists and technical people all the time. I really learned the communication skills that needed to be able to collaborate with people and be able to work through problems on projects. It was humbling sometimes to walk in a room and people say Gordon, you are so smart. I said no, I am not. I am really not. I just know this topic really well because I talk about it a lot. My goal is to try to get them to talk about their experiences. I think as a project manager that is really important for us. We have other people to talk about what their successors are, what their struggles are . How can I help? It to me, that is a very important phrase for project management. How can I help? If you go to -- if you attack it from a standpoint of you have a problem, why did you come with me -- come to me with the problem. If you flip that and you say how can I hope your identity dying you have a problem. It is no longer confrontational and you are receptive to them. In my current role, some of those frustrations I face as a young professional right out of college has influenced how I behave now as a young professional and project management.

Take you, so much. A few things I want to comment on. Gordon is saying you want other people to speak. When I see lists of skills for project

manager number one on the list in terms of communication is usually listening. We are gathering information from our team so we can make decisions. It is more listening than other kinds of communication. Yeah. That is a very important skill. Listening is very important. Then, the role of helping. Used the word helping. When people say what is the role of the project manager it is not the main thing. The number one thing is facilitator.

Dan, do you want to add something?

There are a couple of things I wanted to add. There are a couple of questions here that are pretty good from the Q&A. You say anyone who manages a contract -- you take on small tasks. Step off and say how can I help? Can I help with this? Can I help with that? That is really the way my career has taken me. We expect people and encourage people to take on things like that. You are not just as you start your career you don't go from one site to the next site to the next site to do soil sampling. We want people to be able to start with defining the scope of work and putting together a written scope of work. Soliciting bids from drilling contractors for this example. All of the things that are part of skills that are needed to be a manager. You are learning along the way those skills so

when you are 10 or 15 years into your career, those things come naturally. You are also training other people to do those tasks as well. There is less as a project manager to do and you can rely on staff from progressing. That is how I went through it. You take on these things early in your career. You ask. You volunteered to do things. From 5 years out of school you are starting to take on those tasks. It becomes a natural progression. That is really important. Look for those opportunities to manage small things and then the bigger things become kind of natural.

Terrific! A part of your answer is things people can do but there is a bigger part of your answer that is not really in the hands of younger people to do. That is the duty and the responsibility of the organization to groom the future project manager. As younger people you should be looking. MI working in an organization that is grooming me, setting me up for growth? If not you probably want to be in a different organization. Are you working for a boss? Different bosses are different. Are you working for a boss who will serve as a good mentor? Look for one of those. Tried to get in that group were on that team. If they are proactive about growing their people to be project managers, you will be on the path toward career development.

To that end, let's say you are in a bad position or in a bad group. And I use bad as a term here but let's say you have a mentor that is outside of that group. That is actually great. You can maybe get input from your mentor on how to improve the group you are working with rather than trying to distance yourself. Tried to be the person that helps change it and make it a more positive working relationship to promote everybody within the group instead of having your teammates not in and good atmosphere or something people don't want to be involved with. Make your team one that shines by using outdoor resources that help you along with that.

In my first job for the Army, my first boss who hired me was nearing retirement. He would go on and on about "Where my boys are now. His greatest pride in his career with how he developed all these other people's careers. That is the environment you would hope to set when you are working. You want people doing that for you. You pass it forward when you are moving on in your career later.

Okay.

Before we move on to credentialing, there was a really good question that came in about emotional intelligence versus

intelligence. That is something that is hard you are really good at looking at formulas and data and crunching through numbers. That is a lot of the work we do. That is in some fashion whether from a scope standpoint how are the people we are working with doing or feeling? Do they feel they are participating? Do they feel they are being heard? You have two or three people leading the conversation. That means there are seven people in the room that have invoiced their ideas. A lot of times, you have to think, differently others. The people you have 28. It is really understanding what your group dynamics I like, understanding with the personalities in your group are, understanding that a younger professional will probably take longer before starting an answer than and more seasoned national. I saw the metrics of ages and years of experience on the call. That is really hard for us to do. That is especially when we are the technical experts in the room. Just kind of shut up. That is really hard. The other thing I have learned is if you don't seem like you're getting answers from people or you are not getting them fast enough it is probably because you are expecting something that is unrealistic. You may need to count yourself to 7. Ask your question and you can't tell 7.

See if an answer comes in. Most people, when they try to do this exercise, they will say okay, I asked my question and they just gave the audience 3 seconds of time to formulate an answer and communicate. I have done a lot of work with youth development through the Boy Scouts. When you're dealing with young minds and adolescent minds, sometimes it can take 7-15 seconds before you get a response. It comes down to how do you respond to the emotional intelligence of your audience? How do people behave? How do you set that person up to be successful in the role you are putting them in? If you are setting them up for failure, they are going to fail. If you set them up for something they can succeed in and they can do well and you check in with them and ask them when they have problems and create an open door for them they are more likely to be successful and they probably will become a very strong team member. A lot of times we take our best people away and we keep the people who don't care. They are the ones who don't care to keep as much. I do want to ask something on that subject. They said there wasn't enough of that when they were learning about project management . The new task and materials have a section devoted to the topic. The initiative is growing and it is getting incorporating into training and testing and certification and so forth.

Our next topic is the credentialing. The first question is why become certified at all? First, I want to say in every field, no matter what field you're in, there is more and more emphasis on certification. They are trying to standardize things so everyone has some level of the certification. The first certification doesn't make you a great expert. It means he demonstrated some basis level of knowledge that qualified you for the job. On average certified integers are better than noncertified. On average. Why should you become certified? Competitive advantage. Some companies require certification of project managers.

Others give preference and assignments to certified people. We also have situations where people will only hire consultants if they are certified. Was asked to going on a bid with a company last week because the requirement was they had to be a master Blackwell leading the effort. They didn't have a master black belt. I work with these people a lot. They could handle anything. I am hoping, I don't know for sure that we get improved performance with certification. Definitely you get career advancement and with that comes earning potential. Finally, professional credibility. I was shocked when I finished my PhD, how people listened to me differently. I wasn't any smarter or any different than I had been the month before about somehow , people just a few you differently. When you become certified, people will view you differently. In terms of certifications out there, their certifications in project management from the Project management Institute. From what I can see some of you have these and some don't. If you are looking to get into project management the second one here is for you. This is says I studied project management. I passed the test on it. No experience is required.

They have their own certification and it is very practice oriented. You have to show completed projects and show how you came through.

There are more questions here. Can we get those up? How many have certification in project management? Are you interested in getting such a certification? Do you have other credentials? A lot of you got your PE. That is the first one I got too. I went to engineering school . Technically I fail to this. It looks like most of you have your PE. Very few certification and project management. If you're looking to get into project management, it shows your interest and shows you have the training and education.

In terms of are you interested in getting that that is more than three times.

I am guessing you have experience and you are ready for that. It is terrific.

My next slide discusses this but I think I talked about that already. The PMP needs experience as a project manager in 35 hours of training as a project manager.

I was asked to bring up issues of the changes in the PMP exam. I am not sure it is so important but if 95% of you're interested in

getting it, maybe it is. If you are looking into this the seventh addition is ready to come out. The new 2021 exam is still based on the six. That is the book to study. The old exam is based on 10 areas of knowledge and 49 processes. This is based on the sixth edition. While the information comes from the sixth edition it is not based on the 10 areas of knowledge. It is based on a focus of people, processes, and business. People decide to emphasize how important communication is in all of this. If I get this project and it doesn't matter what happens after. If it is not going to succeed it is because management didn't pick the right project in the first place but I did of the when they told me to do. Now, we are saying expand that . It also follows more of a lifecycle flow. Initiate the project, close out the project.

Okay. I am going to ask the panel but professional certifications you have in project management or and others related to your field. Let's start with Dan again.

Sure. I definitely don't have my PMP or my construction management credentials either. I have gone through my career with a PE and worked off of that. My experience has really been -- my training has been on the job training. I think it is the older style of doing things. I wish that when I was younger that I knew about the fact that there was this credentialing. I think that would have gone a long way and not necessarily getting me there is process of moving on and stepping into and learning the skills of project management gives you the fundamentals . You focus on the fundamentals early on in the career and you are aware of more of the things you need to be focusing on as you move forward. It is not just technical. I think that would have been helpful in making me focus on different things earlier in my career and made it an easy transition from being a technical person to being more of a manager.

Great! Thank you. Gordon?

I kind of had the interesting career that I am trained as a chemical engineer. I have a Masters degree in environmental engineering. I was hired to do an environmental consulting. Environmental consultants don't necessarily need a PE license. A lot of the work we do this not a professional engineer that stamps the reports. Should have gone through that. No one told me about the importance of working for a supervising PE. I have been doing that from my career.

If that is approved --. The -- was a little straightforward in terms of how I go about getting that. The professional engineer license still is kind of up in the air. It is like, who signs off as a supervising PE for the project I have done? I don't know. I don't have that answer. I would love if people gave me the answer. That is me 14 years in my career. I still don't have the answer.

If I can make one recommendation you said you are going to take the training and then fill out the application? Start filling out the

application right from the minute the training starts so you can submit it as soon as it is done. You want to take the test fairly soon after the training is done before you start to forget things.

Okay.

A good discussion. My take is going to be a little bit different. When you open the panel Mark, you have a question about what it meant to be a project manager and someone responded it was empowerment. Identify a little bit more with that when I was thinking about what does a professional certification mean to me. In my organization, I have a professional -- I am a licensed engineer. I am not a PMP that I would encourage anybody to get whatever you are eligible for. I think the credentialing of some sort is empowering. In my organization, with the clients I'm often supporting, having my PE license means I am signing my own documents and designs and reports as a project manager and if someone else needs to be involved with a project with physician engagement to claim responsible charge , and I really the project manager? In my directing the project if I have to have somebody signoff that it was done properly? That is what it means to me. Truly be able to run my own projects.

I definitely see value in that, Mark. To
never stop mentality. There is definitely

I do this more of a caution. Don't set-aside what you're ready bring to the table which is the art. You have to combine those two. They you very much. A couple of people on our panel so they don't need the need for it in our job. Cost their that if you wanted to switch jobs you can do that like to

Anything you need education
--

Next thing I want to talk about
you can start the work without saying here are the things we have to do.

They want to see what they hope will be done is actually going to be getting done.

Next question is how many of you use critical. You probably, on your project, have hundred likely thousand task

If you have 1000 tasks on your project maybe 10 or 20 maybe vertical 980 or 990 don't have to be done on timing of an extension. It makes our job easier. That is why it is the most important concept. At any given time on I 170

I am a little surprised the majority here are using it. Maybe I shouldn't be surprised. The federal government requires earned value many of your types of projects are associated with.

You want to know who to contact. This is a tool that helps me see how to manage my project know who to go to for each of them. That may skip what you going to do along the way within your project to make sure at the end, quality is there Erik Sandoval this final testing is probably testing along the way. I am sure many of your projects, most of projects require procurements the more you can think through and advance who you need to communicate . The next to go along with each other. In the beginning of a project you should be listing what are the risks associated with the work you're doing. Or all of the things that happen that threaten your achievements?

Let me go back to the when I skipped

use up until that. At the end of the project you slow it down and that is why it is --. That is where the name comes from. It doesn't have to be that shape but more often it is. The S curve is in your project plan. You are saying how much did I spend by today? You are drawing a second S curve which is an actual to see how it compares against the baseline to see how you're doing on budget. If you are using earned value you know there is a third S due on agile as well. Considered budget. Someone, I think it was Monica and this chart. This is the picture of years that comes out a critical path. There is something called a tracking chart used throughout the body of probably killing how much you have done to show your status on schedule the S curve do a similar thing but of course, they at cost. There are two ways to track your progress performance during the project. Okay. That is all I wanted to discuss. I wanted to leave sometime at the end to open it up to questions. You the questions of me are questions for individuals on the panel. What question do we have? We did have an observation that contract language and law should probably be taught in some of the project management programs or credentials because a lot of the time project managers are tasked with those that can have a huge impact on how the project is performed. They go on to do the resolutions and payments and withholding because of poor performance. I don't know if you can talk a little bit about contract language or law is part of project management education?

Certainly one we discussed his procurement. There is one devoted to construction. You have an extra chapter at the end devoted to that subject dealing with claims and thinks.

Would have to be familiar enough with the terminology they use certainly whatever contract you select is in our hands. Anyone on the panel have anything to add to that?

My experience is I have taken some project management training classes and short courses . I think all of them I have taken they have all kind of touched on it. They have exercises and training. Is the awareness that is important. The other thing you have to rely on is what do you

have as far as your resources on your team? In our company we have an in-house legal counsel. We have in-house people that go to contracts and insurance things like. They are at our disposal. Sometimes your client has an attorney that is leading into the team and you have access to them. Understanding the pieces you have available to you on your team is sometimes very important. You can really gain a lot of insight from those individuals to help you through certain situations when you're in Chandran uncharted territory to be going toward a claim or issues with insurance or calling a bonding company or something like that. Have to know what is on your team and what resources you have available. I don't think just being a project manager or a vice president of the company will give you the ongoing knowledge to navigate through those challenges.

I agree. That is great. Thank you.

I second that. I am lucky that we have in-house counsel. We have external counsel. We have a procurement department. We have through our UGI corporate. We have another layer of procurement and insurance and risk manage. They are a lot of people that we can leverage their talent and knowledge. I think on the project management side it is really having the awareness. If things start deviating or get uncomfortable for us the big thing is health and safety violations. What recourse do you have as a project manager and project owner to discuss with the client or how do you reward good behavior? They get shortlisted on future bits? What are those things that are allowed to be done? A lot of the times it comes from having open communication with procurement, legal and all of those different team members that you can approach them and talk through things and they see that as a value that you are coming to the table with ideas and you're talking about them category that you problem and you haven't had any, you're the one bringing

I agree. Are there any groups of questions that go together that we could talk about in our last minute or two?

I will go into two groupings of questions. I would just say we have had a number of people commenting and making observations since we have a lot of federal employees live on the session. They are working in roles that are managing projects. They may even have the title project manager in their job title but their agency of the government group they work for does not require credentialing. It is just an observation they are recognizing they are being caught project managers that they are not being encouraged or asked to get this type of credentialing. Several have followed on and asked. This has come from some of the private sector participants. Does securing one of these credentialing increase your worth? In other words, can I count on getting more money if they get a certification?

There are a lot of surveys on that that shows PMP on average make more. On average, yes. That makes it worth it. You heard from our panel that they are in the point of their career that they are an experienced project manager and they see themselves there is no point to get certified. Project manager because your project manager to get certified

is one government agency or client is doing managers. They may be managing billion-dollar and among the best in the world they just decided to take a test that is not the issue. The issue is there is a trend toward certification. For that reason too. Go ahead, Gordon.

One of the things that drove me to take . Through credentialing there is a baseline through the PMP. I have managed a lot of projects. I do a lot of that. What don't I know? Are out there that I have never been shown because I didn't have a mentor that showed that total to me? Really, credentialing gives you that exposure. It seems like the way the PMP is structured as you have coursework you have to do before hand so you can have the opportunity to learn and to know what else is out there and you have become proficient in that knowledge that you can pass the test to say yes, I am proficient as a project manager. That was kind of my way of about
the knowledge. Know what your blinds are, a like kind documents without it. There is nothing requiring a PFP.

Posted are demanding earned value analysis. Said most people are doing it because the server project in the federal government requires it whether the government is your client or someone else if you're doing it because the clients demand it, I guess it is still useful. Remember, you are driving a car you want the dashboard that signaled all of the information generated for you where you can see it, correct? The dashboard of your car somebody's house they can monitor your driving and you don't see any of the nation. Similarly, earned value is reporting to you how you are doing on your project. It shouldn't be just for your client. It should be more for yourself. It helps you steer the ship. I just wanted to make that point because that is one of my things I am always pushing.

We did have some people asked me if you have suggestions, ideas, language or ways to approach management who may not be supportive supportive and pursuing a project management certification?

Well, okay.

For each individual and each individual company is different. I would hope that the true and in most companies is to go toward credentialing in some way, shape or form. Individuals should really have a mentor and have a roadmap for getting to where they want in their career and get for them. That is so it is not a one sided approach. And list other people. And Lister supervisors or mentors to be your advocate and to help make that a discussion point not just going in by himself but going in for a reason. This is where I want to take my career and understand that with supervisors and mentors to help you with that.

Just be persistent. This is a good example for essentially you can't take no for an answer. Have to continue to go back to the people who tell you know I keep presenting an argument and stay persistent. If there really is value to that people will relent. Don't just try one is not a 100 type thing. I think that is a really important thing that

drives here with location. We will they do the no growth and development. So not in too. Sorry, Gordon. Go ahead.

I was going to offer that this conference is is the engineers there one of many societies in our. Associate a great way to possibly talk to you about an outside environment, not in your opportunity to meet other sessional that can become mentors and advocate they can help you or Pat there are a lot of other ways you can gain. For me leadership development largely came from professional societies. Didn't necessarily come from my company. When I asked her project management experience I was told no. When I told was going to be promoted to project assistant manager that was taken away from me. On the professional side, professional societies are really about developing, mentoring and coaching young minds so they can be the leaders of the organization of the teacher. I would advocate anyone that is in seeing growth opportunity or mentoring and coaching with any organization, go outside. There are plenty of people that want to mentor and coach you.

Last quick question I will sneak in Mark, is there a little cheat sheet or booklet that project managers should have at their desk for reference that can remind them of the different tools and methods?

From my six is stigma experience, I know the company I think they are embossed and, not what they call a memory jogger it has all the little tools and you can put in your pocket. I think they have one for project management. That will. Other than that, there are some that are smaller .

I think we are coming to be possible and the time that I have for your panel. Mark, Monica, Dan, Gordon, death and, I want to thank each and everyone of you for having a fabulous session to close out our virtual symposium. If you all could give me a wave goodbye so you know we are moving on I am going to change if you things here on the screen final reminders as we begin our closeout comment for session. Everybody, stick with me. Don't leave . I promised you some important reminders at the end of our session. I am going to follow through with those reminders. The first thing you want to be sure to do is and a great big thank you to our event sponsors. Again, without the support, this event would not have happened. Also want to think as well as our small business sponsors again for helping make virtual symposium happen. One of the things I will remind everybody is this virtual symposium is just one of many events that DC HWS hosts throughout the year. The group is planning to carry on with with its West symposium hoping to be in person in the fall of 2021 out in Denver, Colorado. They are looking to push out abstracts in the late summer this year. We encourage you to visit the DC HWS website. I put that in the Q&A window. Continue to bimonthly webinars highlighting technical presentation. I could into the Q&A window as well, our upcoming schedule. You can't read that I will remind you all we have three of them's. We had to postpone one's the next one will be taking place April 28th. We will have to host it on May 12 all free and available to those who would like to register to participate our website get into the one I am sure you are all hanging out for certificate and critics. I will explain a few things for our

session. For each and every webinar, we make an option available upon submitting feedback to either print out or download a certificate after you fill out feedback. The virtual symposium, you all have access to the seminar homepage. It was the same homepage for every date of the virtual symposium. Along those tabs on the home page there are a few form tabs. Can go to the same page you used when checking in for the live event and click on the feedback form. On the top you will see options to pick the date of the symposium you would like to provide feedback. You can give feedback for each day you attended. You can fill it out couple times as needed. It is very important when you're done filling out feedback form that you check the box at the bottom certifying you here all thing you would like a certificate. If you check the box a certificate will not be issued. If you do check the box and then hit the submit button should immediately have access to a certificate for each day you fill that form out for. It looks something like this. You can say this for your own records. Again, this is only for you as a participant to keep track of the sessions you shared feedback and attended. The certificate, as many of you has listed out to me does not list PDH is. I am only able to issue PDH is via clue in. Sammy and your event PDH sponsors will be issuing those PDH is to you for the individuals who registered and participated in the live event. As we conclude our virtual live symposium I will be working to pull all of the participation logs for all three days and I will be sharing that information with Sammy and our PDH event sponsors so they can work to get those PDH hours available in they will share information on the PDH earn in a follow-up email. Those clue in participation certificate to get are really there for you and your own records and for those of you looking for PDH is, those will come afterward from Sammy and our event PDH sponsors. I apologize if that was not clear for everyone. I will also be sending up a follow-up email to all registrants explaining this as well. If you had to hop off early you will get an X donation email on this process. I will also remind everyone that I will be checking in through my records. If we happen to know you did not participate on any given day you will each get an email from me in the next day confirming that we don't have a record of you checking in on this date of the symposium. If that is correct or not you can click here to correct your check and information. If you don't get any emails we have you fully logged as participating on all three days and you should get the email shortly. Not, you will get an email from me in the next days to correct your check and information. With that, I want to thank our panelists, our planning committee members . I want to thank all of our moderators. I want to thank all of the event sponsors, technical support staff assisting in the background and I want to thank each and everyone of you who participated in this three-day online event. It has truly been a great privilege to be here and be a part of the session with you and see all of the great technical information and exchange that took place. I really do hope to virtually see you all on a future session. With that, I will go ahead and officially conclude the virtual symposium. Thank you all again. I hope you connect with us on a future event. With that I will close things out for the day. Thank you very much for joining us. [ Event