Red-Hill-Transcript-of-Navy-Swarm-Technical-Meeting-with-BWS-2024-12-10-BWS-Recording

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DURATION
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15 SPEAKERS
JoAnna Delfin
Mark Williams
Ben Dunn
Chris Waldron
Ed Corl
Ernest Lau
Unknown
Nāʻālehu Anthony
Paul Winkler
Jeannie Peterson
Allison Felix
Alex Brewer
Waverly Braunstein
Erwin Kawata
Melvin Tokuda

JoAnna Delfin: [00:00:00] And I will be the moderator for today's meeting. I would like to welcome you and thank you for attending today. A kind reminder that today's session is a technical discussion between the participants at the table and select representatives online. At this time, I'd like to introduce the Navy Closure Task Force-Red Hill Deputy Commanding Officer, Rear Admiral, Rear Admiral Mark Williams for opening remarks.

Mark Williams: [00:00:27] And my apologies for holding everybody up. So good morning, everyone, and thank you for coming together today. Uh, the Navy's commitment to this meeting goes back to the Fuel Tank Advisory Committee meeting back on October 9th, uh, where the Board of Water Supply consultants presented an evaluation of the Navy's Swarm Team Tech Memo. Uh, and the results of the Long-Term Monitoring program, also known as LTM, it will be referred to it as LTM throughout this meeting today. That was conducted in accordance with the sampling plan developed by the Army, Navy, Hawai'i Department of Health and the Environmental Protection Agency, and then approved and overseen during execution by DOH and EPA. Our intent in inviting this group together today, is to clarify some of the information presented at FTAC so that the public is accurately informed. (inaudible) I thought we were making positive strides and good faith efforts and finding ways to improve our collective ability to work together more collaboratively to include our recent meetings with WAI, re-engagement with the CRI. And our invitation to today's meeting. I am disappointed that Mr. Lau and Mr. Anthony chose to publish an op-ed in the Star Advertiser in this past Sunday's paper and preemptively taint the atmosphere ahead of this meeting, which had been scheduled for weeks. Doubling down on false and inaccurate claims about the testing protocols and the results of the Long-Term Monitoring program that ran from spring of 2022 to March of 2024. Even though we have repeatedly, with support from the regulatory authorities, clarified the validity of the testing protocols and results in various venues - and we will do so once again today - it continued to share inaccurate information with the public.

Mark Williams: [00:02:33] Let me be clear. Today offers us a unique opportunity to move forward together. To leverage our collective experience and expertise. To reach, to ask critical questions. Explore diverse perspectives. And to reach a shared understanding of the validity and reliability of not only the over 8,000 samples taken during LTM, but the the samples we have continued to collect and analyze under the Extended Drinking Water Monitoring program, also known as EDWM. I believe we all share the same common view that it is imperative that the community has a clear understanding of the data and, as such, our goal here today should be, in my humble opinion, to engage in a thoughtful and robust technical dialogue. I also believe that we all start from the same common objective, that we must protect the environment and its

precious resources. I look forward to open and candid discussions that are rooted in science. And I encourage us all to acknowledge the time, the people, and the conditions under which decisions regarding the selection of the analytical methods were made. And in the future I hope we can come together sooner to address issues as we work to protect the environment and ensure clean water for future generations. For the public viewing today, thank you for viewing, for tuning in for this highly technical discussion. Back over to you.

JoAnna Delfin: [00:04:32] Thank you. Admiral. Before we begin, there are a few housekeeping notes. Restrooms are located down the hall by the water fountain in the same hallway that you came through when you entered. A reminder for all attendees to please silence your cell phones. Today there will be two presentations, one focused on the Navy's Drinking Water Long-Term Monitoring and Swarm Technical Memo and an overview of the Extended Drinking Water Monitoring program. Each presentation will be briefed in its entirety, after which discussion and Q&A from participants will follow each presentation. Again, questions are to be reserved for the discussion portion. So please make note to inquire at that point in the agenda. These presentations are highly technical to facilitate detailed technical discussion. Time has been afforded for the subject matter experts to discuss matters pertaining to the material presented. Therefore, the discussion portion with questions and answers is reserved for the Navy, Honolulu Board of Water Supply, Environmental Protection Agency, Hawai‘i Department of Health, and the University of Hawai‘i. There will be no public comment or question and answer period during this meeting. Other attendees in person and online are reminded to please maintain decorum to ensure the meeting remains focused on the technical discussion between the designated entities. The agenda is posted at the, um, the screen up there. For presenters and the online audience, please note that there may be a five-second delay between the slides, and internet connectivity may produce a lag while speaking, so please speak slowly, clearly, and loudly for the online audience. I'll now turn the floor over to Commander Duncan.

Ben Dunn: [00:06:15] All right. (inaudible) Good morning. I'm Commander

Ben Dunn: [00:06:18] Ben Dunn. I'm, uh, I'm an engineer by trade and originally from ‘Aiea, Hawai‘i. I've been assigned as the deputy for Environment and Remediation at Navy Closure Task Force-Red Hill. I've been doing this, uh, leading the drinking water and drinking water monitoring and the environmental remediation for Red Hill for about 15 months now. Um, I've got about 18 years of service in engineering, civil, environmental and construction experience with the Navy across multiple locations. And I'm very excited to be assigned this project. I will be one of the presenters here this morning, and also we have Mr. Chris Waldron to my right. The

professional environmental engineer with Pioneer Technologies Corporation has over 30 years of experience working on complex public health and environmental related projects. A contractor for the Navy and Marine Corps Force Health Protection Command, and has worked exclusively on Red Hill since the outset through Emergency Response, Interagency Drinking Water Systems Team, and Long-Term Monitoring program. And then most recently and currently the Extended Drinking Water Monitoring program. Online we also have, uh, Doctor Ed Corl. He is the deputy director for the Naval Sea Systems Command Laboratory Quality and Accreditation Office in Portsmouth, Virginia, and has worked there since 2009 and in the field of environmental chemistry since 1989. He has oversight of the Materials and Engineering Laboratory accreditation program for the Navy's nuclear shipyards and also coordinates work on various areas of environmental data planning, sampling and analysis, and collaborating with other DOD services and agencies, regulators, and so forth. His 18 years of experience with the Navy and environmental analysis, and has served on as an expert on emerging contaminants, analytical chemistry, and risk assessment for the Navy Environmental Restoration Program. He has a bachelor's degree in biochemistry, master's in environmental chemistry, and a doctorate in environmental engineering. I'm very excited for today's discussion and our presentations will, which I will briefly review on the next slide here, specifically the content in which we will be presenting. Before I turn it over to our two subject matter experts. So specifically, um, we're here today to clarify and respond to the reports from the Honolulu Board of

Ben Dunn: [00:08:44] Water Supply, which included comments on the Navy's drinking water Long-Term Monitoring program and the associated Swarm Tech Memo from earlier this year. The report, prepared by BWS consultants, contained several misconceptions about the procedures. Some misunderstanding of the chemistry, and several false statements. So specifically today, what we're going to highlight are is this content here. Um, seven points, specifically, method compliance and data defensibility. Data on how chlorine reacts with fuel. Um, some comments about the surrogates and frequency detections and its response to chlorine concentration. Um, the Lab Clipped Chromatograms in our laboratory reports and method blanks. Laboratory contamination as it relates to TPH detection frequency and then method modification specifically with EPA Method 8015. And I will turn it over to (inaudible) points here.

Chris Waldron: [00:09:51] Good morning everyone. Aloha. So I'm going to take kind of.

Chris Waldron: [00:09:55] A step back.

Chris Waldron: [00:09:56] And talk a little bit about timeline. Um, just to kind of make sure that we're to set the, um, I guess the playing field, so to speak, and just to make sure that we're all on the same page. So some key historical information that was incorporated referenced in the BWS's reports was incorrect. Um, and I'm just going to give a couple of examples I'm not going to go into to all of them. But one right off the bat was a statement on the first slide that the Red Hill Shaft was flushed as part of the emergency response. And that's incorrect. And it's important from the context of trying to evaluate the data. So the Red Hill Shaft was not flushed. It was secured. It was taken offline. The Joint Base Pearl Harbor-Hickam drinking water system was flushed and the flushing that we did under the IDWST, both Red Hill Shaft and the Navy ʻAiea/Hālawa Shaft were secured and taken offline. And when the flushing was implemented for Joint Base, only water from the Waiawa Shaft, which was not impacted by the Red Hill release, was used. And that's true today. 100% of the water for Joint Base Pearl Harbor-Hickam comes from the Waiawa Shaft, which was not impacted. And that's a very important point to understand. Um, secondly, um, there was a comment about GACs - Granular Activated Carbon units - in Zones H1, H2, H3, and I1. So the Army installed some granular activated carbon units. For those who are not familiar with those,

Chris Waldron: [00:11:32] those will remove organic compounds, including petroleum, from water, when the water passes through them. In some of the statements that were made and the public forum, as well as in the reports, there was a statement that the GACs were in place and may have been impacted by the Red Hill release. That's incorrect. The granular activated carbon units were not installed and operational until March of 2022, after the system had been flushed, and that the health advisory had been lifted. So there's no way that they could have been impacted by any of the release of the fuel. And so that affected some of the analysis presented by the consultants. And there's other examples. I just. Those are two significant ones in terms of just baseline understanding of the Joint Base Pearl Harbor-Hickam system and its operations. So with that, I thought it'd be a good, good idea to present this timeline. Simple kind of high-level timeline of events. I know many of you are aware of this, but some may not be aware of it. And I guess I'm one of the people that have been around a while, so I kind of tend to go from the start at the beginning. So the first item up there is emergency response. So the release occurred in November of 2021, followed by the emergency response phase. That was right after the release and through the first part of December 2021.

Chris Waldron: [00:13:04] What happened there were a lot of activities, but just some of the primary ones. As I mentioned, we secured the Red Hill well, the Navy ʻAiea/Hālawa well, those were taken offline. Uh, and very importantly, the Hawaiʻi Department of Health issued a health

advisory to not drink the water on base. Um, shortly thereafter, in mid-December 2021 and going to March 2022, the integrated drinking water system team, the IDWST, was set up. As mentioned previously, that was an interagency team comprised of experts from EPA, HDOH, Navy, and Army. And it's important because this team was tasked with restoring drinking water to the Joint Base System, collectively. It wasn't a Navy effort. It wasn't an Army effort. It wasn't an HDOH effort. It was a collective effort. So all decisions were made, were made by the interagency team. They made those on a consensus basis. Uh, throughout. Now, I'll come back to that later. We had the Joint Base system flushing. So this was under the auspices and the direction of the interagency drinking team that occurred in late December is when it began and ran through March 2022. Again, 100% of that water was from the Waiawa Shaft. Flushing was done on a zone-by-zone basis. For those of you who may be aware, we had 19 different zones. Um, one of the really important points is that there was this process were the data-driven process. There were no assumptions made about the effectiveness of flushing. Everything,

Chris Waldron: [00:14:51] every step of the way was, uh, flush, sample, evaluate the data, confirm the results before we move on to the next step. So we in the flushing process, we flushed the mains first, sampled, evaluated the results before we moved into flushing every building and structure on base. And then we sampled after we flushed those. There was no assumption regarding the efficiency or effectiveness of the flushing. Another important point about this - and I know this has taken a little bit on this slide, but I think it's really important - is HDOH required other actions as part of the process to amend and lift the health advisories, and those included a number of different activities that were documented in Removal Action Reports. We call those RARs. Okay. The health advisory was lifted in March of 2022 for the entire Joint Base Pearl Harbor-Hickam system. That was followed by the Drinking Water LTM program. So we had flushed, sampled, and confirmed the effectiveness and restored the drinking water. Then we started a two-year period, March 2022 to March 2024, where we were going to continue to ensure that the drinking water on base was safe. A plan was developed by the interagency team that established data quality objectives for the LTM program. And we'll talk a lot about this later. So data quality objectives are key to any analysis of this. The plan was posted on the Safe Waters website in 2022 for public review.

Chris Waldron: [00:16:31] And data, including lab reports, was shared on the Safe Waters website throughout the LTM period. So we've shared our work throughout the emergency response, the flushing, LTM. There have been regular updates. All of the lab reports are shared. The data validation reports are shared, and summary reports are presented as well. So we've been showing our work. That's followed by the Extended Drinking Water program. And that

started in March of this year, 2024. Uh, the plan is again posted on the Safe Waters website for public review, and we are again posting all of our our lab reports, data validation reports and then summary information are shared on the website. A lot of information on that slide, but I think it was important just to level set and make sure that we're on the same page. Let's go to the next slide please. Okay. So I said I'd come back to this. Um, a little background on LTM objectives. So we're here primarily to discuss the BWS's comments on the LTM data and the Swarm Tech Memo. So it's important that we spend a few minutes discussing the purposes and objectives of the LTM sampling, which were documented in the LTM sampling plan. This is key. And I emphasize it's key because any conclusions about the quality, use, and applicability of the data for decision making should be based primarily on the data quality objectives.

Chris Waldron: [00:18:04] And they establish kind of the who, what, where, when and why. So with this, the overarching goal and purpose of LTM is to "ensure that the water is safe to drink, meets all State and Federal drinking water standards, and continues to be non-detectable or below the designed incident specific limit for petroleum and other response by-product contamination." That's a direct quote. So that's our overarching goal and purpose. But beyond that, for those of you who may or may not be familiar with data quality objectives, is how do we measure that? What do we how do we what do we do with that? So we establish numerical criteria. Those are our fundamental numerical objectives that we can use to evaluate data. And so for the the purposes of measuring our performance towards that objective, we established a numerical DQOs based on maximum contaminant levels. So those are EPA. And the state of Hawai‘i has maximum contaminant levels for concentrations in drinking water. And then also the Incident Specific Parameters, ISPs. So in this case, the Hawai‘i Department of Health established an Incident Specific Parameter or total TPH of 266 micrograms per liter. That was considered the safe level. So if we were below 266 micrograms per liter, that was considered safe for the purposes of LTM. And that's important because that was the primary criteria. And then finally there's the decision criteria. And that's highlighted at the bottom of the screen.

Chris Waldron: [00:19:48] So what does this map. What does this mean? How do we make decisions based on this for LTM? If tap water results collected from all representative houses and buildings that were sampled comply with Table 5 of this plan. Table 5 presented the numerical criteria, MCLs, and the Incident Specific Parameters. Then it will be confirmed that the drinking water in the area remains safe to drink. That was the purpose of LTM throughout. That was how the data were to be evaluated. The final result is the LTM data collected by the IDWST met the DQOs and confirmed that the Joint Base Pearl Harbor drinking water remained safe to drink. No data has been presented by the BWS's consultants to refute that the LTM

samples met the fundamental DQOs and decision criteria. Next slide please. So we collected, you know, over 9,000 samples as part of the overall LTM period. I wanted to just make sure that we're on the same page in terms of data. So this is a bar chart that shows the frequency of detections of certain concentrations of total hydrocarbons. I'm only showing the statistics up to LTM Period 6 because we made a change to the, the surrogate concentration of LTM 7, and wouldn't have been appropriate to include those that actually would have brought these numbers down. Um, slightly. Um, so here, if you look at this, the, the bar on the left shows that of all the 8,000 samples at that time that have been collected, 65% were non-detect.

Chris Waldron: [00:21:39] The first bend to the right of that kind of in the light blue, we had 25% of the samples. We had low-level detections that were what we call "J" flag, which is really kind of what we've been talking about. Um, as part of this overall discussion of the Swarm Team and, uh, with the BWS and BWS consultants. So 25% of the samples had low-level detects, so about 91% of the samples were either "J"-flagged or non-detect. So we're talking about very low-level concentrations. All of these concentrations are less than the 266 micrograms per liter. That's one of the key points. So we got very low-level detections of total petroleum hydrocarbons. And one of the key messages here that you'll, we'll talk about as we move on today is that we have a detection via Media Method 8015. They're not necessarily petroleum hydrocarbons, right? At these low levels, there are other potential contributors that we'll talk about in these. So you just can't take a result and run with it. Next slide, please. So I'm not going to spend a lot of time on this slide. This is, it's not not intended to be an eye test. But what I wanted to show was all of the 19 zones are presented at the bottom of the slide. And this is the same data on the previous slide. And it shows that the bulk of the data, again, in all zones, are all kind of coalesced around non-detect and 25%.

Chris Waldron: [00:23:15] And it's across the board. We see the same pattern of detections. Regardless of the zone that you're in at the sites. Okay, so whether it's 25%, if we move up to the 7% that were 75 to 100, you can see it's, it's not isolated in one particular zone. There are all zones throughout the site all the way up. That's really important that the distribution is similar. And the reason why I bring this up is that if if we were, if we were suspecting that the Red Hill release were the source of this, we wouldn't see this pattern, this expecting pattern, we would expect to see a distinct spatial pattern of detections, meaning in specific zones of the systems. And so higher concentrations of TPH would have been expected, uh, near to where the release occurred, not throughout the entire zone. Decreasing concentrations would have been observed further away, and non-detection would have been in many of the zones. But we didn't see that. We saw similar patterns of low-level detections throughout the system. All right. Next slide

please. So we're not seeing too much of a lag. I mean it's pretty much right on. That's good. That makes it easier. So what does this mean? In the Swarm Team, we worked with the laboratory to identify some contributing factors to the peaks. Looked at mass spectral analysis.

Chris Waldron: [00:24:42] And we're going to talk in more detail about that later today. The most predominant contributors, other than the surrogate by-products that we saw, were fatty acids, which are naturally occurring fats or lipids. Um, so that's hexadecanoic acid, octadecanoic acid are just examples. Things if you've touched, it gets on your skin. Those are coming from the fats or lipids on you. Phthalates. We use phthalates if they're in plastics. Very, very common in laboratories in the environment. These are not petrogenic hydrocarbons, but they all appear as TPH detection in Method 8015. And I know that I briefed many of you many times on this and the FTAC back in March. I mean, that's one of the key points of this, is that you can't just take an 8015 TPH result and run with it as if it's petroleum, because it's not. It could be. It could be petroleum. But you have to dig deeper. It could be pyrogenic. It could be biogenic, naturally occurring. It could be from a lab contaminant reactant. Those are very important points. The key message here is that there were no petroleum JP-5 fuel signatures observed in any of the samples analyzed. And I saw that in the BWS consultant's report that said that there were low-level peaks. But I believe in Doctor Winkler's report, he commented that in one of his conclusions that he did not observe any JP-5 signatures in the samples that he reviewed.

Chris Waldron: [00:26:15] All right. Next slide. Okay. So kind of digging into the meat of this, um, and focusing on the most current, uh, FTAC presentation by the BWS. One of the claims that was made was that "The existing data was found to be very suspect, and thus would be qualified as unusable for the purpose of proving the absence of TPH in the drinking water system." And I added the emphasis there and underlined "qualified." And "The data is technically not compliant or defensible and the samples were not collected in compliance with EPA recommendations." And this is an important point. This is a key claim in BWS's review and it's repeated multiple times. This is technically incorrect. It's untrue. And it's not sustained, uh, substantiated by any of the data. And we're going to address this in detail on subsequent slides. So a couple of points that I wanted to make is again, the LTM data are valid and are usable for the purposes established under the LTM Plan. So again, going back to our data quality objectives. Evaluating the data. It's very important. The EPA and HDOH have agreed with the overall Swarm findings. I know that there's some disagreement on some of the specific lines of evidence. They didn't agree on every single thing, nor do we expect them to. But in balance, they agreed with the conclusion that the detections were not associated with JP-5 fuel.

Chris Waldron: [00:27:50] It's very important. Another thing that I want to emphasize is, science can't detect a zero. I think there's a misunderstanding that when we talk about somehow proving the absence, no one can prove the absence of any contaminant. It's just not scientifically possible. And it's not credible to state that. We can only state what we can measure to, which is what we call "the detection limit." So we can say what is present above the detection limit. We can't say what is present below the detection limit. So we do our best to establish low detection limits. It's very important. But then beyond that we want to ensure that we have rigorous data quality control. The Navy did that under the auspices of the IDWST, where we have Level 2 and Level 4 data validation on every data package that we collect. And that's really, really important. These are some of the the most rigorously reviewed data packages you'll see out of a project with over 9,000 samples. The lab results and data validation reports are shared on the Safe Water website. And I've got a link down there. And obviously if we share this lot, share and post the slides, you can go to the link to Zone A1 to look at not only the raw lab reports, but also the data validation reports that show what we've done in terms of data quality. And so with that, I'll turn it over to Ed.

Ed Corl: [00:29:22] Thanks. Thanks, Chris.

Ed Corl: [00:29:24] I want to start off to make make sure that everybody can hear me on on your end.

Mark Williams: [00:29:30] Good to go.

Ernest Lau: [00:29:33] Can I ask a question?

Ed Corl: [00:29:34] Okay. I.

Ernest Lau: [00:29:36] Guess just a question in terms of the agenda after each each of your presenters present. And when does the BWS experts have an opportunity to ask questions or make comments?

JoAnna Delfin: [00:29:50] So the.

Ernest Lau: [00:29:51] Discussion and to.

Mark Williams: [00:29:54] Get through kind of.

Mark Williams: [00:29:55] Get through all the points in the open discussion. Okay.

Ernest Lau: [00:29:59] Thank you. Okay.

Mark Williams: [00:30:02] Go ahead, Ed.

Ed Corl: [00:30:04] Okay. Thanks. I'm uh, by the way, I have lost connection twice since we've started. So I'm going to deliberately hold my breath when I can and try not to make any unnecessary movements. I'm going to go very slow and very loud. I apologize for that, but I'm hoping very much that I don't lose connection. I am calling from Virginia, so, uh, hopefully we won't, we won't have any, uh, have any issues. So with that said, um, you know, Chris, of course, uh, kicked this off already and what I'd like to, to do relative to addressing these first two points is really based upon, um, two main areas. And that that is, the first one is that the comments suggest that there's some sort of, um, uh, requirement that, uh, by rule, states that if you don't quench chlorine, you basically don't, you don't pass go, right? That everything is invalid and unusable. Um, that is that is not correct. And I'll talk a little bit more about that in just a moment. The second part of that has to do with the data, the science. And that is did failure or not - I shouldn't say failure. Did the decision, the deliberate decision that the project team made to not quench the sample, did that somehow now provide us data that are biased low, and therefore unusable from a data usability standpoint? And I'm going to address that point as well. So, um, listen, the first part of this, the comments from both Doctor Winkler and AQA seems to suggest again that there's some sort of administrative or some sort of procedural proforma, uh, type of requirement somewhere that basically stipulates that if you don't remove residual chlorine,

Ed Corl: [00:32:03] then all the data are null and void. And as a matter of rule, you can't use the data anymore. And I can assure you that that is absolutely not the case. So it is somewhat the case for drinking water methods. So all of the laboratories that analyze drinking water for us across the United States, they are required to follow, um, the strict requirements of methods that are written and published under the Safe Drinking Water Act. So those methods are codified in the Code of Federal Register and CFR, and with few exceptions, the laboratories are required to follow those methods verbatim. But there is nothing in Method 8015. There's been some comments that the method requires quenching, and that is absolutely not true. Anybody on this phone, um, anybody that that's present, you can, you know, you can Google EPA Method 8015

and you can do a search for "chlorine" or "quenching" in that method, and you will not find those words do not exist. But the commenters are correct that you have to go back to a referenced chapter as part of the Compendium and SW-846 to find a reference regarding um, regarding quenching. Now, EPA Method 8015 is not a drinking water method. It was never designed for drinking water, and it was never published as a drinking water method, and it was never codified.

Ed Corl: [00:33:35] So it is not law and it's, they are published. All those methods were published for the Hazardous Waste Program under RCRA. And EPA Method 8015, I have personally and in a previous life, I've run Method 8015 - I don't know, thousands of times. So I have first-hand experience running this method. Um, and it was primarily designed really for the UST program, the Underground Storage Tank program. But it was really never designed for drinking water. So it was published in SW-846. It was never codified, and it's not required by law in any way. So, um, the commenters here are correct when they reference Chapter 4, again, of that compendium. And I'll talk a little bit about that in just a second. Um, so the second part of it, of course, um, is not only the data but the fact of the planning. So the sampling plan, as, as Chris had discussed, the sampling plan was actually developed along with our regulatory partners, that includes the Army, the Navy, the DOH and the EPA. Um, and it was planned as such. And that decision that was made to not quench the samples, um, was agreed to by that, by that project team as being consistent with the project objectives for the LTM. Now, that decision predated my involvement with, uh, with the Swarm. And I thought that, you know, maybe Chris now would might be a good time for you to provide a little bit more background on that decision when it was made.

Chris Waldron: [00:35:12] Yeah. Thanks. Uh, so the the things that I'd like to emphasize about that the decision is that this was very purposely and deliberately the decision was made. We had a lot of discussions with EPA and DOH, and in fact, they went over days where we were talking about, you know, what was the appropriate approach and what we were going to use going forward. We have to kind of take a step back when we, when the emergency response, when that occurred, we were in the height of COVID and there was a resurgence of COVID here on the islands. Um, there were supply chain challenges at the time. Uh, not only in getting necessary materials, bottleware and so on and so forth, but also just the the nuts and bolts of shipping samples and whether or not the laboratory was going to be open, or laboratories were going to be open. And so we were working that whole, whole slate of issues at the time. That's not an excuse, but that's a reality of what was going on at the time in November, December, January of 2021 and then 2022. Um, at the time of emergency response, a number of samples

had been collected by DOH and also the Navy that had not been quenched. And when we sat down and discussed that we were discussing this in the context of the the data quality objective of 266, you know, would this affect our ability to accurately and precisely detect concentrations at that level? And we discussed this.

Chris Waldron: [00:36:51] We had a number of different experts involved in the discussion. And and what we determined was, is that, if anything, that we would end up with a slightly biased, high result, meaning that we were we would get some false positives. But we would not, it would not in any way, shape or form, uh, minimize or limit our ability to detect TPH if it was there at the highest peak. So the decision was to move forward. And it's in some ways, it's kind of ironic because one of the things that we were concerned about at the time was if we, for example, when we were in LTM, we had another discussion about quenching versus not quenching. And the discussion was, well, if we're concerned at how that might be viewed if we changed our approach. In other words, we had gone through the emergency response and the flushing phase where we hadn't quenched samples. Now, if we switched to quenching, would that be viewed as some sort of method change or deviation, or that somehow that the data wouldn't be comparable. And you saw that in some of the BWS's comments. The question about the the EDWM and moving to the microextraction. Those are exactly the points that were brought forward there. And so we wanted to make sure that we had a consistent approach throughout. And so we went in this deliberately, with input from all of the partners, and ultimately decided this was the best way to go for long-term monitoring. Back to you, Ed.

Ed Corl: [00:38:23] All right. Thanks, Chris. And I think it's beneficial that it provides a little bit more context into that, um, into that decision. Um, so, so just to to summarize my points here for this particular slide. Um, again, there's no, there really is no method. There's no EPA, there's no federal or statutory requirement or mandate that specifies - if you don't quench the sample, um, then the data can't be used and that they're not valid. That is not true. Um, and any suggestion that this is, that this is the case is, is incorrect. So secondly, and as as Chris had described, the decision to not quench the samples during the LTM was made by the project team, um, and agreed to by our regulatory partners. So if we could go to the to the next slide please. Might be a little bit of a lag. I don't, I don't see the advance yet.

Chris Waldron: [00:39:38] It's, it's up here in the room okay. It's okay.

Ed Corl: [00:39:42] There we go. Yeah. There's there's quite a bit of delay there. So um I'm going to, I'm going to try to go as slow as possible to make sure that that we're in sync. Um, so I

wanted to make, you know, the the case in point, um, again, about the reference to Chapter 4. Again, the, this reference about quenching is not in the method, but the method does direct you to an earlier chapter of the SW-846 Compendium. Um, and the reviewers are quite correct by that, but you will find that this is actually the only reference that exists. Now, this is not what you're reading here is not something that the Navy made up. This is this is verbatim directly out of SW-846. So, um, as you can clearly see, this is a recommendation. The preservation and holding time and those type um, of, of of recommendations are not requirements. Um, and the team again collectively decided not to, not to quench those samples. So again, this is the only reference that you will find, um, regarding quenching. And again, it is not a requirement. It's a recommendation. So from that standpoint the data are absolutely valid and 100% usable. Um, but now let's, let's take a step back from that just a moment. Right. So, um, even Paul Winkler, to his credit, during the FTAC, he asked the right question, which is the elephant in the room.

Ed Corl: [00:41:23] And that is, if the decision to not quench the samples, um, could that have produced biased low data? Um, and that actually is the question. And the Navy is prepared to, um, to address that one as well. So if we could go to the to the next slide, please. So assuming that you guys are seeing the next slide, uh, and I'm not, let's talk about this a little bit. So, um, in other words, if low levels of JP-5 were in fact present and residual chlorine remained in the samples, do our results represent the true levels of JP-5 if they were in fact present? Um, at that point of compliance, in other words, at the location that they were taken. So, are the results not representative or are they are they biased low, in other words. So let's, let's start off first with a little bit of chemistry. And I don't want to delve into this too much. It's been a while since I've been out of graduate school. But let me tell you what I do know as a chemist. Right? So JP-5 contains primarily straight chain alkanes sometimes are referred to as aliphatics and can be between, depending upon where it's manufactured, but, but usually it's between 80 to 85% of JP-5 consists of linear and cyclic alkanes, so the vast majority of JP-5 are these linear and cyclic alkanes. So these are saturated hydrocarbons, and they are not likely to be degraded by the low levels of chlorine that are typical in distribution systems for that exist for for what we call breakpoint chlorine chlorination.

Ed Corl: [00:43:21] Um, so there's, there's just not enough oxidative power, there's not enough oxidation strength caused um, or exist at 500 parts per billion or one or even two parts per million of residual chlorine to cleave off methyl groups or to break alkanes apart and what we call complete mineralization. In other words, the, the ability of the chlorine to degrade the alkanes and therefore give us low-bias results. And that is just not the case. Now, what we do know is a possibility, because we've seen this reaction with our surrogate that you can get, um,

chlorine and bromine reactions with electron-rich groups. So these are things like aromatics. And that's why it um, that's why it is reacting with our ortho-terphenyl surrogate, which is high in aromatic groups. And and it can also react with olefins. These are double bonds. And these are what we call "electrophilic addition reactions." So those are possible. We know that from a chemistry standpoint, we've seen it um with our surrogate that can currently have. However keep this in mind even if these electrophilic addition reactions are occurring, those adducts, in other words, those by-products would still show up as detects under EPA Method 8015. So if anything, we're not expecting to see a biased-low result.

Ed Corl: [00:44:59] If anything, you're going to get biased-high data if you don't quench the sample and we have the data to support that. And I'll show that to you in just a second. But I wanted to to re-summarize, um, that the decision to not quench the samples did not create a situation where our LTM data were not representative or biased-low. It just didn't happen. Chlorine concentrations in the distribution systems are just not high enough and don't have enough oxidative power to degrade the major constituents of JP-5. It's just not going to happen. Okay. So we have to be data driven in our decisions, right? So if we could go to the next slide. So this kind of sets up, um, a little experiment that the Navy did to make sure that we confirm what we know, um, to be happening. So in February of, uh, of 2024, there were 23 site samples that were selected for matrix spike analysis. So these were side-by-side analysis of, um, drinking water distribution samples from Red Hill. Uh, one bottle for each sample, one was quenched with sodium thiosulfate, one was not quenched with sodium thiosulfate, um and one was and they they both had JP spikes JP-5 spikes of 100 parts per billion. So this is relevant to fairly low-level um JP-5 concentrations, so both were spiked at JP-5 concentrations of 100 ppb.

Ed Corl: [00:46:40] So that's slightly above our nominal reporting limit of 80. These were extracted using EPA Method 3510, which is the methylene chloride method that was used early on in the LTM. And in the next slide I'll show you a table summary of that, um, of the spiking experiment. So assuming you're seeing the table and I'm not, the ah okay. Outstanding. Yeah, there's, there's quite a bit of delay here. I'm sure it'll come up in just a moment. So, um, listen, all, all recoveries and there was one exception that we appropriately noted, um, below that we found to be, um, some contamination in the laboratory. But all of these discoveries fell within the acceptance criteria that was set up as part of our sampling plan. Now, these data actually confirm what the chemistry, what I think about the chemistry, what we knew was going on in the system and actually confirmed that the decision that the project team made to not quench the data can in fact and does meet our project quality objectives. So if you look at the unquenched, um, MS samples. All right, the matrix back samples, you'll see the average recovery for those

samples that were not quenched. So we have samples of where residual chlorine remains. And we have a spike of 100 parts per billion. The recoveries are very good. The average recovery is about 92%.

Ed Corl: [00:48:22] And you can see that the ranges of those recoveries are anywhere from, um, from 52 to 131. Um, however, the quenched samples, those same samples except quenched with thiosulfate. The average recoveries were 81%, certainly statistically different data set and those ranges 38 to 110%. So as you can see, these data only confirm exactly what we know about the chemistry and what we thought about our data quality objectives. And only confirm this is the data, our data-driven, um, results and conclusion that in fact the data are usable and meet our, our project quality objectives. So we, we've shown as factual evidence that first of all, there's no procedural rules that specifically state that if you don't quench a sample, the data are invalid. That just doesn't exist. That is false. Method 8015 was published under SW-846. It wasn't published as a, as a drinking water method. In Chapter 4 of the Compendium, these are all recommendations only. However, the chemistry, the science again suggests that the decision by the project team to not quench the samples is not going to degrade the sample and not going to, um, result in a situation where we can't use the data for our specific project objectives. And most importantly, of course, the Navy has shown that the data supports that fact. So, um, with that said, I think I'm going to turn this now. Chris, back over to you.

Chris Waldron: [00:50:12] Thanks, Ed. (inaudible). So we're going to advance to the next slide. You'll get it in about 20 seconds. Um, so one of the, um, one of the claims that was made, um, in both the, the BWS reports as well as at the FTAC presentation, was that there was an agreement that the surrogate does react with chlorine and bromine. However, the surrogate concentration was constant throughout LTM, and the frequency of TPH detections did not change with chlorine concentration. And then the second part that kind of goes through this is another quote, is that the surrogate concentration was the same throughout LTM 1 through 6. Therefore, the contribution to the signal from the chlorinated surrogate is expected to be constant. And so that's one of the the fundamental kind of comments is that, why didn't we see the same frequency of detection of TPH throughout? Why wasn't it 60%, just above the detection limit everywhere at all times, if the surrogate concentration was was constant and it was reacting with the chlorine and bromine? And it's an, and it's an excellent question. I mean, it is um, but I think that and I'm going to show the data this, but the comment tends to oversimplify the reaction between chlorine. And I'm going to put bromine there and I should just say halogens but chlorine and bromine and the surrogate. We don't fully understand all the details of

the reaction. However we know we know quite a bit, based on the theoretical science as well as a number of different empirical, um, data and studies that we've done. So many factors affect the reaction between chlorine and bromine with the surrogate.

Chris Waldron: [00:52:05] That's the obviously it's the chlorine bromine concentrations are important, but also the reaction time, temperature, light and other factors are going to affect what happens in terms of that reaction. So we're talking about the, the, the halogenation of that o-Terphenyl and how much of that's actually going to be either brominated or chlorinated. It's going to depend on multiple inputs into that reaction. And I'm going to show some data here on some subsequent slides. So one of the things that I'm going to kind of go into are a surrogate retention time experiment, which demonstrates the significance of reaction time on the formation of the TPH chlorine concentrations that slightly increased over LTM. Uh, chlorine and bromine, they react with the surrogate that result in false positive detections. So if you eliminate one or both, uh, then the probability of a TPH detection is decreased significantly but show that both statistically and then also empirically. And then lastly, uh, we're going to show how the reduction in surrogate concentration affected the TPH detections and in LTM Period 7. Where TPH detections dropped dramatically just due to the reduction of our surrogate concentration in those samples. So multiple variables that play into this, which is why you don't get a single constant signal if you will, out the back end. So the first if you go to the next slide. Uh, this is a just a quick summary of a retention time study that we did. Uh, this is related to the halogen reactions that ended previously referred to. We know these reactions are occurring, and even the data validators, even the folks at BWS acknowledge, they acknowledge that this is the case.

Chris Waldron: [00:54:08] But we did some further digging and further evaluation with the lab in order to try to demonstrate this empirically based on our, on our data. So what this is showing is these are, there's, uh, four bars on this chart up here. And so on the left-hand side is the 8015 TPH result in parts per billion. And on the x-axis down below is how long the sample sat from preparation to actual analysis. So the surrogate was added to the sample. It was prepared like any other sample. And then it sat for a period of time. So we sat, we analyzed some samples immediately. We let it sit for four hours, another for 12, and 24 hours. And so what you can see here is the concentration of uh, of TPH that's reported increased with reaction time. So there's no change in the chlorine concentrations. There's no change in the surrogate concentration. The only variable that was was varied was time. Right? So this shows that time is an important component. So when you look at where we analyze the samples, immediately we get a result of 15 parts per billion. And that's a brominated o-Terphenyl, okay. That's our surrogate reaction. What we're seeing there. If we let that same sample sit for four hours, we get almost 70 parts

per billion. So that's above our method detection limit. So if we analyzed immediately we'd have a non-detect. We let it sit for four hours. We get a detect at 70 parts per billion. If our method detection on that's 50.

Chris Waldron: [00:55:57] And that just increases with time. So it's really important to to note that we wouldn't expect necessarily to have a constant signal, meaning a constant TPH result, because we know that not the samples didn't necessarily get analyzed immediately every single time. Now, I'm not suggesting that the lab let the sample sit for 24 hours. They didn't do that. Typically, the lab analyzed the samples, likely within an hour or so. Um, they use the term immediately. Um, but there's, there is a time delta for sure between samples. Higher TPH concentrations or false positives were observed as residence time increased, demonstrating an unquenched samples are biased high. So this gets back to that whole concept of you know, what are we seeing in terms of the results and the bias of those results? Now for full transparency this is a, it was a limited set. We had one set of four samples. By no stretch of the imagination was this a statistically derived replicate sample set. Okay. So um, being fully transparent as, as we are and have been, I want to be able to show this. We didn't include this in the Swarm Team Tech Memo because it wasn't a statistical replicate sample study, but we incorporated it here for the purposes of furthering the technical discussion. This is an important piece of evidence in terms of the reaction.

Ernest Lau: [00:57:30] Why? Why wasn't it given to us?

Chris Waldron: [00:57:35] And again, this wasn't because we only had one set of samples that we ran this on. We didn't feel that it had the met, the scientific rigor to go into the Tech Memo at the time.

Ernest Lau: [00:57:47] But if time appeared to be so important, wouldn't the, the next logical question be maybe we should do a more rigorous examination substantiated (inaudible)

Chris Waldron: [00:57:58] But potentially, yeah, I mean, certainly I mean, there are other I mean, I would come back to this, that there are other lines of evidence that we evaluated in this and so, looking at across all the lines of evidence. And I'll present some other information here.

Ernest Lau: [00:58:11] And when you're talking about time, is the time from when the sample is taken and when the lab actually performs,

Chris Waldron: [00:58:16] No, this is only the time between the lab has received the sample and now they are preparing the sample. So they, um, they are extracting it, adding the surrogates. So this is only that time. So it's not the time between collection. It's the time to.

Ernest Lau: [00:58:31] Shipping.

Chris Waldron: [00:58:32] Yeah. And which doesn't really affect this, because the surrogate is introduced at the lab. So that's where that reaction would occur. And so this is demonstrating that we introduced the surrogate. And so that's the time between introduction of the surrogate and actual analysis.

Ernest Lau: [00:58:48] Well in your limited analysis of the sensitivity down into, instead of hours, and measured in minutes make any difference to you?

Chris Waldron: [00:58:56] Um, so they measured them in hours. The first one you can see the first chart there is literally probably they analyze those samples, what they said immediately. But it was less than 30 minutes in terms of timeframe. I mean, I don't have the exact, whether it was 32 minutes or whatnot, but.

Ernest Lau: [00:59:12] So some samples sat for even 24 hours,

Chris Waldron: [00:59:15] One, one set that was run as part of this limited study was allowed to sit overnight, 24 hours, before it was analyzed. And again, that's, the sample was prepared and it was ready to inject on column. And then it sat.

Ernest Lau: [00:59:30] Yeah, this is a big difference between 15 parts per billion and 117.

Chris Waldron: [00:59:35] Exactly. Yep. Now again, most of the.

Unknown: [00:59:40] Samples that didn't have these are pure surrogate samples.

Chris Waldron: [00:59:44] These are samples that were this is of Joint Base water, but they didn't have JP-5 in it. So this is what you're seeing are the results of the reaction between the chlorine and the o-Terphenyl creating the brominated or o-Terphenyl or chlorinated o-Terphenyl, which then shows up as a TPH detect. So.

Ernest Lau: [01:00:07] But these are samples taken from the residence or.

Chris Waldron: [01:00:11] Joint Base, Joint.

Ernest Lau: [01:00:12] How do you know they had no TPH?

Chris Waldron: [01:00:14] Because they actually have the actual original samples as well. Yeah.

Ernest Lau: [01:00:20] Thank you.

Chris Waldron: [01:00:20] Yeah. You bet. Okay, so if you go to the next slide. So.

Nāʻālehu Anthony: [01:00:27] Check for time we're at 10:00.

Chris Waldron: [01:00:29] Okay. Um, so for, uh, chlorine residual. So, um, the statistical analysis of chlorine residual concentration measured during TPH collection indicate that disinfectant levels have increased during the second half or did increase during the second half of 2023, coinciding with the onset of more frequent TPH detections. Um, and just showing that the systemwide median value increased by 100 parts per billion, uh, to about 520 parts per billion. And you can see that in that far right-hand side. So in Period 5, 6, and 7, you can see that we had about 410 parts per billion residual chlorine. That increased in Period 6 to 500. And then in Period 7 to 520. So it wasn't a static number. It's not, that's not a huge difference in that we wouldn't expect that there would be a huge difference in residual chlorine concentrations.

Chris Waldron: [01:01:39] That's part of the operation and maintenance of the system. But it's important to note that there was a slight increase that coincided with that. So we knew at the time that chlorine was an important component in the reaction with the surrogate. But we also suspected bromine as part of that reaction. Um, and this is back when we were having many discussions in the Swarm Team Tech Memo back in January and February of this year. But we didn't have any bromide or bromine data collected as part of LTM. So we just, we simply didn't have the bromine data that we could, uh, present in terms of the reaction. So we suspected it. Um, but it wasn't there. We have collected bromine under the EDWM program. So starting this year. So from April to September of 2024, uh, the pre-chlorination concentrations from Waiawa Shaft and these are naturally occurring or it's about 130 parts per billion. So that's on average the post-chlorination samples for bromide are typically just under 100. So a slight reduction

post-chlorination. Um, we are continuing to sample for that. But that's an, that's an important part of this overall kind of assessment in that we've identified that the o-Terphenyl primarily reacts with it looks like bromine somewhat with chlorine in the lab actually identified it as a brominated o-Terphenyl. So the bottom line is it's chlorine is only one part of the story. It's only one of the variables.

Chris Waldron: [01:03:21] But multiple factors, um, impact the formation of a false positive TPH detections due to the reaction with the surrogates. Go to the next slide. So we did, in the Swarm Team Tech Memo, um develop a logistic model to predict the odds of a TPH detection as a function of chlorine residual and surrogate concentrations. This doesn't take into account, uh, time, temperature or other factors are simply looking at what was the impact of the relationship between chlorine and the surrogate. So the odds ratio is a statistic, for those of you who may not know, that quantifies the strength of an association between the event of having a TPH detect and the chlorine and residual surrogate concentrations. One of the advantages of using a logistic model is that you can input multiple variables into the model and evaluate their relative impact on the actual outcome. So, um, if, if the odds ratio equals one, then the odds of a detector, regardless of whether or not a chlorine residual is there or not. So basically it's background. You're not seeing anything. So if you get an odds ratio greater than one, the higher it is, the more significant the impact is. The results of this slide show that a unit increase in chlorine residual increase the odds of

[01:05:04] the TPH detect by a factor of 5.1. So that's five times the odds ratio of one. And that was statistically significant, showing that there was an impact on the TPH output, which is what we would have predicted, based on the theoretical analysis of the reaction as well as some of our other empirical data.

Chris Waldron: [01:05:27] But also, it's important to note on here, using the the surrogate concentration of 2000 mg/l, increase the odds of detection by a factor of 11.1. So the surrogate concentration was even more significant in the formation of the TPH detection. Um, obviously, as I mentioned previously, we didn't have bromine at the time the Swarm was convened. If we had, I would have included bromine. Peter would have included bromine in this, and we would have run that. The bottom line from this is if you remove the halogen. So chlorine or bromine. So like quenching. Or if you remove or significantly reduce the surrogate, the false positive TPH detections decrease significantly. So again that's that relationship. What's the cause and effect? What are we seeing? And that's a contributing to false positives. Okay. Next slide please. Another slide - I have two more slides here and then I'll turn it back over to Ed. Um again getting

back to kind of this concept of signal so that we have a constant signal throughout. So what we did was, um, put together this kind of stacked bar chart, which is a little hard to see. I apologize for that. So I'll try to kind of take you through this, but these are about 20 different samples from Joint Base.

Chris Waldron: [01:07:01] These were all reported as TPH detections just above the method detection limit. The method detection limits highlighted in that kind of orange-red line up. It says MDL midway up on the chart. That's 50 micrograms per liter. And what we did was we took the, the samples here, and we asked the lab to try to break down by evaluating the chromatograms that fit the detected concentrations and put it into individual buckets. Right. What contributed to that? Now, again, as Ed said, when when this analysis is done, the lab just integrates, meaning any of the peaks that are shown, they get added together and the concentration appears. This is kind of breaking that down. So the yellow bars on this chart, um, show the concentration that's associated with the surrogate reaction. So this is the halogenation of the surrogate. And so you can see, you know, kind of starting from the left and working your way across, that the yellow bars are not a constant signal. It varies. So again there are multiple factors. We talked about time being an important part of this chlorine residual concentration. Bromine concentration are going to be important parts of this. Potentially temperature so on and so forth. But we can see that the concentrations vary. But we have many concentrations that are right around, say 30 parts per billion or so. And then we have some in the middle that are kind of down around ten parts per billion and slightly less, but they contribute significantly to the potential detections.

Chris Waldron: [01:08:47] Um, the green bars, the next ones up on top of that, those are what we call the Four Horsemen. They appear in every sample. Those are brominated and chlorinated alcohols. They will disappear with quenching. Again, so if you stack those two together, you get a signal that starts to get pretty close to the method detection limit. The light blue bars are fatty acids. Okay. And then the other ones are other miscellaneous peaks. None of these are, um, jet fuel or have a petroleum signal, but they show how you can arrive at an additive effect within the non-discriminate or indiscriminate 8015 analysis to get a detection of what comprises it. So the signal strength is not the same across the board in terms of the o-Terphenyl reaction with the halogens. But in looking at this, this provides information in terms of, of what we're seeing in terms of this. And ultimately, I think Doctor Winkler commented this in his review is that at these low levels, any signal contribution is going to potentially kind of add to that bucket and put you at a level closer to the method detection limit. So taking steps to reduce that - any of those additive signals - will then bring us down. And we haven't seen any sort of signatures that are indicative of fuels.

Nāʻālehu Anthony: [01:10:14] Hey Chris it's 10:15. How many more slides did you folks have?

Chris Waldron: [01:10:18] Uh, we've got about ten. So there's three points left over here.

Nāʻālehu Anthony: [01:10:23] Okay. What I'd like to request that we get the full half hour Q&A just to make sure I don't want to be penalized, because the admiral was tardy.

Chris Waldron: [01:10:31] We'll go ahead and add the time.

Chris Waldron: [01:10:34] Um, okay. Next slide, please. So this this last slide I think is really important. Um, on this, this slide shows the impact of reducing the surrogate concentration on TPH detections during LTM. And so on the left-hand side, we have the y-axis. We have frequency of detection. And you can see in Period 6 in the green the surrogate concentration was 2,000 parts per billion o-Terphenyl. We had - and you can kind of get an overlap there - but about 64% frequency of detection in LTM 6. Low-level detections of TPH. You move over one one bar to the right in blue. This is the first part of LTM Period 7. So this is before January 18th 2024. The samples that we collected in LTM 7 had exactly the same surrogate concentration of 2,000 ppb. And we had a frequency of detection, again, very low levels. But we had detections of 61% at that time. And you can see that. And I want to call this out. We're talking about a large number of samples for Period 6 - that's 1,522 samples that comprise that green box. So it's a large sample size. For the blue box blue box, we had 325 samples that went into that 61%. Now, in Period 7, we made the decision to reduce the surrogate concentration from 2,000 ppb to 100.

Chris Waldron: [01:12:18] And that was the only change. So we're still talking about using Method 8015 with the Prep Method 3510, which is separatory funnel with methylene chloride. No other changes were made. No changes made to our sample collection procedure, no other changes. The only change the lab made was to, was to reduce the surrogate concentration. And you can see that the number of detection, the frequency of detection drops off precipitously. So we end up with 3.1% frequency of detection in Period 7 after only reducing the surrogate concentration. And again, that's based on 1,179 samples. So it's a huge sample size. So there was a significant reduction in TPH detections in LTM 7 when only the surrogate concentration was reduced. All other parameters remained unchanged. And again, that ties back to all the lines of evidence that we talked about previously in terms of the reaction with the o-Terphenyl, what we're seeing with bromine and chlorine, and all the other lines of evidence. It's really

important that this shows, again, what we documented and, and, and predicted in the Swarm Team based on our analyzes. This came out obviously after that because we didn't have this data, but it confirms what we said.

Nāʻālehu Anthony: [01:13:39] Chris, can you explain that to me? I'm not a, I'm not an engineer. What, why you made the change, uh, midway through seven to this 2,000 parts per billion, down to 100 parts per billion.

Chris Waldron: [01:13:51] So there were a lot of discussions, as you're aware of in, in the Period 6 time frame. So in the fall of 2023, you know, we were seeing 60% low-level detections of TPH. And so the Navy EPA, DOH there were a lot of discussions going on in terms of what's why are we seeing this? Why is this, why is this increased? You know, previously we were seeing low-level detections probably about 20 to 30%. And then it went up. And so we started digging into this. And as part of this process, um, the, the potential reaction between the surrogate and the chlorinated or halogens appeared. And we, we looked at that in the discussion was, hey, we're seeing the same peak on every single chromatogram. So when we look at the chromatograms, right after we get the solvent front, we get what we call the Four Horsemen, and then we see one right after the surrogate, there's another peak that appears. And so what happened was there was a number of discussions. We said, well, look, we can, uh, look at reducing that surrogate concentration. It's not going to impact our ability to detect. And that's what the results were. So it was a science led us to this.

Nāʻālehu Anthony: [01:15:09] Who, who - where is it mandated for the 2,000 parts per billion for the surrogate?

Chris Waldron: [01:15:16] So the lab sets that up based on what the initial expected concentrations are. And the surrogates are typically much, much higher because they're guideposts that come out.

Nāʻālehu Anthony: [01:15:25] Right.

Chris Waldron: [01:15:25] Right. We put the surrogate in and we want to see it. And it's always much, much higher than what the expected result is. And so the lab set the surrogate up, based on the data quality objectives of detecting, say, 266 if you evaluate that. So it's not uncommon for the lab to have a very high surrogate concentration, especially if we're expecting to potentially see some detections. And again, I'll have to go back to say out of emergency

response and flushing there was still quite a bit of discussion about that there there could be potentially isolated pockets of jet fuel that's out in the system that we might detect. And so we were not under the assumption that, hey, we're going to have all clean, clean, clean samples. We want to make sure that the analytical program was set up to be able to detect those. Now, certainly now after two years, we've got a lot of data that shows over and over again that we don't have TPH, but the lab had it set up at 2,000 to start with, which was which isn't unusual by any stretch.

Nāʻālehu Anthony: [01:16:31] And so LTM 1 through 6 was 2,000 constant, until you made this change at 7.

Chris Waldron: [01:16:36] In 7. Based on the data that we had.

Nāʻālehu Anthony: [01:16:39] And so the gradual uptake of TPH over time is explained by what?

Chris Waldron: [01:16:47] Well, that's one of the things. I mean, again there's multiple factors in that reaction. We don't understand all of the specifics of exactly why we we ended up with a 60% TPH frequency of detection in Period 6. And under the Swarm Team we evaluated, you know, were there changes in operational parameters? Were there changes in lots? Meaning, you know, a different chlorinating agent, were there changes in doses? We weren't able to identify or pinpoint an exact specific explanation for why it went up to 60% in that period. What we were able to explain is why we were seeing TPH detections at all at low levels. And that's the detection here and the reaction between the chlorinated and bromine and the o-Terphenyl. Um, and you can see that conclusively on this slide. And what the other lines of evidence.

Nāʻālehu Anthony: [01:17:42] Thank you.

JoAnna Delfin: [01:17:43] So I think there's still a lot of discussion happening. Um, we want to try and get through all of the slides and then continue on with the discussion after. But I know we all appreciate the conversation. Just, um, we want to go ahead and move forward.

Chris Waldron: [01:17:56] Thanks, JoAnna.

Chris Waldron: [01:17:58] Okay. Next slide.

Mark Williams: [01:18:07] Ed, over to you.

Ed Corl: [01:18:11] Okay. Thanks, guys. Again I, I really apologize to everyone. The audio is um, at least on my end from all of you coming in, uh, pretty broken. Uh, and I hope mine is coming in clear enough. Um, I think I also heard that we need to do a little bit of a time check, so I'll try to speed along a little bit to keep us on schedule. Um, I'm now assuming you're on point number six. Slide 23.

Mark Williams: [01:18:39] Ed, we're we're fine time-wise. And we can hear you loud and clear.

Ed Corl: [01:18:43] Okay. Outstanding. Good. And if I need to slow down, or if you can't hear, hear me, please, please let me know. Um, so, you know, relative to to point number six, um, regarding, uh, lab clipping, you know, I want to I want to state before we start that probably this comment, um, was the most, uh, concerning to the Navy, um, because it suggests that either the laboratory and or the Navy manipulated data with some, like, purposeful subterfuge or ill intent at manipulating data. And I want to assure everyone that is absolutely not the case. The Navy strongly rejects that notion in its entirety. Now, I can understand the comment, and I'll go into that in just a moment, but I want to make sure I'm very clear that NAVFAC, the command, and certainly my office -- I work for a data quality office. We would never allow. We would never tolerate such actions for us, from my office, those are called inappropriate practices. Um, and we would never allow them to happen. And I can tell you, firsthand, that, um, NAVFAC and the command would not allow it either. So, um, so with that said, um, the concern is, in my opinion, um, from what I call an unfortunate use of the term "peak clipping." Um, now, this process does not affect integration. It doesn't affect the peak, peak signal. It does not affect quantitation. It's simply a scaling feature by the Chemstation software or the manufacturer. So, um, that's done by the laboratory. The Swarm Team and its report,

Ed Corl: [01:20:33] we also did resize some chromatograms. Um, it's nothing more - if you can think of either blowing up, um, or or condensing down a picture - um, that's basically when I say resizing. That's all it is, right? So, uh, also keep in mind that, um, the majority of the integrations are automatically performed by, by the Chemstation software. The only way to manipulate an integration is if the laboratory does what's called a "manual integration." Um, and our data validator commenters, they, they're quite familiar with this, I'm sure. And so am I. Um, the laboratory, if they do a manual integrations, they have to justify why they would do it. Um, and that would show up as part of the audit trail as well. So the data validators would be very, they would clearly see that, um, during the, during the data review. And again, keep in mind that the

laboratory uploads, uploads their data directly into the EDMS, not the Navy. So the Navy can't, um, can't have any input into this as well. But, um, my case in point, if we could go to the to the next slide, please. So assuming you're on slide 24, um,

Mark Williams: [01:21:48] We are.

Ed Corl: [01:21:49] Uh, okay. Thank you. So again, um, I want to restress that this absolutely is not in any way, um, a situation where either the laboratory or the the Navy manipulated any data. But as I said before, I understand the comment. I'm a, I'm a data-quality guy.

Ed Corl: [01:22:11] Right? So I understand. So, um, they're on slide 24. What I did here, was I took a screenshot that's directly off of one of the raw data reports for EPA Method 8015. And you can see the highlighted text that I have there. And this is probably what precipitated the comments from the data validators. And as the data-quality guy, again, I would ask the question as well. So, um, the, the Navy dug into this a little bit more to make sure that we obtained all the facts, and we found that this really is due to what I call an unfortunate use of the term "peak clipping" not by us, but by the underlying software and the manufacturer. So again, the software scales the chromatograms, um, in, in its report, so that figures are better defined and that integrations can be more clearly defined, um, to the, to the analyst. And again, the Swarm Team, also, we resize some chromatograms as part of our report as well, but in no way, either by the laboratory or by the by the Swarm Team. In no way were any integrations or data manipulated in any way, whatsoever. And if you can go to the next slide, I'll provide you a caption of some text directly, uh, from the the software from the vendor of the, of the, of the instrument itself. So again, assuming you're on slide 25, I'm still on 23 on my screen. But um, so to be more clear, this is a narrative that's directly from the Chemstation manufacturer.

Ed Corl: [01:23:55] So this is not from the Navy, right? This is from the manufacturer. And you can, you know, you can read through this, but, you know, basically, um, it says clipping is a scaling feature. And some of the older versions of Chemstation, um, and it's used for 6890s. These are some of the older versions of, of some GCs, um, that are out there. Um, and it's, it's done to scale the small versus large peaks. So chemists are able to properly integrate the peaks in the software. This does not affect the integration, the peak signal or the quantitation, it simply scales the signal. So again, I do understand the comment. I do understand the comment and I get it, but I really think this is really nothing more than a misunderstanding. And it's unfortunate that the manufacturer used the term "peak clipping". But again, excuse me, in no way were integrations or signals in any way manipulated. Um, and again, the, you think about EPA

Method 8015, it really doesn't deal with individual peaks anyway, right? Method 8015 is a total integration, um, of, of what's underneath of, of what's above the baseline. So it's really based upon stop and it's based upon stop. So, um, that's really what you know, what, uh, you know, what manipulates or what really starts the integration. Um, and if the laboratory does any manual integrations, it's it it's indicated on the report, and also provided as part of the audit trail to the,

Ed Corl: [01:25:30] to the data validators. Um, we reviewed the data and I saw very, very few instances of, uh, of any manual integrations being done by the laboratory. So, um, moving on to slide 26.

Mark Williams: [01:25:51] Good to go.

Ed Corl: [01:25:52] So again, good. Uh, my screen is still on 23. So there's quite a, there's quite a bit of lag, but um, so method blanks, you know, this is actually, um, a really interesting, uh, part of the, of the mystery that we call EPA Method 8015. Um, you know, I think it's really so, you know, point number seven. So first, first of all, let's start there. So, so the method blank showed that laboratory contamination does not appear to be a major cause for the increased frequency of the TPH detection. So as Chris mentioned earlier, the Swarm Team first, was first brought together to, to try to investigate these increases of very low-level detections. And um, we tried to wrap our heads around exactly what, what was happening. And, you know, if you think, um, that it's actually more appropriate in this instance to say that for the most part, method blanks didn't show a problem with the system. Um, and that is true. But you have to remember that, and Chris alluded to this earlier. You have to think about the construct of detection and how we're using data based upon signal-to-noise ratio. Right. So that's very, very critical. Um, EPA Method 8015 was really never designed to look at TPH at these low concentrations.

Ed Corl: [01:27:18] So blank noise, if you will. Methylene chloride is a very good solvent. Remember that. And also remember that Method 8015 is a nonspecific method. Remember that the detections that we see and is reported as TPH by Method 8015 does not mean that it's specific to petroleum. That is absolutely not the case. So anything that will be extracted into that solvent, and then anything that will be ionized in that FID flame will show up as a detection in Method 8015. It does not necessarily mean it's TPH. So, you know, this concept of noise is relative. And the more that you extract a volume and reduce it down or concentrate it, it's true where you can get more signal and therefore a better detection, but you also suffer the potential complications of also increasing the noise. Right. And the fact that 8015 is a very nonspecific

method, then your signal-to-noise ratio may not change with that, right? Because you may get more signal but you're also getting more noise. So this concept of contributions of the method blank is relative. And it's really, really important depending upon where you are in that scale. So perhaps at concentrations above our reporting limit or the quant limit where you're looking at signal-to-noise ratios of theoretically 10 to 1. Those are situations where now you're getting a lot more confidence that, that, um, that what you're seeing in that detect is really in your sample and not part of the noise or part of that background.

Ed Corl: [01:29:01] Um, and your method blanks. Secondly, um, keep in mind that method blanks are wonderful indicators. They are, um, of contamination, contamination issues, um, in the laboratory for specific batch. But remember that, um, they are really only good at, at finding systemic issues. So here's some examples for you. So, um, things that come into contact with your method blank and also follow the same process for your samples. So things like your solvent. Right? So if your solvent is noisy, if it's contaminated, that solvent is also used for your samples. So that a method blank contamination is also going to be representative of potentially what's going on in your samples as well. But remember that's not always the case. You can get what I call "episodic contamination." And I'm going to show you an example of that in just a moment. You can get episodic contamination of specific samples that will not show up in your method blank. The key is finding sort of that baseline, right? That baseline for what our system is capable of seeing in our, in our method blanks. And I'll talk some more about that, um, in just a moment. So especially if you consider our original data quality objective of 266 parts per billion, EPA Method 8015 can probably do a very good job at that level. But when you start getting below your reporting limit, and especially as you start approaching the detection limit for a method that's very nonspecific, can respond to a lot of things, then it gives you the opportunity for a lot of things to go wrong.

Ed Corl: [01:30:50] And your baseline or that noise can now come into play quite a bit. And that, that background, if you will, can actually be a substantial, um, positive, positive indicator in what's going on in your samples. So, um, it becomes significantly more relevant, if you will, um, at higher concentrations. So, um, the this, um, this low-level noise, um, that's created by these detections may not be petroleum related at all. Um, and actually the these lessons are some of the, the, the key lessons that we learned and um, and helped us, uh, to, um, to the new microextraction method. And the reason I say that is because every chemist will tell you that the more that a chemist has to handle or manipulate a sample, the more that can go wrong, the more that you have an introduction for potential problems. Right? So in that microextraction method, we have, um, very few, fewer steps where the, the, the chemist is actually manipulating

the sample. And therefore our background came, came down quite a bit. And also hexane is not um, is not, as I guess you could say, not as noisy as methylene chloride. Methylene chloride is an extremely good solvent, but it picks up a lot of things and it can create a higher background, if you will, when it when it comes to TPH.

Ed Corl: [01:32:19] So if we can go to the to the next slide, slide 27.

[01:32:29] We're there, Ed.

Ed Corl: [01:32:31] All right. Thank you. And again I'm going to show you a specific chromatogram in just a moment, if you'll indulge me, that talks about specifically an example of some of that episodic contamination that I'm talking about. So slide 27. Um, this is actually really, really interesting. And I want to make it clear that, um, you know, the EPA does not endorse what we call, uh, "blank subtraction," right? That's not done in any environmental program. And I'm not in any way I'm not endorsing its use. I'm trying to make, um, a clear point here, that method blanks are relative and the contributions to our detections depends upon that signal-to-noise ratio and where you're at. So here in slide 27, um, what you're seeing here. So this is just for September of 2023, right? So for, for September we had 309 diesel range organic detections. 309 detections. 162 of those were less than the reporting limit. So that's a little over what? 50, 50%. 52%. Um, so if you were to consider the the baseline of concentration or detections that we were getting for our method blanks, and if you were to subtract that, then all would have been less than the MDL. If those blank uh, contributions, um, had been removed. Now to me that's quite staggering. That's telling me that there's quite a bit of contribution there. Now, 147 of those detections were actually greater than the reporting limit.

Ed Corl: [01:34:09] Right? So now we're getting to where we have a little bit more confidence in that signal-to-noise ratio. But 78 of those would have been less than the than our detection limit, if you had removed the blank contributions. 51 would have been between the reporting limit, limit and the and the MDL. And 18 would have still still been greater than the reporting limit. However, let me reemphasize that of those - and Chris mentioned this earlier - as part of the ELIPS program. And I know you guys read that report where we did some very specific mass spectral analysis. So of those 18, right? So now we're above the reporting limit. And we know that the method blank is not really contributing a significant amount, um to those detections. So now we're in a higher signal-to-noise. And we're more confident that what we have really was in the sample. But of those 18 through mass spectral analysis, we identified that the major contributors to those detections were hexadecanoic acid, octadecanoic acid, phthalates, the

brominated terphenyls, and then those Four Horsemen, which are chlorinated and brominated compounds that, that show up early in the chromatograms. So, um, this just is further provides you further information about you have to think about the fact that blank or think about it as baseline as background. It all, it's all relative and it depends upon the level of your detection. So even when we had levels of detections that were above the reporting limit, again, where the signal-to-noise was relatively higher, we identified the major contributors to those detections.

Ed Corl: [01:36:02] Okay. So what about the um what about the organic range? Of the organic range detections, as you can see there on the right, um, there were 34 detections. Right? These are the higher detections. This is C. I think C24, C28 through C40. Uh JP-5 normally falls by the way in the DRO range. So these this the ORO would be heavier petroleum constituents. So only 34 detections. 27, only 27 of those were less, or 27 were less than the reporting limit. That's what uh, almost 80%. 80% of the organic range that the higher range detections, um, were less than the reporting limit. Um, all of these would have been less than the detection limit if you would have counted or accounted for, um, the the respective method blank concentrations. Um, in those. So seven were greater than the reporting limit, Five of those seven would have been less than the MDL. Again, if you consider the contributions of blank, and two would have been between the reporting limit and the MDL. So again contributions of method blanks is relative, number one. Um, it's all based upon that signal-to-noise ratio. And anything below a reporting limit, you start to lose your confidence. Right? Um, so I wanted to leave you with this. I had, um, Waverly, our project chemist crunch a few numbers for us just this morning on this issue.

Ed Corl: [01:37:43] Um, some additional facts, right? That would, um, uh, to help, uh, um, accentuate my point here. So listen. To date, we have almost 9,500 samples that we have collected, almost 9,500 samples. Of those, 316 of those samples were qualified as non-detect, and the reason they were qualified as non-detect, that was due to elevated concentrations in the method blanks. Okay? 64 of those 9,500 samples were above the reporting limit, but those were qualified as estimated. That's that "J" qualifier. And the reason they were qualified as the, as estimated is because of blank contamination. Right? So it does happen. So again if you consider, if we think about our method blanks, I want you to think about it as background of our system. Background of the laboratories capability. Right? So then for all 9500 samples, 9500 background accounts for up to 80% of the reported concentration for results that were less than 100 parts per billion. And guess what? The vast majority of our detections, I think over 90% - and Chris and Waverley can correct me - over 90% of our samples were below 100 and up to 80% of that background accounts for that. So that's based upon fact. That's based upon data. So um, and that represents the majority of our detections, those that are less than 100 parts per

billion. So listen, you can get episodic contamination issues. That's absolutely true. And if we go to the next slide I just wanted to show you something that was really interesting.

Ed Corl: [01:39:36] Yes.

Chris Waldron: [01:39:37] I think we're running into a little bit of a time crunch here. Um, so.

Mark Williams: [01:39:43] We're going to roll forward.

Mark Williams: [01:39:44] We're going to roll forward in discussion. Again apologies for going long. I think you can see we're passionate. And we took the concerns seriously and wanted to make sure we showed you our homework. Um, but I know for the sake of time, let's get to the open, open discussion and dialog so that we can make sure.

Mark Williams: [01:39:59] We can stay as long and if some folks have got time commitments. But anybody can say, we'll say if folks need to, we'll stay available for questions, answers. If even folks need to leave physically, we'll keep the virtual option open. You want to dial in from the car right over and ask questions. That way we'll be available.

Nāʻālehu Anthony: [01:40:17] So.

Ernest Lau: [01:40:17] If I think, (inaudible) is this being recorded?

Mark Williams: [01:40:22] It is. Yes.

Ernest Lau: [01:40:23] So you can go through your whole presentation. But we have a hard stop at 11:30 again, which is according to your agenda that was given to us at the time, but also all of the materials that are have been discussed today, including the data that's being referred to, the different tests of whether or not scientifically done or just not on a small sample. If he can provide that to us, because we'd be glad to actually take a deep dive with our experts to kind of come back with questions or thoughts to that information. So that way it'll be more productive than just this kind of structure, which is dominated by presentations and very little time for discussion. That'd be my request, then, for consideration. The video of this is all materials that are discussed today to us, so that we can actually take a look at it. As you know, there's information that I think that came out today that we've never seen before. I think it would help

our understanding and maybe clear up misunderstandings. So then we formally come back with something, maybe in writing, as a follow up to close the loop on this.

Mark Williams: [01:41:36] Okay. Well, we'll take it into consideration.

Nāʻālehu Anthony: [01:41:38] Yeah. I mean, you know, we, we would like to see the data that that these folks are drawing to these conclusions from. Is that something that's follow up?

Ben Dunn: [01:41:48] Um, we'll certainly be posting these slides as well here in the next day or so.

Nāʻālehu Anthony: [01:41:52] Specifically the data question, though, Commander. (inaudible).

Ben Dunn: [01:42:02] This is the last one here, summary slide, but that's a recap. So um, as far as the remaining time that we have today, there is a summary overview. The EDWM, um, is pretty straightforward, but those will be included in the slides that we've, um, made available online. So we won't cover here today. We'll, we'll stop here and we'll provide the remainder of the time for discussion. Given that information that we shared.

Ernest Lau: [01:42:33] What do you want to do first, the Peer Review Team?

Nāʻālehu Anthony: [01:42:37] Why don't we have the Peer Review Team ask any questions.

Ernest Lau: [01:42:42] Paul, uh, Ali and.

Paul Winkler: [01:42:46] Good, good morning or good afternoon, as the case may be. Can everybody hear me?

Mark Williams: [01:42:51] Yes. Thank you.

[01:42:52] Yes, we can hear you. Well.

Paul Winkler: [01:42:54] I'd like to thank the Admiral and the Commander for their time in looking at our comments, and for taking time to allow us to have this discussion. We do appreciate that. Uh, I wanted to make, uh, before I get into my questions, a couple of statements. Uh, Ali and Jeannie will have some questions, and they'll ask them. I'll get through

my questions fairly quickly because time is a little bit shorter. Um, but I want to make sure that, that, that the Commander and the Admiral understand that our goal was to evaluate the Tech Memo and the conclusion therein. From my perspective, the Tech Memo said there was increased observation of TPH detections in LTM 6, and the Swarm Team got together and said, well, the reason that this detection increase was observed was because we had blank contamination and we had chlorinated surrogate. My question basically came down to, if nothing changed in the method from when you started to when you ended, why did we start to see these upticks in concentration? And so that's really the way that we looked at this data, trying to decide, did the conclusions of the Tech Memo fit what we think we saw with the data? Now, having said that, I do have a couple of comments. Um, and as you guys have noted, uh, nicely in your, uh, review, I did note that I didn't see JP-5 and I didn't, um, and, uh, but we weren't tasked with just looking at JP-5. The, the point made to us was there have been potential fuel spills in this system since it existed.

Paul Winkler: [01:44:37] So please consider more than just JP-5, which is what we did. And so if it seems like we didn't necessarily pay attention to JP-5, that is why. The second point I would make is um, what we saw in the Tech Memo was related to hits above the detection limit and almost all below the reporting limit. So certainly we did not consider the action limit at all because that was not what we were tasked with. So with some of those things, uh, to to start the discussion, to clarify our position, I just wanted to make those clear. For my questions. Uh, so I think we all agree 8015 was not created for drinking water methods or drinking water analysis, yet it's been applied to drinking water analysis. My position on this is, in clearly Chapter 4 does say you should dechlorinate water. And yes, it's a recommendation, but I, in 40 years of environmental analysis, I've never seen a client of mine accept a drinking water analysis that was not dechlorinated. Uh, in that same vein, uh, you could look at holding times for VOCs. Those also are our suggestions in SW-46 and I have, I have worked for labs where we paid money to resample because holding blanks were blown. So I don't think you should minimize the importance of this. So it's my it's my feeling that we, we do know that chlorine reacts with organic chemicals in water.

Paul Winkler: [01:46:08] That's why you dechlorinate. So if you're not going to follow an established and recommended procedure, I would like to see data to show that that you don't have to. So that is, the default should be dechlorinate. If you decide not to dechlorinate, you should have data showing why you can't. In my mind that would be an MDL where you where you have water with a half a part per million of chlorine in it, you spike it at 50 ppb DRO and you go extract it and you show that you can, in fact, get recoveries or not. I didn't see that data. I see

that Ed did show some data on matrix spikes where they don't know. We haven't seen that data. I certainly haven't seen that data. And it would be interesting to look at that data to evaluate kind of how that looked. Personally, I would like to see it spiked at the MDL, not a matrix spike level. And also I would like to know what the matrix spike actually was. So was it chlorinated tap water or was it, you know, DI? I mean, I don't know. So there's some things I don't know about that. If we had an MDL in chlorinated water to show that you got good recoveries, then I would be fine with not dechlorinating. Interestingly, I think we saw as the, as the presentation went on, dechlorinating your samples a really good idea before you analyze it. Um, Commander Dunn showed that pretty clearly on that one slide.

Paul Winkler: [01:47:34] So that's my first point. Uh, in terms of our comments about dechlorination. Uh, we didn't really get into the second method a whole lot. The questions I have related to the mBq method really were we're putting a whole lot less analyte into the column. So of course background levels go down. And I would like to have a discussion of if you're putting at the MDL 100 nanograms of analyte onto the column using the septimal extraction, and only 37 using the mBq. How can we have equivalent detection limits? And we didn't get time to discuss that. So that may be something that we should look at later. I also wanted to comment that I plotted all of the data that we had available to us. I plotted all of the raw areas of method blanks for all the data that was on the website provided to me. When I plot all of that, I really didn't see any change. Uh, any, any systematic change in blank contaminations. What I was looking for is did blanks slowly, the raw areas of blanks slowly climb up from LTM 1 to LTM 6 and beyond, which would explain why we start to see some hits above the detection limit. I did not see that when I looked at blank data. I saw it pretty well scattered about the mean throughout all the LTMs. And I would like also to kind of point out LT 1, LTM 1 had a very low frequency of TPR detections, yet it had a relatively high chlorine concentration.

Paul Winkler: [01:49:11] And so my question would be if chlorine, high concentration of chlorine does in fact lead to higher detections because you have issues with chlorine, why didn't we see that in LTM 1? If in fact chlorination method blank were problems? I'm not really seeing that because we used the same method. We had high chlorine in LTM 1. We didn't have a lot of lot of hits. In LTM 6 or some zones we did. And I think that there are some other factors that might not have been considered that could be causing this. And that was the point of our comments. In terms of defensibility, from my perspective, what I'm saying is, if you can't, if you didn't follow established procedures and you don't have data to show that you, it was okay not to follow them, then I could, I could, I would have to qualify that data and say, I think this data is suspect because we don't know about it. Because we don't know really what effect chlorine has low

concentrations of alkanes. I'm not saying that it will react. I'm simply saying I don't know. And so that led to our question. Um, I think I'm going to turn this over to Jeannie Peterson now. Really, those were basically the comments that, that I would have for discussion in regards to your guys points. So because we have limited time and maybe we can get to discussion those after Jeannie and Ali have a chance to make their points. So, Jeannie, you're up.

Jeannie Peterson: [01:50:43] Thanks, Paul.

Jeannie Peterson: [01:50:45] So, as Paul indicated, our review was based on the lines of evidence provided by, excuse me, provided by the Swarm Team in their Tech Memo. So that is all we had to go on. And if there were other things that supported it, it should have been put in there. So the Navy has said that the use of sodium thiosulfate as a preservative was only guidance and not a requirement. So my question is, what criteria was used to determine which guidance or recommendations to follow and which would not be followed? And you know, so why was one disregarded and another wasn't? And why did the Swarm Team memo state that Method 8015 does not include steps to prevent analytical interferences/reactions that may occur due to the president, the presence of disinfectants. For example, free chlorine in drinking water samples.

Chris Waldron: [01:51:52] That are we at? Those are the two questions you have. Other questions?

Jeannie Peterson: [01:51:56] Yes, I have other questions.

Chris Waldron: [01:51:58] Okay. So are we.

Jeannie Peterson: [01:52:00] You time to answer? Do you want me to ask all my questions at once?

Chris Waldron: [01:52:03] I'm just trying to get a point of clarification. Paul asked all of his then went to you in terms of time. So do you want to? I can come back.

Jeannie Peterson: [01:52:12] I can ask the rest. Okay. Um, okay. So there's some discrepancy as to what clipping means, but our basic premise was to point out that chromatogram clipping precluded full evaluation of the data, because we were not able to determine what was clipped and what wasn't. Small noise peaks being clipped. That doesn't sound like scaling. Either way,

um, we should have had before and afters so we could see what was clipped and make a determine, a determination, because maybe what they clipped was something important. We don't know. That was our point in that, in that memo, in that review. Um, so the the Navy also, uh, called out our PPM versus their PPB. I think they were looking at finals while we were looking at on-column concentrations. That's, you know, but in case there were, uh, errors in whatever, reporting or whatever, because maybe, maybe what they were looking at is correct. And it was maybe what we were looking at weren't, um, I think going forward, don't you think like a stage three at least? Maybe a stage four should be done on all the data packages. Uh. Let's see. In the executive summary of the Swarm Team's Tech Memo, they state that residual JP-5 fuel in the system from the November 2021 release from the Red Hill Bulk Fuel Storage facility as a root cause of low-level TPH detections, was evaluated to have either a low likelihood or extremely low likelihood of being the potential cause. Doesn't this mean that the Swarm Team had already decided, prior to their investigation, that residual JP-5 couldn't be the cause, and based their findings on that likelihood? And also, I just want to say that we're not saying TPH is there and we're not saying TPH isn't, or JP-5. We're saying that the Tech Memo did not definitively prove it. Alli.

Allison Felix: [01:54:50] Hi. Can you hear me?

Ernest Lau: [01:54:53] Yes. Yes.

Allison Felix: [01:54:54] Okay. Um, I don't want to feel like we're piling on the point, but I'm going to add on to the point about quenching the samples. Um, yes. We all realize that 8015 is a guidance method. However, it's being applied to drinking waters.

Allison Felix: [01:55:17] It is reasonable to expect that drinking water methods for semi-VOAs were consulted and considered. And I actually thank, um, this team today for the explanation why they decided not to dechlorinate. Because that was, um, that was very puzzling. But, um, uh, I am going to point out with them that literally every semi-VOAs method out there, whether it's a drinking water regulatory method or a guidance method, says to dechlorinate the samples because chlorine, chlorine is a known interference. Um, that's going to be the end of me beating that drum. Um, I do have a question that's anecdotally. Um, and I know we're trying to stick to science, but anecdotally, um, inhabitants of the base have said, said that they saw and smelled contamination at certain times during the long-term monitoring. And they've also indicated that the frequency of the odors that they were smelling corresponded to an increase in detects. And I want to, I would like to know if that was discussed and taken into consideration? Um. Let's see. I

would also, um, like to because one of the things in preparation for this meeting, I was trying to find was the Removal Action Reports. I was unable to find them when I was clicking around on the Safe Waters, um, website. So I would like to ask someone, to someone if they could point me in a specific direction on that website where I could find them. Um, I would also like to point out that we were asked to review this Swarm Team memo, which was about low-level detects that by definition met the project DQAs. So I'm. Um, we were evaluating from that perspective, not from the perspective of the project DQO of the screening level of 266 micrograms per liter, um, was met. I don't think we disputed that that was met and that all the detects were low-level. That's it for my questions.

Jeannie Peterson: [01:58:02] I have one more comment. I just want to say that 8015 is not just about concentration, but about pattern. And a lot of the stuff that we've talked about, the extraneous peaks, the method contamination, all of that, uh, makes it difficult to determine what's there at a low level. So things like that. You have to take that into consideration and plan for it. And do, you know, like make sure your blanks are clean, make sure everything's clean. You can't just oh it's blank contamination. We're going to just subtract it.

Ernest Lau: [01:58:54] Alli, did you have anything else add in? Or Jeannie or Paul?

Paul Winkler: [01:59:01] Uh, I do not. I do not, Ernie. Uh, I think I made my points that we can open up for discussion.

Ernest Lau: [01:59:09] Uh, yeah. Maybe we can now get the Navy's experts to respond to the questions. I wasn't keeping track of all the questions, and hopefully Chris got them down. Yeah, yeah. Okay. How about with, uh start with Dr. Winkler?

Chris Waldron: [01:59:21] Well, I mean, I think Doctor Winkler made the point in terms of, I guess, first and foremost, setting the stage here in terms of the interaction and some of the questions. Um, we certainly would have welcomed, um, uh, having a meeting or a pre-, advance notice of this prior to the announcement at Board of Water Supply meeting, so that we could have worked with, uh, your consultants to answer any, any of the questions that they might have in terms of the data or not. So the kind of the paradigm that's been set up wasn't of our making or wouldn't be anything that we would have designed, we would have tried to encourage sharing. And you guys know, I went over and briefed you guys prior to any of the releases that we did as part of trying to share information that we had and what we knew. So a lot of what I see out of the questions that have been asked today, and also in the previous reports, are

things where we would seem to be that there's a misunderstanding or a lack of information that may have been provided, or the purpose of the Swarm Team Tech Memo that I think the majority of which could have been avoided, in my opinion, had we met and just looked at the work through this collegially versus kind of in this result, in this kind of drive by, here's comments, so on and so forth. So that being said, um, I think, you know, it seemed to me and Doctor Winkler that, um, that we're in maybe more agreement than we are in disagreement, um, in the sense of, uh, comments about low-level detections. Um, number one. Number two, that there isn't a JP-5 fuel signature.

Chris Waldron: [02:01:26] It seems that seems to me that we agree on that front. It seems that there is a question out there as to whether or not there could be low-level TPHs associated with other fuels or other releases. And I guess I would, I would get back to you and again, the reason why I focused on the data quality objectives is that the data quality objective behind the data that were collected as part of the emergency response, and PM was primarily focused on the November 2021 release of JP-5. The analyte list was focused on that. Data quality objectives were established based on 266 micrograms per liter. And so we didn't collect the data with the express purpose - and I think, you know this - the express purpose of trying to speciate low-level, meaning concentrations near the detection limit of other potential petroleum hydrocarbons. And in fact, the method really doesn't have that specificity. It's not a GCS, GCMS type method. Um, so the, the purpose originally was focused on, on that in terms of the data and the data, how the data were collected and analyzed. And I don't I mean, I guess I would put that out there and maybe you weren't aware of that in terms of, you know, what was had it originally established. Um, I guess what I would ask you is, have you seen in, in the review of the chromatograms that a big portion of looking at 8015 is looking at the gas chromatograms? Have you seen any sort of indication or patterns that might suggest the presence of, of other fuels? Because we haven't seen that. We haven't seen any actual fuel signatures that would suggest the presence of other fuels or releases.

Paul Winkler: [02:03:27] Commander, what I would say about that is we don't really know. The problem is, again, the lack of specificity with 8015. And I'm just going to put a quick recommendation and then get to your question. If it was me, I would be looking at uh, DRO and JP-5 by 525 and just do all this by GCMS. Uh, all this confusion could probably be eliminated. But in terms of other fuels, um, because if you have issues of weathering and we don't know how long they're in there and we we can't. When I looked at the chromatograms, it's like, well, okay, I don't know what those peaks are. They put the total area is above the MRN or even the MDL because we don't know what those peaks are. We have to call them TPH. Now. Whether I

know that they are or aren't is kind of irrelevant because of just the way the analysis works, you know? So when you're in the lab, the chemist really can't just say, well, I don't think that's the stuff, so I'm not going to report it. You kind of have to. So did I see a hydrocarbon hump? No, I did not. But I also didn't see a hydrocarbon hump in some of the low-level standards. And and what I don't have is MDL data. A lot of my sticking points in this entire process, even in the new fields report is, at what level can you really see, for example, hydrocarbon? I mean, in environmental analysis, we're trying to defend the non-detect versus something that we think is there. That's why MDLs are so critically important in this whole process. And we really didn't have access to a real good look at MDL data for much of any of this, any regularly at all. And that will certainly come up within our discussion on the MEQ. So no, I didn't see what I might say. Well, gee, that's a big hydrocarbon, but I don't know if I should have seen it.

Chris Waldron: [02:05:22] Yeah, and I guess I'll turn it over to Ed to chime in on this. But I guess with that, I mean, I think that's one of the points of emphasis that that I've tried to do in trying to educate folks as I've talked to them about the limitations of Method 8015. Right. I mean, when you're pushing this method to such low levels, then all these other potential interferences and you call it out in your memo and in the conclusion section about any small contribution potentially adds to the noise that can put you above the detection limit. And we're going to run up against that no matter what. I mean. And that's why I presented that one chart that had that the various stacked elements to it as you as you read them, you still have the potential for those contributions. It's just not. I mean, it might in my mind, you have a nonspecific method that we're trying to, at least in this discussion, ascribe specificity to which it just doesn't have. And, you know, when you, as you mentioned, we're, we are normally applying this method to solid waste samples where we have we're at a gas station site or we're at an industrial site where really the noise doesn't matter that much. We have a clear hydrocarbon hump with peaks, whether it's weathered or not. It's very clear. But when you're trying to apply it to this, to drinking water samples and down in a focus at the detection limit, I mean, you're just not able to have the resolution needed in order to make that determination. And then I'll, I'll jump off my soapbox. We did run 525 on every one of those samples. Um, so.

Paul Winkler: [02:07:05] Yeah. Go ahead.

Chris Waldron: [02:07:07] So we have speciated GCMS results for the representative indicator compounds as well at low-level detections.

Paul Winkler: [02:07:16] What I didn't see though, in the 525 data is an MDL, so I don't know how low of a level of DRO you could see in the 525, because it's not a normal 525 analyte constituent. And a lot of my questions could have been answered if, if I had seen a 525 MDL with DRO, then I'd been okay with that. But that data I did not see.

Chris Waldron: [02:07:41] We did not run 525 for DRO. We ran it for the 525 petroleum indicator compound. Just to be clear. So DRO specifically wasn't run for 525. But your BTECs, naphthalenes, methyl naphthalenes, benzopyrene was, was run.

Paul Winkler: [02:08:01] Yeah, a lot of those were actually on the 8260 side of things because they're they're more volatile and again indicator compounds might be JP-5. But you know what about other. And again Commander, I want to make sure that I keep in mind the fact that we were asked to consider any kind of petrogenic thing that might be in the sample from years of potential leaks. And so we had a wider view of what that peak really meant. Um, and so I know again, in the new field report, they said, well, you know, we look we didn't see any hydrocarbons above the 8270 MDL, but I don't know what that means. If you don't shoot the TPH standard at the MDL, I can't evaluate that statement.

JoAnna Delfin: [02:08:47] So I think there's a lot, still a lot of technical discussion to that needs to go on. But I do understand that, um, some of the members here at the table do need to leave. So we want to give an opportunity for them to, um, if they have any questions or remarks.

Nāʻālehu Anthony: [02:09:03] Yeah. Thank you. And thanks, everyone for the detailed information. Um, it's a, it's a, I'm Nāʻālehu Anthony for the Board of Water Supply. Um, certainly not an engineer or an SME in drinking water. So keep my comments and questions fairly high level. Um. I think it was Commander Dunn at the onset. You said that maybe it was Chris. I forget this was at the onset of the presentation. That Red Hill Shaft, um, wasn't flushed. Um,

Chris Waldron: [02:09:36] That's correct. I said that.

Nāʻālehu Anthony: [02:09:37] You said it. Thank you. Thank you. Chris. Um, we've been pumping 4.8 million gallons a day post-spill, and then now it's at 1.8 to the tune of - I don't know if anybody's keeping track - 5 billion gallons. If that's not flushing, what would you call that?

Chris Waldron: [02:09:53] Well, it's in the concept of, uh, emergency response. It's, it's a misinformation to say that the shaft was flushed. The system was flushed, brought in clean

water from Waiawa Shaft to push out anything that was in the system, but to actually happening at, happening at Red Hill, it has been air gapped. It's been separated from the system. Okay. So that has nothing to do with the LTM discussion at that point.

Nāʻālehu Anthony: [02:10:22] Right it was just a comment you made about that.

Chris Waldron: [02:10:24] Right but I was just clarifying.

Nāʻālehu Anthony: [02:10:25] That just for clarification.

Chris Waldron: [02:10:27] I think. So at Red Hill itself. You're right. It's being pumped for hydraulic capture. Right. And actually what you're trying to do is bring the contaminants in to the, to the well itself by pumping it. That's the whole point of that. It's not to flush them in the aquifers to pull the contaminants in.

Nāʻālehu Anthony: [02:10:45] I have a question about that as a follow up, Chris, um, you said that it's to pull the contaminants back in. Does that mean that the contaminants are moving outward?

Chris Waldron: [02:10:53] No, it means that one of the fundamental things that you do with a release like that is you try to establish what we call hydraulic capture. In order to ensure that within a radius of, what's in the radius of it a protective measure, that's implemented because groundwater is going to flow and contaminants will flow at a reduced rate because they have what we call "retardation," because they interact with organics and other things within the aquifer. So as part of the emergency response and as part of the initial parts of the IDWST, the team implemented hydraulic capture or pumping under the auspices of HDOH and EPA, with their oversight in order to have a belt-and-suspenders type approach. And it would be that standard practice. I mean, as an engineer, that's one of the very first things that we would would do.

Nāʻālehu Anthony: [02:11:45] As a, um, as a practice, have you been able to measure how much has actually been captured?

Chris Waldron: [02:11:50] I'm not, I'm not directly involved in that. So I can't answer that question. Yeah. Team members that are. But that's separate from this discussion.

Nāʻālehu Anthony: [02:11:57] Yes, sure. Okay. So the next question, um.

Chris Waldron: [02:12:00] Do you want to answer that question?

Ben Dunn: [02:12:02] One, one second. Before we move on to that topic, there are a couple of people that raised their hand as you were speaking Nāʻālehu. So I just wanted it clear. Um, so, Mr. Brewer and then, uh, Henning, um, you had your hands raised up. So if it was specific to what, uh, Nāʻālehu was saying, um, please go ahead.

Ernest Lau: [02:12:21] And also identify with, uh.

Ben Dunn: [02:12:25] Yes, absolutely. Thank you.

Alex Brewer: [02:12:26] I can save it for after my my questions were related to the presentation.

Ben Dunn: [02:12:34] Okay.

Nāʻālehu Anthony: [02:12:34] So just, just another. Sorry. I don't want to take up too much time. Just another couple simple ones. Um, in the earlier slides, uh, the HDOH ISP, the safe level was 266 micrograms per liter. Um, just yes or no. Is that the, the taste and smell quotient for TPH is below that. It's like 100 micrograms per liter?

Chris Waldron: [02:12:59] Again it depends on what, what you're talking about. If you're talking about benzene or other aromatics. JP-5 doesn't smell. It doesn't have exactly the same odor culture as that. But you can smell it. You could potentially smell it.

Nāʻālehu Anthony: [02:13:12] Just (inaudible) at this table, the 266 or like if you go to whatever 260 that that's actually safe to drink.

Chris Waldron: [02:13:22] That was the value that was established by DOH as a safe, safe to drink. Yes.

Nāʻālehu Anthony: [02:13:26] And they've been tinkering with that number ever since. They've they've made adjustments to it.

Chris Waldron: [02:13:30] I don't know that that's the case. We haven't seen any other adjustment or number associated with that.

Nāʻālehu Anthony: [02:13:35] My understanding is that they made adjustments to it over time.

Chris Waldron: [02:13:37] But what was the, what was your number?

Ernest Lau: [02:13:40] Yeah, I think it went up.

Chris Waldron: [02:13:41] What was, what was Board of Water Supply's number?

Nāʻālehu Anthony: [02:13:43] Yeah, it went up. I mean, I think the, you know, the part of the what.

Chris Waldron: [02:13:47] Was Board of Water Supply's number?

Nāʻālehu Anthony: [02:13:48] Well, the.

Chris Waldron: [02:13:49] 100 isn't that on your website. And you have your consultants do an evaluation?

Ernest Lau: [02:13:54] Yeah, we did an evaluation many years ago,

Chris Waldron: [02:13:56] But when was that?

Ernest Lau: [02:13:57] And actually kind of validated, I think, where the Department of Health's levels were originally back about five plus years ago.

Chris Waldron: [02:14:07] Originally their number was 400.

Ernest Lau: [02:14:09] No, no, no.

Waverly Braunstein: [02:14:10] When we started,

Chris Waldron: [02:14:11] The EAL was 400.

Waverly Braunstein: [02:14:12] When we started the water crisis.

Chris Waldron: [02:14:14] Yeah.

Ernest Lau: [02:14:15] Well, the water crisis here, we're trying (inaudible). We are talking about what it was prior to the pandemic, because we've been on this since about ten plus years.

Chris Waldron: [02:14:27] As I have as well. I worked on that back.

Ernest Lau: [02:14:30] So remember the numbers kind of.

Chris Waldron: [02:14:32] You know, based on based on toxicity. Yeah. Based on.

Ernest Lau: [02:14:35] They kind of raised that now, they're kind of going back down.

Chris Waldron: [02:14:38] But I don't think there's a new number out that 266 was the incident specific parameter was the safe level that was established, and that was the measuring stick.

Nāʻālehu Anthony: [02:14:48] And everything below that is safe to drink?

Mark Williams: [02:14:50] Safe to drink according to the Department of Health.

Nāʻālehu Anthony: [02:14:52] Okay. I wonder if you can put up slide 28. But I'm just I don't know enough about. Um. It's the one with all the peaks. Can you tell me, can you walk up there and tell me what the scale is on the vertical axis?

Chris Waldron: [02:15:07] Ed, why don't you talk to this? This is the glove. This is a chromatogram of the skin contact with the glove. Now, this is an on column measurement in terms of the units. So those are not units in terms of parts per billion. Those are the response. So Ed, maybe you can talk.

Ed Corl: [02:15:25] Right, Chris. So I think I heard that that question. So yeah, the unit, the the units that you're seeing in the vertical column to the left on the y-axis, um, are just intensity. Right. So the, the integrator is just going to integrate the area underneath a specific area. So all you're looking at is detector intensity units. It's not concentration um, in any way. Um, but just real quick to, to explain this chromatogram. It's really pretty interesting. We did, we had the

laboratory do some little experiments for us. Um, and in this, uh, in this particular example, um, uh, what was done here is I think it's the, I think it's the blue trace. Um, uh, is a Red Hill sample with a detected concentration, right. A final concentration of 145 parts per billion of of DRO and 245 parts per billion of ORO. That's the C-28 through C-40. Um, and the black trace represents the result of the analyst. Right. Simply doing this, taking a gloved hand, swiping it on their forehead and then stick it in, sticking that gloved hand into the vial. So we didn't quantify this, but it's it's easy to see that, if you look at that black trace, we've got a lot of, um, basically noise, right? We have an episodic, um, example of the fact that, remember, 8015 responds to just about anything, um, and just that act. And it's probably not just the skin. You can get a lot of the emollients right from your skin, but also from the glove. Another lesson learned that the laboratory found is they were actually getting more petroleum hydrocarbons from certain glove manufacturers. They actually had to switch the type of gloves they were using. But at any rate, the point the point I'm trying to make here is that you you can get episodic, right? Events of little things like that that can cause a positive detection of of TPH in these, in these analyzes. So um, anyway, they did a lot of other little tests as well, but it's a pretty good example of what can happen.

Paul Winkler: [02:17:49] And. Let me respond to that real quick. So and I did comment on this in my comments. And my point would be, suppose you had sunscreen and or hand lotion and you grabbed that glove out of the box and then put it on your hand, grabbed the other, other glove and put it on your hand. You now have a contaminated glove. And that's what I'm pointing out. You know that possibly some of this contamination was due at the point of sampling is contaminated gloves. So I don't disagree with that. But I would think that the procedure for how you put gloves on needs to be more tightly discussed and described in the EDWM, for example.

Ed Corl: [02:18:27] Yeah, I, I concur, Paul, and um, let me back up. And first of all, I wanted to the reason I raised my hand is I wanted to apologize to Paul and Jeannie and Allie because I heard about maybe 10% of your questions. So, um, they were a little bit, a little bit broken there. You know, one thing that is very clear that I did here is, um, you know, part. Yes.

[02:18:54] Ed we're gonna we're gonna move on to to some more of the BWS questions in the room here,

Chris Waldron: [02:18:57] And then we'll, we'll roll back.

Ed Corl: [02:18:58] Understood.

Mark Williams: [02:19:00] Questions.

Ed Corl: [02:19:01] Sure, sure.

Nāʻālehu Anthony: [02:19:03] Thanks, Chris.

Chris Waldron: [02:19:07] Thank you.

Nāʻālehu Anthony: [02:19:09] Um,

Ernest Lau: [02:19:10] Actually I wanted to give Erwin, uh, Erwin's been in Water Quality for 40 plus years. So, Erwin go ahead,

Erwin Kawata: [02:19:18] Just a couple of real quick questions. First, you know, like, uh, the discussion on the matrix, like, study the surrogate resident type study. Were those done after the report came out, the LTM report?

Chris Waldron: [02:19:31] So, um, there's a combination of things. Some of them were done after the time of the new Swarm Team Tech Memo. Um, some of them were follow-on data that we didn't feel like, uh, like I said, with the residence time study was enough scientific rigor to put into the actual Tech Memo. I mean, as you as you know, the the Swarm Team Tech Memo was almost 500 pages in length. We tried to cover lots of lines of evidence. We had to kind of pick and choose of what we were going to put in there. Um, so it wasn't, you know, what we tried to do is put forth the strongest what we felt was the strongest technical argument that we had data to substantiate. And that's what we tried to do.

Erwin Kawata: [02:20:15] Okay. So in terms of 8015 not being a drinking water method, I think that's that's that's. No. I don't think you're going to hear an argument about that. When you take something like that, like a non-drinking water method and actually apply it to drinking water, shouldn't you do an MDL study? Shouldn't you try to test it against the material that you are testing it on, and work out any kind of technical issues that could potentially come out?

Chris Waldron: [02:20:43] So again, I, and I think that's a great question. And it had we had time uh, that that might have been what we had done. But that's why I spent so much time at the beginning of this brief to try to kind of level, set the group in terms of what was going on. The

emergency response happened. Uh, 8015 was already had already been run. DOH had collected samples. The Navy had collected some samples. We had a number of discussions in middle of December, heated discussions, about whether or not we should be running 8015 zone. My position was, no, we shouldn't run 8015, to be frank.

Ernest Lau: [02:21:23] Yeah.

Chris Waldron: [02:21:24] But, uh, in the end, we didn't have a lot of alternatives. So the, you know, at that time, what was on the table, and I can understand the different perspectives. There were folks that came into that meeting that said, hey, we need to run 8015 because we don't have many alternatives. You know, we can run 524. We can run 525. That's going to give us only the speciated results. So in the end, we we agree. And I would say I reluctantly, I agreed I was one of the members. Sherry was one of the members at the table. But we didn't have alternatives. We didn't have time to do that. We raised a number of these issues, and it doesn't mean that I was a soothsayer or Sherry was or anybody else. We all knowingly went into this saying, there are limitations in this method. There are going to be some challenges in terms of some of the data, especially with the potential for some of the interactions with chlorine. However, in terms of the objective of determining whether or not we were at 266, the group agreed that we were confident that we could make sure that the data would meet that. It was never our intention in, in that to say that we could rule out every TPH at 30 micrograms per liter or whatnot. We tried to do the best we could with the time frame that we had.

Ernest Lau: [02:22:49] Just to kind of follow up on that, Chris. I understand it was a really tough time back then. With everything happening in COVID, and on top of that, I get that. Um, in the two years under the alternate. Hindsight is always 2020. And so I want to caveat that because anybody can be a expert looking backwards in history. It's hard to do it when you're in the midst of the event itself. But couldn't (inaudible) MDL study had been done, even after LTM started, just to validate and point out any issues that might happen with the use of the 8015.

Chris Waldron: [02:23:35] I mean, I would argue that yes, it could have been done. But I think again, it's out of everything that you've seen in terms of the data and information that's presented and the lines of evidence all coalesces around the fact that we were able to accurately and precisely quantify TPH to the data quality objectives. And so what I think is you're asking a different question now. The goalposts are kind of being shifted away, shifted away from 266 and the JP-5 discussion to a different discussion about analytical resolution of an 8015 method to potentially resolve other TPHs, which I would again argue that, it's, that method

is not going to be able to do that. And so with that, we've kind of moved into, as part of EDWM, there was we we've shifted methods to a microextraction method. It's still an 8015 method, but we've now enhanced our our resolution with doing some forensic analysis of the data. So as the question kind of morphed, if you will, in terms of taking a higher resolution analysis, the Navy made adjustments based on those feedbacks and part of the EDWM program, that we didn't get a chance to talk about, but I know I briefed you guys about this separately, um, and we've incorporated some of those things. So when you look at the analytical methodology that's used as part of EDWM, we're looking for using GCMS methodology, um, over 200 different alkanes, alkenes and aromatics as part of this kind of detailed forensic analysis.

Ernest Lau: [02:25:19] So are you doing an MDL for that? Just to validate its.

Chris Waldron: [02:25:23] So that the lab has.

Ernest Lau: [02:25:26] (inaudible) drinking water.

Chris Waldron: [02:25:27] We are not doing in and of itself, an MD, an independent MDL study. The lab has to do an MDL study as part of its, uh, certification procedures, right? And you guys know this. The lab has to run an MDL study on, on every analytical approach that applies. So there's an MDL study that's done on an 8015 analysis. Um, the lab that's running the forensic analysis has MDL studies on all of the forensic methodology that's running, as available. I didn't get to to show you a slide I was going to show as part of one of Doctor Winkler's questions about the shift in methodology in EDWM to the MEQ that we I did have a slide on the MDL study that was done, uh, by the laboratory on that to show how we get to the detection limits that are comparable and actually even a little better than LTM. So those are being done.

Ernest Lau: [02:26:23] Thanks, Chris. For the sake of time, since we're kind of running up against the clock and we're at 1130. Um, you know, on slide 11, if somebody can bring up slide 11 please.

JoAnna Delfin: [02:26:53] Working it.

Ernest Lau: [02:26:55] Thanks. Uh, so I guess I need some clarification, because you know, I think our experts concluded that, you know, because of issues, especially with the appearance issues, uh, chlorine interference issues for petroleum hydrocarbons, that data is kind of suspect. It doesn't really validate whether it's present or not present, but how? How.

Chris Waldron: [02:27:22] So let's. Can I.

Ernest Lau: [02:27:23] Can I ask you this statement?

Chris Waldron: [02:27:25] But, but again. You made, a you made a statement that the consultant said that we don't know if it's present or not present, but that's not, that's absolutely not true. We've showed that in multiple ways.

Ernest Lau: [02:27:37] I'm trying to understand that against, you know, right now, you kind of pointed out and given additional information about the problems and the data that points toward substantiating interference and other other things. I'm not a chemist.

Chris Waldron: [02:27:52] Okay.

Ernest Lau: [02:27:53] But the LTM data are valid and are usable for the purposes of establishing the LTM Plan. Maybe you can explain exactly what do you mean by that? Because, you know, you're, you've kind of explained that the, the failure to actually dechlorinate and quench, created interference problems.

Chris Waldron: [02:28:15] It created. I mean, again, so when we talk about interference problems, I think it's important to define in technical discussion. We got the opportunity here to do that. So Ed brought this up. You can have interactions that could result in what we call false positives or interactions that result in false negatives. Right? So a false positive means that we are detecting TPH, if you will, when it's actually not present in the samples. So we have. We're going to err on the side of being conservative or protective. Okay, a false negative would mean that we, we don't detect TPH when it's actually there. Okay? All of the information that we have in terms of the interaction between, uh, the halogens: chlorine or bromine and sodium thiosulfate, have resulted in false positives. So we're more apt to detect TPH even though it's not there. There's been no indication in the data that we have or in any of the information from the consultants that you guys hired that would suggest that we did not detect JP-5 or TPH if it was actually there above the MDL. So with that, again, what we've seen in terms of the actual interference, as you termed it, is low-level contributions to TPH around the MDL between 50 and 75. Okay? Our um, our criteria under the the LTM program was to make sure that we were below 266 obviously. That was the value, that was the key value. There's no indication that any of the results are above 266. And in fact, the detections that we have are all between 50 and 70.

And that would again suggest that those false positives don't affect our ability to make a decision about the protectiveness of the drinking water based on the data quality objectives.

Ernest Lau: [02:30:22] So maybe in simple terms, Chris for me, I'm not a chemist. Do you believe TPH was present in your water system?

Chris Waldron: [02:30:32] Absolutely not.

Ernest Lau: [02:30:32] So no TPH.

Mark Williams: [02:30:34] We have no indication.

Ernest Lau: [02:30:36] During the LTM.

Chris Waldron: [02:30:37] We have no indication under LTM on any of the samples that there's a fuel signature in those under review of the chromatograms.

Ernest Lau: [02:30:45] So maybe, you know, the other part of it because, uh, we run a water utility and we deal with customers. We serve people, uh, something that is, uh, affects their health directly. But how do you explain, what is your explanation for the increase in complaints calls during that month? And I think it was October or so that year, uh, that people were complaining about smelling or, you know, having health effects. Um, what's the Navy's read on that? What's what causes that?

Chris Waldron: [02:31:17] Well, that's outside my lane specifically,

Ernest Lau: [02:31:20] But maybe I can ask that to the admiral.

Chris Waldron: [02:31:23] So, I mean it's, that's a DOH space, but I can tell you they've run the numbers and there's not. There's not a change in disease state.

Ernest Lau: [02:31:31] So the the increase in the...Do you have an increase in calls to your emergency numbers?

Chris Waldron: [02:31:37] We're tracking that. There were increase in calls. But as you know, there are a lot of different factors that play into calls. I mean, as you being a water purveyor, you

know, that you get calls. So there was an article in the paper this weekend about an e-coli issue in Board of Water Supply water. I'm sure that you got a bump in, in the number of calls that came into that with people calling in.

Ernest Lau: [02:32:01] Oh, yes we had a few calls. But.

Chris Waldron: [02:32:02] But I mean, that's part of it, right? The cycle of social media, the cycle of when we have meetings, you know, that there have been contentious meetings with the CRI. So when I've come out to brief, typically it's been there's been different things that have gone on. All of those things play into, you know, the discussion. I'm not saying that every single call is associated with that, but I know that you're aware that it's a complex thing to say well, I just we got an increase in number of calls. Well, the call frequency was actually, I think, you know, if I go back and and think about the numbers correctly, we did get an increase in calls. But we've got 100,000 people on this system, right, that are using the water on this drinking water distribution system. And we didn't see I mean, there was a bump, but it wasn't huge.

Mark Williams: [02:32:50] We also see call, the call patterns like cyclic to PCS season. So so we'll see spikes right during traditionally during July-August time period. We have PCS season. And then also when we go to information booths or video land calls. So we'll do base all-hands calls. We'll push information out. A lot of times that will result in an increase in calls.

Ben Dunn: [02:33:07] So the Navy is also responding to all of those calls. And we never found any evidence of petroleum or other.

Ernest Lau: [02:33:15] So you're saying the LTM is valid and proves no TPH in the system?

Chris Waldron: [02:33:22] Yes. We haven't seen any fuel signatures in any of the chromatograms in the data associated with LPM. That's correct.

Ernest Lau: [02:33:31] Thank you. I think we're out of time. But one thing I'd like to make and Mark, Admiral Williamson, uh, the presentation that our experts did at the Fuel Tank Advisory Committee I thought was fair for the Board of Water Supply to be prepared to provide that presentation of our perspective and evaluation of the Swarm report, because we first learned of the Swarm report at actually the previous FTAC meeting where Navy had an opportunity to present. So since then, we were able to get a copy of the Swarm report, and based on what was in that report, we did an evaluation and provided that at the FTAC, which I thought is fair. Uh, at

the end close to the FTAC meeting, uh, Ed I know you came up to me and approached me about getting together because I think you and I agree that doing the tests correctly and getting good data from it, good scientific data is very important to address people's health, to know what's in the water or not in the water. So making sure that the methods and everything is done, you know, properly and rigorously so that the, the trust in that data is good. Um, and I thought it was my mind, I was thinking just, uh, you maybe Chris and I didn't know about, uh, Ed here, but whoever you wanted to bring to the table, we bring our experts together.

Ernest Lau: [02:35:00] Have our own meeting to talk about and share the perspectives, and, uh, about what I. What came out on this meeting was that your initial context was, uh, I saw that, uh, the entire Board of Water Supply board members were also on the email, uh, not as a CC, but actually addressed to them, implying that they were invited to come to this meeting. Nāʻālehu was in that meeting. I just want to point out, and I think you understand, that, uh, you have more than two members of the Board attend a meeting, that needs to be sunshined. It needs to be made public and available to the community. Uh, and we were, we actually had, uh, enough board members to come to establish quorum. So this venue would have been at the Board of Water Supply. But I agreed with you to have it held here. And I just want to thank you for making this available to the community. Uh, I think, uh, this could be used as a first step forward in greater transparency. I look at the inspector general's report, you know, the DOD inspector general's report. And I was really disappointed to see that a lot of our concerns are actually validated by the IG's report. But going forward, greater transparency, sharing data with us more freely and less redactions, I think is a positive step forward. So if you want to get together and follow up with the experts talking to each other more, we can do that. But, and we're willing to do that. But, you know, there's a bunch of information that was referred to today that I don't think we've had an opportunity to actually see until this presentation. So we're open to receiving more information.

Mark Williams: [02:36:55] Now we'll take you up on the opportunity and we'll stick around. And I think some of the folks want to stay online. I know you guys have to depart, but appreciate you coming out today. I appreciate the dialog. Um, and again, the folks online, I think we still have some questions to get to, so we'll be happy to do so. Um, if, if you and I know y'all can dial in if you want to continue, we'll continue to answer the questions of the consultants. That's okay.

Ernest Lau: [02:37:18] Thank you.

Mark Williams: [02:37:19] Thanks.

JoAnna Delfin: [02:37:20] Everyone in the room. Um, a lot of discussion. Do we? Would you all like to take a break? Maybe a ten-minute break?

Mark Williams: [02:37:26] Yeah (inaudible).

JoAnna Delfin: [02:37:28] Five minutes?

Mark Williams: [02:37:29] Yeah.

Alex Brewer: [02:37:35] I don't know if everybody's back, so, uh. Yeah, I can ask my question if it's appropriate.

Mark Williams: [02:37:44] Go ahead.

Waverly Braunstein: [02:37:45] Absolutely.

Alex Brewer: [02:37:46] Okay. Sure. I have a couple questions. I don't know if my slides, um match up, so I'll see how it goes. I had a question, and my name is Alex Brewer. I'm with the EPA Region 9. Um, for slide 15, this was the LTM matrix spike study side-by-side? Um, was there a measurement of precision for these data sets? I just see average recovery and percent recovery. So that's one question.

Alex Brewer: [02:38:14] Um. Question two is related to slide 17. And slide 17 is the surrogate study. Um. How was this quantified if the MDL was 50? I see 15 ppb. The MDL is 50, though, right? Um, that's one question. Um, two.

Alex Brewer: [02:38:38] Was this one peak or multiple peaks? Was it a pattern? Was there a pattern observed basically. And um, so that's like a two-part question. And another part to that is, um, what was the percent RSD on recovery for the surrogate? So essentially what's the error bar on these um columns. Um, so and then on slide 26 um.

Chris Waldron: [02:39:07] One at a time.

Alex Brewer: [02:39:08] Okay. All right. Sorry. Well, maybe those two. We could. Yeah, we could.

Chris Waldron: [02:39:15] Ed. Do you want to?

Ed Corl: [02:39:20] Uh, yeah, sure. Assuming everybody can hear me. Yeah, that's a good question. Okay. Yeah, it's a good question. For, for this, we were only looking at percent recovery. There was we weren't looking, um, at precision, uh, with this particular study. So it was just it was just an evaluation of recovery.

Alex Brewer: [02:39:40] Okay. So I don't know if the percent RSD overlaps or I mean, I see the averages are pretty close, but with that percent recovery range, right. The error bars may or may not overlap.

Ed Corl: [02:39:51] Understood.

Alex Brewer: [02:39:52] May or may not I don't know. I was just asking. Thank you. And then for slide 17.

Chris Waldron: [02:40:01] So on 17, on 17. So the first question you asked about the yes, the 15 is below the MDL. We had the the lab go in and just do a manual integration on the brominated o-Terphenyl. And obviously that's an estimate at that concentration. Um, but we're obviously we get a response on the instrument and we're able to quantify that to in order to provide context. Um, the, uh, in terms of the gas chromatogram, if you look at those on the gas chromatograms, uh, there's a single peak. Um, we get a classic peak pattern.

Ed Corl: [02:40:43] Can you show that chromatogram, Chris? I don't think I showed that, did we?

Chris Waldron: [02:40:47] Um, do you have the hidden slide? Yeah. Show the hidden slide with you. So glad you asked that, Alex. Um, is it not the next slide on there?

Ben Dunn: [02:41:00] Slide 18.

Chris Waldron: [02:41:01] It should. I don't know if you deleted it or not.

Ben Dunn: [02:41:05] Got the blue field background.

Chris Waldron: [02:41:06] I'm going to have to look at the backup slides. So I have a chromatogram that shows the overlay. This is it.

Ben Dunn: [02:41:15] Yes.

Ben Dunn: [02:41:16] It's coming up right now.

Chris Waldron: [02:41:19] Uh, for time purposes, I didn't, I didn't show it, but, um, it's coming up. So here's the the chromatogram. So this is, uh, the chromatogram from these runs, color-coded the same way as the previous chart. And so on the right hand side, you can see the reaction between the halogens and the, the surrogate o-Terphenyl. So you get a brominated o-Terphenyl there. And the colors are a little bit hard to see, but they're, they're all superimposed. The black one was the 15 part per billion, the red spike is the 69 and the blue and the green. And so you can see it's the the clear. And you see this, Um, this pattern on on almost every chromatogram that we've run out at Joint Base Pearl Harbor-Hickam. Um, it's it's basically the same thing every time you look at it.

Alex Brewer: [02:42:21] So what's typically the percent RSD on recovery for OTP?

Chris Waldron: [02:42:26] Um, I don't know that off the top of my head. Um, Waverly, do you know that off the top of your head?

Waverly Braunstein: [02:42:34] I don't know it off the top off my head. I'm trying to run the percent RSD right now on the, um, the spike study. Um, I could check with the lab because, you know, they keep control charts. They might have that. Um, I know it's, it's tight, but I don't have that number. I'm.

Chris Waldron: [02:42:50] Okay.

Waverly Braunstein: [02:42:51] I can try and pull some of them up now. Um, and again, with this slide, we weren't necessarily looking to absolutely quantify it, but this was done when we were first looking into the idea that, you know, what could be affecting it. And the lab offered up this residence time study. So, you know, I don't have a lot of rigorous backup for this slide, but it definitely told us we were going in the right direction.

Ed Corl: [02:43:15] Yeah. And we don't. By the way, I don't think we repeated this multiple times. So we also don't know the error bars for these particular peaks either.

Paul Winkler: [02:43:28] But, but Ed, really this just shows that chlorine reacts with the surrogate. Nobody disagrees with that. I don't think. From my perspective on my comments, it was just that it didn't cause a problem. All of a sudden in LTM 6 and not the entire period is what I'm saying.

Ed Corl: [02:43:45] So yeah, so that that was the objective, Paul. You're correct. Um, again, this wasn't meant really to be, to be quantitative. It was just to give us some more anecdotal evidence that, in fact, that we know that this was occurring. And, and we also did an experiment where we didn't add a surrogate at all. So if we didn't add a surrogate, would you see these peaks? And the answer is no. They went away. So what you're seeing the peak on the far right is the brominated ortho-Terphenyl those that's the bromine adduct. And then those two smaller peaks in the middle are actually chlorinated adducts.

Alex Brewer: [02:44:18] So this was 2,000 ppb for OTP. Sorry, it all sounds alike but.

Ben Dunn: [02:44:24] Correct in 2,000, 2,000 parts per billion o-Terphenyl.

Alex Brewer: [02:44:28] So, so on slide 22 the surrogate was reduced to 100 ppb. Right? And if most of these were extracted pretty early, it really isn't. I mean, is the question, would it be expected that, um, you would get a contribution to a detection or do you think it would influence it? Well, and that's on slide 22 that um, the surrogate concentration reduction slide.

Chris Waldron: [02:44:58] So if you go to slide 22, actually if you would go.

Alex Brewer: [02:45:02] Yeah, it's that one.

Chris Waldron: [02:45:03] So let's go up. Go up. I mean, I think these two slides. Go up one slide if you would. So I think it's a it's a combination of when you're looking at this um, there are a number of contributors here uh, to these TPH detections. So this one shows a stacked bar chart. The yellow bars are the concentrations of the brominated o-Terphenyl. And so again, it's not a constant, uh, signal in terms of concentration. It's constant in terms of that we get a response. Uh, in other words, there's a reaction that's occurring. And the point I was trying to make today was that it's not just a simple, um, you know, we get we've added 2,000 parts per

billion o-Terphenyl. It reacts with the chlorine we get 30 ppb out the back end. The concentrations range for a variety of different factors that are going to play into that. Obviously concentration is one, but it doesn't vary that much at all for the surrogate. It does vary a little bit for the chlorine. But reaction time, which is why the residence time study was presented as an impact. I'm sure temperature and other things also are going to affect that reaction. And it may be in the end at the end of the day, the bromine bromide concentration is one of the keys is that typically is more reactive than chlorine at the end of the day for these addition reactions. That being said, when you look at this, you've got the yellow bars and then the the green bars are the chlorinated alcohols, what we call the Four Horsemen that are part of that. And then you've got some fatty acids that are pretty much in every single sample. And so you've already got what I would call kind of the noise out there.

Chris Waldron: [02:47:01] And then it's just a matter of whether or not there's anything else that's going to potentially push you over that MDL. Right? And so one of the reasons why you don't see, um, 60% frequency of detection is that we're frequently bopping around the method detection limit. Right? So it could be at 30%. But we have signature below the MDL in all samples. And it's just a matter of whether or not maybe that sample sat for a little longer than others. Maybe there was, you know, there could have been some, uh, some field contribution where somebody had lotion or whatnot. We didn't see any any clear signatures by field team or anything else that we could point out specifically. So the point is, they're all very close to the kind of in the MDL range, and it's just a matter of whether or not it goes above or below. And, you know, we then it's a binary, right? We had a hit versus trying to quantify something below that. If you go to the next slide, um, this does show that if you reduce and again the only change here is reducing the concentration of the o-Terphenyl from 2,000 to 100. Everything else is exactly the same. And the frequency drops. And that is showing us that, at least in terms of the overall contribution, when we look at it across the population, that surrogate interaction seems to be the most dominant player in the, the false positive detections. It's not the only player we haven't removed everything, but that's the most dominant figure in that. And this shows that with the reduction in the surrogate concentration.

Paul Winkler: [02:48:53] So Commander, this is Paul Winkler. I have a question about that though. Again, my my concern with that explanation is it should have been there. We should have been bopping up and down above the detection limit throughout the entire LTM. We shouldn't have seen relatively clean data for a year and a half and then all of a sudden detections. That's my sticking point with this.

Chris Waldron: [02:49:16] Well. Yeah, you're right. But I mean, again, if you look at that, other than the, the very first LTM period, Doctor Winkler, we were in the 20 to 30% frequency of detection of TPH. And yes, it did go up uh, in Period 6 from, you know, 30% up to about 60%. And obviously here at 64%. But we saw that across the board. Right? And so, um, was there another factor we were looking at whether or not there was changes in lots in terms of what they were using as part of the de-chlorination. We didn't have any information on seasonality of like bromide concentrations or something else that might explain it, but even on the ones that are at 30%, I mean, the purpose of that previous slide to say is that, you know, when you have 50 as the cutoff in your you have contribution of the brominated o-Terphenyl and the Four Horsemen, and that's in the order of 35 to 40. It doesn't take you very much to kind of get you above and below that. I mean, if you if we went back and we were to, you know, somehow manually integrate Non-detects, you would see that that signal is there. It's just a function of it, of it not a push, being pushed across that threshold. Unfortunately I yeah. Go ahead.

Paul Winkler: [02:50:39] No, I'll just say because I have two comments about that. One, it would appear that the MDL of 50 is actually too low, in my opinion. It should probably be higher if you can't reliably measure analyte signal above analytical noise. But again, to keep in mind, Commander Dunn, we were looking at, we were tasked with why why did this come up in in LTM 6. Not really. And that's really kind of what we why we were looking at that. Did we see this explanation explaining something that didn't occur? And then all of a sudden did. And when I say I don't, I don't think that that surrogates and blanks cause something specific to LTM 6. They should have been there the whole time is the point I have been trying to make with my comments. And so I think there's another factor in all of this. And maybe it is bromide. I don't know, but I think there's something else going on that isn't explained by the Tech Memo explanation. (inaudible).

Chris Waldron: [02:51:46] So when you say that, let's just take a step back. Set aside the the 60% frequency detection. And let's just talk about it in the context of if you remove the surrogate. Okay. I mean, ultimately we're talking about a reaction between the surrogate and a halogen. Right? And when we, when we remove it, that frequency of detection drops drops to 3%. So when you talk about another contributor, I mean, are you talking.

Paul Winkler: [02:52:19] The thing is, so I'm not I'm not disagreeing with lowering the surrogate concentration. I'm an an advocate of that. I'm an advocate of quenching before you analyze the sample. Again, we're just trying to defend my position on the Tech Memo evaluation. And, and the thing is, because the surrogate was present in 2,000 ppb throughout the entire period, we

should have always seen something. And when you go to the slide that you had, I think it's 17, which is a great slide, by the way. Then the question or the one to be is 15, but it's one with the yellow bars and the green and the blue bars. It's that other that is causing us problems and what our statement is. Look, we don't know what that other is yet. So, so you may well that surrogate reactions and fatty acids contribute to this, but there's a whole bunch of other in there. And all we're saying is we don't know what that other is.

Waverly Braunstein: [02:53:19] But could I interject? I see your point. But if we look at what Chris has put on here, that other represents maybe 20 to 30. Yeah, PB, I mean, it's not a lot. It's.

Paul Winkler: [02:53:33] That may be true. But we were looking at raw values above the MDL and evaluating does the blank explanation circuit explanation explain why we saw an uptick in LTM 6? This data here I'm assuming that's across uh all all LTMs. Just looking at looking at that, I would say I don't see any periodicity there at all.

Waverly Braunstein: [02:53:59] That's actually just from September.

Paul Winkler: [02:54:02] Okay. So the question would be what would this graph look like if we I mean, I'm not suggesting you do this, it's a lot of work, but if you looked at all the LTMs for the entire period, what would that look like? That might actually give us some insight into what else we're missing. You know what I'm saying? I don't know if I'm making my point clear, but yeah, I don't I'm not sure we see periodicity. If we did that.

JoAnna Delfin: [02:54:27] Um, I don't see any hands up in the room. Um, Chris, did you was there anything that you wanted to.

Chris Waldron: [02:54:35] Um. Well, I was trying to circle back to some of the, um, from the AQA. There was a question about, um, assumptions on residual fuel and stage five, uh, which gives me residual fuel in the system prior to LTM and that, um, the Swarm Team, um, as part of our findings, maybe started off with the assumption that there wasn't residual fuel in the system, in the system. And I would, um, with that. And again, you may not be aware of that. We, as part of the emergency response and as part of the, uh, implementation of the flushing plan and the restoration, um, there were a series of step by step, uh, flushing, sampling, evaluation of the results. So we started with the mains within the zones. And this was done zone, zone by zone. Um, so we flushed the zone. Uh, collect a sample from the mains. Uh, get the sample back. That sample was analyzed for 524, 525 uh, 8015 - a bunch of different analytes that were

specified. Uh, evaluate those results. And then if they met the DQ of criteria and the risk criteria, then we were able then to move forward to the next step. And the next step was flushing of, uh, structure. So residences, schools, CDCs, buildings. And then from that we sampled a subset of those homes and structures, geospatially within each area. Um, and then from there, we could make the decision to, uh, about whether or not the health advisory could be amended for that zone to start with. So in terms of looking at the data, as it led up to much later the Swarm Team evaluation, we had data points, from each one of the zones, from the mains and the distribution system, and also from homes and residences that showed that we did not have residual fuel in the system based on analytical results.

Chris Waldron: [02:56:52] So those results weren't presented in the Swarm Team Tech Memo. Those results were presented in individual what we called Stage 2 and Stage 4 I guess, if I can remember right, reports where we presented all of the data prior to moving forward. Um, as part of the IDWST. And again, that wasn't a, a Navy endeavor. That was an, an Integrated Drinking Water System Team endeavor. But then, so that was it. That was the data-driven approach. In terms of that, we didn't assume anything. We had data to back that up. In addition to that, again, when you look at the any of the data or information geospatially, we weren't seeing any sort of indication of a release that might be in a geographic location or anything that would would indicate that relative to Red Hill or other other locations within the facility. So we did not take that lightly. I mean, in fact, we did not go into the Swarm Team. Uh, this is a long answer to the question, but when the Swarm Team was stood up, there were only a few of the folks like me that had been around for a while involved. They purposely got involved new people. Um, so, you know, there were about 30 of us on the original calls. The majority of the people on that call were brand-new.

Chris Waldron: [02:58:18] There were only a handful of us that had been around. I mean, I think three or four or five of us that had been around since the emergency response for context. And so all of the ideas, I guess, if you want to call them preconceived notions or decisions, were challenged as part of the the Swarm Team discussions and moving forward because nobody, the majority of the people weren't involved. So they weren't weren't wedded to anything. It was like, all right, show me. So that was really the how the Swarm Team worked. Um. The, uh, there was another there was a question about, um, forgive me if I don't have them all. I tried to write them down, but I'm sure I missed them. I think there was another question about, again, in terms of the the decision to quench versus not quench. Um, and, um, I think the question was somewhere along the lines of, you know, how did we make a determination of which guidelines did we follow versus not follow? Um, and I mean, again, all of that was done very deliberately

and very seriously. Uh, we, as you would expect for the certainly for all the drinking water methods, those are followed to the letter, right? Explicitly. 8015 not being a non-drinking water method and being brought in. I mean some of that was a function of being in the emergency response and some of the samples that, that had already been collected were non quenched. And so we were kind of faced with a discussion about how to proceed from there and how how might that impact the data quality objective.

Chris Waldron: [03:00:02] And so one of the reasons why I spent so much time today on focusing on the data quality objective is to try to level-set us in terms of the making sure that we're below 266 and having confidence in that result was the fundamental primary objective. If we, you know, anything beyond that, I mean, obviously we would like to get non-detect throughout the distribution system, but that wasn't necessarily in front of us in terms of emergency response. We expected that we might get some detections. I mean, we had just had a release from Red Hill and we were sampling. Um, and as part of the confirmation sampling, um, but we just didn't see any, any elevated detections. So, you know, in looking at, um, recommendations, they that would probably be the only one that I can think of, again, off the top of my head that we didn't follow that particular recommendation. But for all the factors that I mentioned previously that played into it at the time as part of the emergency response and then at at LTM, we had another significant discussion at that point about whether or not to quench. I mean, it's like, okay, do we make a change and and quench? And we made a decision not to quench primarily over concern that that people would have is that all of the emergency response was based on non-quench results and that questions about comparability of the data set and so on and so forth. And again our data quality objective remained the same.

Ben Dunn: [03:01:43] Warren, you got your hand up. DOH.

Melvin Tokuda: [03:01:48] Hi.

Melvin Tokuda: [03:01:48] This is actually Melvin Tokuda. We are sharing the connection from DOH. Um my question is going back to slide 17. The resident time study. Hey Chris, do you see any value in widening that study and getting more population involved to see if the pattern is still the same?

Waverly Braunstein: [03:02:12] Chris, can I take that one? Sure. Um, well, the thing with that is that this is done using the sub-funnel, uh, 35 Method 3510, which we're not using in EDWM. I mean, we could go back, but it would be, You know, purely for informational purposes. At this

point. This was done with the separatory funnel, um, method. Not microextraction. And in general, for microextraction, we were not even without the quenching. We weren't seeing the brominated o-Terphenyl, uh, with the microextraction possibly having something to do with the hexane solvent versus methylene chloride, we don't know. But you know, it it would be a very interesting study, but I don't think it would be of use for extended drinking water.

Ed Corl: [03:03:05] Yeah. This is Ed. Um, I think Waverly is correct. Um, you know, I was working with Jason at the laboratory, and we were throwing around some ideas regarding the, the, the actual, the chemistry that was going on. Um, it's obviously has something to do with the methylene chloride. There's something going on with the methylene chloride. We're not really sure. Um, but when we went to the hexane, those things went away. So it's definitely has something to do with the previous solvent.

Melvin Tokuda: [03:03:42] Thanks for that answer.

Mark Williams: [03:03:46] Um, so there was a question about the RAR report. Uh, the folks were trying to find those, uh, how are we going to get them to link to those? We have 'em and then obviously DOH has 'em as well. Uh, how do we distribute that?

Ben Dunn: [03:04:02] We have, uh, well, we have all the contact information for everybody who joined today. So we'll follow up with a, uh, an email pertaining to that. And so.

JoAnna Delfin: [03:04:13] But, but the information is on Safe Waters so we can send that screenshot. Yeah. Yes. And the actual link. Yeah

Mark Williams: [03:04:23] So we would, we would provide basically it's like an FAQ on how to get to 'em. A screenshot, a link just to make sure that folks can get access to those those reports.

Allison Felix: [03:04:36] That would be great. Thank you very much, because I did poke around on the Safe Waters website. I just couldn't figure out where to go in there to to find those reports. I would really appreciate it.

Mark Williams: [03:04:53] Um. What else? What did I miss?

Ed Corl: [03:05:05] I, I only, this is Ed. I only caught, um, snippets of the additional question regarding the the peak clipping. I think that was, um, Alli that asked that. So, um, you know, what we can do? And I think Waverley's actually already done this is, you know, we can delve further into getting you some empirical evidence, um, about, you know, exactly what that peak clipping does to show you that the integrations have not changed. Is that something? Didn't you start that already, Waverly? Is that something we can get together for them?

Waverly Braunstein: [03:05:36] Um, I sent, um, a couple of ones where you could actually see even the, you know, it had that that clipping header, which, you know, for one thing, it doesn't even mean anything. It's leftover, but you could see where the baseline is. And it was clear that clipping didn't mean that small peaks were ignored because they don't. You know, I'm sure you know that. But they don't, they don't integrate individual peaks. It's a complete baseline to baseline full area integration. Integration. Yeah. Sorry. Losing my voice here. Um, I could probably get together a few Ed, maybe you and I could talk offline about some good examples of it.

Ed Corl: [03:06:15] Um, sure. Yeah, I think that's a good idea. Um, so Waverly and I will take that action to see if we can get you guys some additional information to, to show you exactly what's what's going on with that.

Allison Felix: [03:06:30] Thank you.

JoAnna Delfin: [03:06:41] Sir? Yeah. Okay. Um, Chris or Commander Dunn, do you have any closing comments?

Ben Dunn: [03:06:55] So we're about to close the meeting, so if there's no further questions or comments, I'll hold for five seconds. Um, before I turn it over to Ed and and Chris, if they have any closing remarks, and then we'll close up.

Ed Corl: [03:07:11] I do not. I was just, um, I actually I was, I was going to, you know, again, thank Paul and and Jeannie and and Alli. Um, Again, we actually do think that that we're closer here. There was some miscommunication, I think, on some issues. And obviously there was some, there was some data that that you were not aware of. Um, so we are all in favor of working collaboratively with you to, to close the gaps on, on some of these things. And one of the things that was obvious to me early on, you know, in hearing Paul, is that, um, it's pretty obvious that there was a data quality objective issue here, right? Um, because as, as Chris, you

know, clearly stated, you know, our data quality objective was 266 and that has now sort of evolved to a detection limit for Method 8015. So we're sort of pushing our ability of using data that was actually designed for another objective. And that's that can be a very, very difficult thing to do. But um, anyway, we'll, we'll do what we can, um, to, to work with you guys to get any further information that we can for you. Because I'd like to think that we all want the same thing. Anything. So anything I can do to assist? We're here to do it.

Allison Felix: [03:08:21] I have one more thing when it comes to the clipping. The Navy's response stated that going forward, they were going to remove the statement that said peaks were clipped. Instead of that, I would rather them show us exactly what was done in each data package so that we can look at it and know.

Ed Corl: [03:08:45] So I think the the plan is actually both. Um, what what, uh, Waverly was expressing is that the little statement that was in that data package doesn't mean a thing anymore. It's sort of a carryover. So we need to eliminate it because actually, I think Waverly, please confirm if I misspeak, but that the peak clipping, um, type thing is, is actually not being done anymore. It's sort of a carryover, but we will Waverly are going to work on getting you some further information on exactly what that meant to the respective data.

Waverly Braunstein: [03:09:16] Right. And I also think, don't think that we're using that instrument anymore. That was back in the sub-funnel days, but things were never being clipped. It was just a default printout on there. And and again, clipped doesn't mean eliminating peaks. It it meant scaling which the surrogate.

Ed Corl: [03:09:35] Yeah.

Waverly Braunstein: [03:09:35] The, the software manual.

Ed Corl: [03:09:37] Yeah. Right.

Waverly Braunstein: [03:09:37] But yeah.

Ed Corl: [03:09:38] Right. Right.

Waverly Braunstein: [03:09:39] Even even in the SOP for using the instrument, they don't call it "clipping." They say "scaling." Could be. Yeah. Yeah.

Ed Corl: [03:09:51] I don't I don't know.

Waverly Braunstein: [03:09:53] I don't know, but I know that I know that there's no censoring of data because it is it's a baseline-to-baseline. No, no peaks are removed.

Allison Felix: [03:10:03] But if something is being done, it needs to be shown. That's all I'm trying to say.

Waverly Braunstein: [03:10:09] Right. And it's, it's not being done.

Ed Corl: [03:10:13] We will investigate.

Waverly Braunstein: [03:10:14] Yeah.

Ed Corl: [03:10:16] We will investigate.

Ben Dunn: [03:10:20] Thank you, Jeannie. Uh, Chris, do you have any final comments?

Mark Williams: [03:10:27] Well, I again, I'd like to echo what Ed said and thank you for your time today. A lot of technical discussion. Um, you know, I think ultimately we're committed to the same thing. And that's the health and protection of everyone that is on the Joint Base Pearl Harbor-Hickam drinking water distribution system. We continue to work at that every single day. Uh, we have endeavored to be transparent and share information. Um, I know sometimes that can be a little bit difficult to getting to, a lot of times, just due to the sheer volume of the data. I mean, again, 10,000 samples. That's a lot of samples. And then we're collecting another five to 6,000 plus samples as part of EDWM and so one of the things that we have committed to is to be open and transparent and sharing that information. We're continuing to do that, and we're continuing to do that as part of EDWM. Um, and the result of EDWM have been consistent with the results of out of the Swarm Team Tech Memo and all the findings to date. I mean, it's basically been, we haven't seen any petroleum signatures, and I didn't get a chance to really talk about some of the QAQC things that we're doing in terms of, uh, double-blind performance testing, samples of JP-5, um, uh, matrix spikes for every batch of samples that we're collecting, uh, trying to go above and beyond of showing that if we actually have fuel in the water, petroleum hydrocarbons in the water, that we would detect it if it was there, um, accurately and precisely. So just want to emphasize that, you know, again, our shared commitment to the

protection of the folks on the drinking water system. I mean, that is first and foremost in everything that we do and will continue to do. So thank you for your time today.

Ben Dunn: [03:12:26] Yeah. Thanks, Chris. Um, so yeah, we'd also like to thank everybody for coming to the table today. And then the amount of time investment made today, as well as we had to carry over. Appreciate your patience as we walk through the brief. Um, to, you know, really outlay for the discussion. Um, a lot of great discussion. So appreciate that piece as well. Uh, we, I annotated a few takeaways. Um, and follow ups. So we'll send out the links for the, um, RARs uh, will provide a little more. Um, uh, some of the information that we just talked about. Um, information on Safe Waters. Um, And if we would like to have another follow-up discussion, then then certainly welcome that as well. Certainly I would like to approach it in a more collaborative manner, um, in moving forward. And I know BWS had made some comments there. Um, like we had set out when we first were publishing the Swarm Tech Memo, we sat down with BWS. So, um, it's only good, us being able to have this detailed discussion. So again, thanks everybody. And, um, I wish you all a great afternoon. This information and the links in the presentation will be in this week sometime.

JoAnna Delfin: [03:13:44] So it'll be on this Joint Base Pearl Harbor Safe Waters website and the Navy Task Force website as well.

Mark Williams: [03:13:52] And we should say Merry Christmas and happy holidays, right?

[03:13:57] (inaudible).

Mark Williams: [03:13:58] Absolutely. So.

JoAnna Delfin: [03:14:00] Thank you everybody.