Exhibit 56

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF NORTH CAROLINA
SOUTHERN DIVISION

IN RE: CAMP LEJEUNE WATER LITIGATION,) Case No. 7:23-CV-00897

VIDEO DEPOSITION OF
DAVID SABATINI, PH.D, PE, BCEE

TAKEN ON BEHALF OF THE UNITED STATES

IN OKLAHOMA CITY, OKLAHOMA

ON APRIL 11, 2025, AT 9:03 A.M.

REPORTED BY: LANA L. LEDFORD, CSR

A P P E A R A N C E S

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ALSO PRESENT VIA ZOOM:

Deanna Havai, Motley Rice
Giovanni Antonucci (DOJ)
Haroon Anwar (DOJ)
Kailey Silverstein (DOJ)
Dennis Reich
Morris Maslia, PE
Remy Hennet, PE
Zina Bash, Keller Postman

VIDEOGRAPHER: Stesha Ferguson

T A B L E O F C O N T E N T S

P L A I N T I F F S' E X H I B I T S

G O V E R N M E N T E X H I B I T S

Page 105, Line 23: Testimony marked at the request of Ms. Baughman

S T I P U L A T I O N S

It is hereby stipulated and agreed by and between the parties hereto, through their respective attorneys, that the deposition of DAVID SABATINI, PhD., PE, BCEE may be taken on behalf of the UNITED STATES on APRIL 11, 2025, in OKLAHOMA CITY, OKLAHOMA, by Lana L. Ledford, Certified Shorthand Reporter for the State of Oklahoma, pursuant to notice and Federal Rules of Civil Procedure.

* * * * * *

THE VIDEOGRAPHER: This is the videotaped deposition of David Sabatini. Today's date is April 11, 2025, and we are on the record at 9:03 a.m. Will counsel please state their appearances for the record.

MS. BAUGHMAN: Laura Baughman for the Plaintiffs.

MS. HORAN: Alanna Horan here on behalf of the United States, and I'm joined by my colleague, Allison O'Leary.

MS. HORAN: Good morning, Dr. Sabatini.

DR. SABATINI: Good morning.

MS. HORAN: I'm sorry. I think we need to do the oath first.

THE VIDEOGRAPHER: The court reporter will now swear the witness.

DAVID SABATINI, Ph.D, PE, BCEE, of lawful age, being first duly sworn, deposes and says in reply to the questions propounded as follows:

* * * * * * *

EXAMINATION

BY MS. HORAN:

Q Good morning, Dr. Sabatini. Could you please state your full name for the record?

A David Allen Sabatini.
Q And what is your current address?
A Current...
Q Address.
A Address.
1632 Crestmont, C-r-e-s-t-m-o-n-t, Avenue, Norman, Oklahoma 73069.
Q And do you currently have a work office that you go to on a regular basis?
A I'm an emeritus professor so I have an office I go to several times a week.
Q And where is that office?
A It's at the University of Oklahoma.
Q Have you been deposed before?
A I was deposed once before about 40 years ago on work that I did for the railroad. But that was a short hour-or-two-long deposition about work that I had done.
Q And I understand it was 40 years ago. But to the best of your recollection, what was that deposition about?
A It was about railroad right-of-way, and a farmer had built a dike to try and prevent flooding onto his land which was encroaching upon increased water levels on the railroad

right-of-way -- the railroad elevated tracks. So the concern was what they did would have damage -- what the farmer had done would damage railroad property.

Q And were you in your capacity as an expert in that case?

A I was -- it was based on work I had done for the railroad. So I was testifying to work I had done for the railroad.

Q And you've only been deposed that one time?

A That's the only time. Once.

Q So as, I think you know, I represent the United States in this matter. And you understand that you're obligated to tell the truth today?

A Yes.

Q A court reporter is taking down everything that we say. It's important that you answer verbally. For example, you must say "yes" or "no" rather than nodding or shaking your head.

Does that work?

A Yes.

Q Off to a good start.

Please talk at a reasonable pace. The pace I'm speaking at is fine. You seem to speak

at a very reasonable pace as well. But just to make sure that the court reporter can take down everything we say. Fair?

A Fair.

Q We'll do our best not to interrupt each other just so the court reporter, again, can take down all of our complete questions and your complete answer. So I just ask that you please wait until I finish my question before you start to answer, and I will do my best not to interrupt you when you're speaking as well.

Is that fair?

A Fair.

Q Once the deposition is complete, you'll be -- you'll be given the opportunity to read the transcript of your testimony and make any corrections, and then you'll be asked to sign it.

Do you understand that?

A Understood.

Q Only you are testifying today. You must answer to the best of your ability. And I just ask that you not ask other people for their help in answering any questions today.

Fair?

A Understood.

Q If you do not understand a question, please let me know and I'll do my best to clarify the question. If you don't ask for clarification, I will assume that you understood the question.

Is that fair?

A Fair.

Q Is there any reason why you're unable to give your most truthful and accurate testimony today?

A No.

Q What did you do to prepare for your deposition today?

A I reviewed my expert rebuttal report and associated reports.

Q What do you mean by "associated reports"?

A I reviewed Hennet's expert report that I was responding to. And I reviewed the AH Environmental report that was pivotal. And I reviewed the Nakasone paper that fed into the losses over the weir and the spiractor. And the McKone paper and the shower experiment.

Q So other than reviewing your expert report, Dr. Hennet's report, the AH Environmental

report, the Nakasone study, and the McKone study, did you review any other documents in preparation for your deposition today?

A Possibly, in general. Just background information. But not specific -- not to my recollection. Oh, I reviewed Hennet's deposition. That would have been specific.

Q Did you review any other depositions beyond Dr. Hennet's?

A That's not -- not to my recollection.

Q Did you meet with anyone to prepare for your deposition today?

A I met with counsel yesterday to go over being the first time as an expert, in preparation.

Q And for how long did you meet with counsel yesterday?

A We met for two or three hours in the morning and then hour or two in the afternoon.

Q Besides Ms. Baughman, who I believe --

A Yes.

Q -- may have been the counsel you were with yesterday --

A Yes. Yes.

Q -- was anyone else present for that

prep?
A Not in person.
Q Who joined you remotely?
A Devin Bolton and Kevin Dean.
Q Have you testified in court before?
A No.
Q And I believe you said this is your first time serving as an expert witness in a case?
A Yes. Correct.
Q Have you read the complaint in this case?
A I'm sorry? The...
Q The complaint.
A Yes. Early on, I did, as I recall. The complaint. What -- refresh my memory of the complaint.
Q Sure.
So a complaint is a document wherein the Plaintiffs state what their allegations are.
Do you recall reading a document like that at any point?
A I think I may have, several years ago.
Q And to the best of your understanding, what are the Plaintiffs' allegations in this

case?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Not remembering, specifically, the document, I'd be hesitant to speak to that.

Q (BY MS. HORAN) Sure.

So setting aside the complaint document, just generally, what is your understanding of what the Plaintiffs' claims are in this case?

MS. BAUGHMAN: Object to the form.

THE WITNESS: It's kind of an open-ended question. Can you be more specific?

Q (BY MS. HORAN) I'm just trying to understand what -- what you believe the Plaintiffs' allegations are. It's not -- it's just your understanding.

A Okay.

Q And it could come from any source kind of. You've -- sounds like you've been working on this for -- for a while, based on your billing records. So really just generally, what your understanding is.

MS. BAUGHMAN: Same objection.

THE WITNESS: The -- that there was groundwater contamination that resulted in

drinking water contamination and that there was exposure as a result.

Q (BY MS. HORAN) Do you personally know anyone with a pending lawsuit or administrative claim against the United States related to their time at Camp Lejeune?

A No.

Q Do you know -- or strike that.

Have you ever spoken, in person or via email, with a man named Ernest Hunt?

A I'm sorry? With...

Q With a man named Ernest Hunt.

A I've had no personal contact.

Q Have you ever spoken, in person or via email, with a man named Mark Cagiano?

A No.

Q Have you ever spoken, in person or via email, or text message, phone, any of those, with a man named Jerry Ensminger?

A No.

Q Have you ever spoken, in person or via email, phone, any form of communication, with a man named Mike Partain?

A No.

Q When were you retained in this matter?

A It was in April of -- two years ago.
Q So April 2023?
A '23. Yes.
Q And how did you -- or strike that.
You were retained by the Bell Legal Group; is that right?
A Yes.
Q And do you recall if they contacted you or if you contacted them?
A They contacted me.
Q Had you previously worked with anyone from the Bell Legal Group?
A No.
Q Do you recall the name of the attorney that called you?
A Pat Telan. T-e-l-a-n.
Q Not exclusive to the Bell Legal Group, but have you ever worked with any of the counsel in this case before?
A No.
Q Giving your best estimate, roughly how many hours have you spent working on this case?
MS. BAUGHMAN: Objection to form.
THE WITNESS: I'd have to refer to my records. I don't recall a specific -- a number.

Q (BY MS. HORAN) And you've been billing hours since April of 2023. Is that fair?
A Yes.
Q And your billing records would be the best place to find out how many hours you've worked on the case?
A Yes.
(Government Exhibit 1 marked for identification)
Q (BY MS. HORAN) I'm marking as Exhibit 1. This is a document with the Bates CL_PLG-Expert_Sabatini_0000002426. And it runs through the Bates ending in 2443.
MS. BAUGHMAN: So what she's reading is just the number at the bottom.
THE WITNESS: Okay.
MS. BAUGHMAN: Okay.
THE WITNESS: Okay.
MS. BAUGHMAN: He doesn't know. Just so he understands. Okay.
Q (BY MS. HORAN) And if you have any questions like that, please feel free to ask them.
A Thank you.
Q We want to make sure you're on the same page as me.

A Thank you.
Q Dr. Sabatini, do you recognize these as your billing records?
A Yes.
MS. HORAN: So I'll just put on the record, I've looked and I've only been able to find billing records for the calendar year 2024. So we would just request the records from April '23 to December '23, and then any from 2025.
MS. BAUGHMAN: So to the best of my knowledge, there aren't any from 2023. You can ask him, but I'm not aware of them. And I don't think they exist for 2025 yet.
THE WITNESS: Yeah. I've not --
MS. BAUGHMAN: But you can ask him --
THE REPORTER: Wait. One at a time, please.
MS. BAUGHMAN: Yeah. Remember, don't -- only --
THE WITNESS: I'm sorry.
MS. BAUGHMAN: -- one person at a time.
THE WITNESS: I'm sorry.
MS. BAUGHMAN: And you should only speak when she asks you a question. Okay?
THE WITNESS: Okay.

MS. BAUGHMAN: All right. Go ahead.
MS. HORAN: Sure.
Q (BY MS. HORAN) I think -- did you bill in 2023 calendar year?
A From the best of my knowledge, yes.
Q So there would be a record of that billing that you did in 2023; correct?
A That would be my understanding.
MS. HORAN: Okay. So we just request those documents.
Q (BY MS. HORAN) And you have not billed for 2025 yet?
A No.
Q Okay. And since January, roughly how many hours do you think you've worked on this case?
A I'd have to refer to my records.
Q Sure.
Looking at your billing records, prior to receiving the DOJ reports in December of 2024, you had drafted and finalized an expert report.
Fair?
MS. BAUGHMAN: Objection to form.
THE WITNESS: I had worked on a document. Yes.

Q (BY MS. HORAN) And in your billing records, you refer to that document as expert report. Fair?
A In the billing. Yes.
Q And you did not file that expert report in this case; correct?
MS. BAUGHMAN: Objection to form.
THE WITNESS: I'd have to defer to counsel.
Q (BY MS. HORAN) You don't know one way or the other whether that document was ever filed?
A To my knowledge, it --
MS. BAUGHMAN: Objection to form.
What do you mean filed? We don't file expert reports.
MS. HORAN: That's a fair correction.
MS. BAUGHMAN: Okay.
Q (BY MS. HORAN) Do you know if that document was ever provided to the United States?
A No. No. I mean not to my knowledge.
Q The first page of the Exhibit 1.
A Okay.
Q The second billing line is for January 9.

Do you see that?
A Yes.
Q And it's for .5 hours, and it says, "Prep for 1/23 trip."
A Yes.
Q Where was that trip to?
A The trip did not happen.
Q Where was the trip anticipated to be?
A The trip was --
MS. BAUGHMAN: Wait. Hold on. I'm going to object and just refer, for your sake, and for Dr. Sabatini, to case management order number 17 which says that communications between expert and counsel are not discoverable.
So to the extent you need to answer any question about why a trip didn't take place, that's privileged --
THE WITNESS: Okay.
MS. BAUGHMAN: -- if it was a communication with counsel.
Go ahead.
MS. HORAN: Are you claiming privilege over where the trip was to?
MS. BAUGHMAN: Only if he has to rely on communications with counsel to answer the

questions.

MS. HORAN: Okay.

Q (BY MS. HORAN) I'll ask you, Dr. Sabatini, but please don't answer if you have to rely on your communication with counsel to answer it.

A Okay.

Q Where was the trip that you were prepping for on January 9th to?

A That would cause me to rely upon communications from counsel.

Q Okay.

MS. BAUGHMAN: I might have said the wrong CMO. Just for the record, it's case management order 17. I don't -- I'm not sure if that's what I said. Just -- just to correct that. But go ahead.

MS. HORAN: Sure.

Q (BY MS. HORAN) And Dr. Sabatini, we'll go throughout the whole day. So to the extent I ask you a -- I might not know.

A Uh-huh.

Q So to the extent I ask you a question and you have to rely on your communications with counsel to answer it, that rule applies

throughout the whole day.

A Thank you.

Q Okay. Could you please turn to the document ending -- or the page ending in 2438?

A 2438.

Q The last three entries on that page for June.

Do you see those?

A Yes.

Q And the entry next to June 11th says, "Consider additional calculations/analytical solutions."

Do you see that?

A Yes.

Q And the June 25th entry says, "Sample calculations-mass/concentrations-Tarawa Terrace."

Do you see that?

A Yes.

Q And the June 28th entry says, "Sample calculations-HPIA/HPLF."

Do you see that?

A Yes.

Q HPIA. What does that stand for?

A Hadnot Point Industrial Area.

Q And HPLF. What does that stand for?

A Hadnot Point Land Fill.
Q Could you turn to the last page, the page ending in 43?
A (Witness complies.)
Q The last billing entry for December 31st says, "Finalizing rebuttal report/Zoom call with Morris Maslia."
Do you see that?
A Yes.
Q Did you finalize your rebuttal report on December 31st or did you continue to work in -- work on it into January?
A I -- as I recall, we had an extension which allowed additional time.
Q So you continued to work on it into January. Fair?
A I don't recall specifically because I was targeting the earlier completion date. So I don't recall. I think -- believe I did do some additional work.
Q And the answer to that question would be in your billing records. Fair?
A Yes.
Q What is your practice with how often you bill the attorneys?

A Initially, it was I sent monthly. And then at some point last year, Lori Mertz recommended quarterly. So I transitioned toward quarterly billing towards the end of last year.

Q And you haven't billed for Q1 of 2025 yet?

A No.

Q Do you anticipate doing that soon?

A Probably sometime in the future.

MS. HORAN: We would just request those when they become available.

Q (BY MS. HORAN) The second half of the last entry on Page 43 says, "Zoom call with Morris Maslia."

When did you first meet Morris Maslia?

MS. BAUGHMAN: Hold on one second. Just -- just to be clear. So you know. Okay? Case management order 17 says you don't talk about your communications with --

THE WITNESS: Right.

MS. BAUGHMAN: -- other experts. But when you --

THE WITNESS: When. Time.

MS. BAUGHMAN: You can answer that question. Okay? Go ahead.

THE WITNESS: Okay. Thank you.

I've not met Morris Maslia in person.

Q (BY MS. HORAN) When did you first speak with Morris Maslia?

A As I recall, there was a general information Zoom with --

MS. BAUGHMAN: Just when.

THE WITNESS: When. When. Thank you.

In mid to late '23.

Q (BY MS. HORAN) And do you recall who else was on that Zoom in end of 2023?

A There were multiple people, but I don't recall. That was so long ago.

Q And roughly how many times have you spoken with Morris Maslia since then?

A Two times. At most, three.

Q Besides Morris Maslia, to the best you can recall, have you spoken with any other Plaintiffs' experts?

A Not that I recall. I'm trying to think through. No.

Q You don't recall ever speaking with a man named Dr. Aral Mustafa?

A No.

Q Have you ever spoken with Dr. Konikow?

A No. Well, not related to this case.
Q Had you previously worked with Dr. Konikow?
A Well, I was trying to -- I may have met him at a conference years ago.
Q Do you recall ever speaking with Jones or Davis?
A No.
Q Did you have any help in preparing your expert report? And again, I'm not asking about attorneys.
MS. BAUGHMAN: So not lawyers. Anyone else.
THE WITNESS: Say again?
MS. BAUGHMAN: Okay. She's asking you if you had help preparing your report, but she's not talking about any lawyers or anyone who's employed by a lawyer.
THE WITNESS: No.
Q (BY MS. HORAN) So no grad students or anything?
A No.
Q Okay. Did you write your expert report yourself?
A Yes.

Q Okay. You can put Exhibit 1 to the side.

A (Witness complies.)

MS. BAUGHMAN: So we just keep, like, a stack because sometimes she might go back to these. Okay.

THE WITNESS: Okay.

(Government Exhibit 2 marked for identification)

Q (BY MS. HORAN) I'm marking as Exhibit 2 -- this is a document with the title Expert Rebuttal Report of David Sabatini Ph.D, PE, BCEE, January 14, 2025.

Take as long as you'd like to flip through it, but do you recognize this as your written expert report that you submitted in this case?

A Yes. At least the cover page certainly. I assume the rest of the document.

Q Do you want to flip through it just to make sure it's all there?

A Sure. Let me...

MS. BAUGHMAN: Do you want him to look at every page or what do you want him to do?

MS. HORAN: Just generally.

THE WITNESS: Make sure there's -- this

looks -- it looks complete. Yes.

Q (BY MS. HORAN) All right. And this is the report that you reviewed in preparation for your deposition today?

A Yes.

Q Having reviewed your report in preparation for today, are there any corrections to the opinions you offered that you would like to make?

A No.

Q You can set that to the side.

A (Witness complies.)

(Government Exhibit 3 marked for identification)

Q (BY MS. HORAN) I'm marking as Exhibit 3 -- this is a document with the title January 2025 Rebuttal Expert Report of David Sabatini Supplemental Amended Materials Considered List dated April 9, 2025.

Dr. Sabatini, does -- do you recognize this document?

A Yes.

Q Have you seen it before?

A Yes.

Q And you recognize this as your supplemental materials considered list. Fair?

A Yes.
Q We -- does this include all of the materials you reviewed as an expert?
A To the best of my knowledge, yes. I mean, there were so many documents, but yes, this -- yes.
Q Is there anything you've reviewed since April 9th that you would like to add to this list today?
A No.
Q So the materials considered list that we originally received in January went to Page 8, and then everything from Page 9 onward was added to the April 9, 2025 list.
Is that your understanding that there was an update on April 9th?
A That's my understanding. Yes.
Q So since filing your report in January of 2025, you've since reviewed these 21 pages of materials? Is that fair?
MS. BAUGHMAN: Objection to form.
THE WITNESS: Yes.
Q (BY MS. HORAN) And when did you first receive the information -- or strike that.
When did you first receive the documents

on Pages 9 through 30 of this list?

A I don't recall.

Q Did you review any of the materials on Page 9 through 30 of your materials considered list prior to submitting your rebuttal report in January?

MS. BAUGHMAN: Objection to form.

THE WITNESS: I may have, but I don't recall.

Q (BY MS. HORAN) Have you reviewed all of the materials, all 30 pages of these materials?

A To varying degrees, yes.

Q The materials in -- listed on Page 9 through 30 are not directly cited in your rebuttal report.

Is that fair?

MS. BAUGHMAN: Objection to form.

THE WITNESS: To the best of my recollection.

Q (BY MS. HORAN) Could you turn to Page 11? It starts on Page 11 at the very bottom. Or strike that. It's actually on Page 12.

On Page 12 of your materials considered list, you have a number of depositions listed.

Do you see that?

A Yes.
Q You mentioned that you reviewed Dr. Hennet's deposition in preparation for today. Looking at this list now, did you review any other depositions in preparation for today?
A I looked at the deposition of Ernest Hunt and Mark Cagiano.
Q Have you read all of the depositions listed on Page 12?
A To varying degrees.
Q When you say "to varying degrees," what -- what do you mean?
A Some in detail and some just briefly. Some were more pertinent than others.
Q Have you attended any depositions in this matter?
MS. BAUGHMAN: Objection to form.
Do you mean in person or...
Q (BY MS. HORAN) No. Remotely or in person. At all in any way. Phone call.
A Yes.
Q Which ones have you attended remotely, in person, or a phone call?
A One.
Q And which one was that?

A Hennet.
Q The materials you have listed on Page 9 --
A I don't know if this is worth commenting. Some of these CLJs may have been in my appendix. I'm not sure.
Q When you say appendix, Dr. Sabatini, are you referring to the water buffalo Appendix A?
A Yes.
Q Now, that has its own materials considered list.
A Okay.
Q Is that fair? Or -- you're welcome to look at your report next to you if you'd like.
A Yes.
Q So are those separate materials considered lists or is this materials considered list inclusive of all of your documents?
MS. BAUGHMAN: If you know.
THE WITNESS: Yeah, I -- I'm not clear. I'm not sure. Trying to be comprehensive.
Q (BY MS. HORAN) Sure.
Why did you provide a second materials considered list with your Appendix A as opposed to just one for the entire report?

MS. BAUGHMAN: Objection to form.
THE WITNESS: I'm not sure. Can you --
Q (BY MS. HORAN) Sure.
A I'm not sure the question.
Q Sure.
So your Appendix A has a materials considered list -- and again, you're welcome to look at it.
A Yeah.
Q Why did you decide to provide its own materials considered list with your Appendix A --
MS. BAUGHMAN: Objection to form.
Q (BY MS. HORAN) -- separate from the one attached to your report?
MS. BAUGHMAN: Objection to form.
Well, this wasn't attached to his report. Exhibit 3 was not attached to his report. So I'm going to object to that.
MS. HORAN: Sure.
Q (BY MS. HORAN) So separate from the one that was on April 9th, you have a materials considered list affixed to your Appendix A.
A Yeah.
Q Is that fair?
A These were pertinent to the report, and

my only --

MS. BAUGHMAN: It's a reference list; it's not a materials considered list. So I'm going to object to that.

THE WITNESS: I guess the only thing I was trying to comment, I didn't know if -- in an effort to be comprehensive, if some of these might have also been listed here.

Q (BY MS. HORAN) Okay. So you're not sure?

A No.

Q Okay. Since submitting your expert report in January of 2025, why did you decide to review the documents in Pages 9 through 30?

MS. BAUGHMAN: Object to the form.

THE WITNESS: I don't recall.

Q (BY MS. HORAN) Okay. You can set that aside.

A (Witness complies.)

Q Could you turn to Exhibit B of -- of Exhibit 2 which is your expert report? I believe it is your resumé.

A My vitae?

Q Yes.

Any changes since you've submitted this

vitae in December of 2024?

A I believe not. I don't think there's any articles. Book six is almost released. But I don't think it's yet released. On Page 3. Book six. So that may have an April date on it.

Q And that's Surfactant Formulation Engineering Using HLD and NAC.

A Yes.

Q That book.

A Yes.

Q And you're a co-author on that book?

A Yes.

Q Other than that that book might have been released by now, anything else that you can think of?

A Minor detail, but then a couple of the chapters in that book will also -- dates will be updated.

Q Sure.

A So co-edited, co-authored the book, and then several chapters in the book.

Q Sure.

Anything else?

A No.

Q Presently, your professional roles

include the associate director of the Institute for Applied Surfactant Research, you are an adjunct professor at the University of Ethiopia, and one university in Thailand.

A Correct.

Q And you are a partner at Surfactant Associates.

A Yes.

Q Is that an accurate summary of your present professional roles?

A Yes.

Q In this case are you contracted directly and personally with the Plaintiffs' leadership group or is it through an entity?

MS. BAUGHMAN: Objection to form.

THE WITNESS: I'm sorry. Ask again.

Q (BY MS. HORAN) Sure.

So are you contract -- let me rephrase.

You have a role in a number of organizations. Is your contract to do work on this case with one of those entities and then you work on it or is it with -- directly with you?

A Directly with me.

Q And you received a bachelor's degree in civil engineering from the University of Illinois

in 1981?

A Correct.

Q And you received a master's degree in civil engineering from Memphis State in 1985?

A Correct.

Q And you received a Ph.D from Iowa State University in 1989?

A Correct.

Q What is your Ph.D in?

A It's in civil engineering. With an environmental emphasis.

Q What does that mean?

A Within civil engineering, there's structural engineering, geotechnical engineering, transportation engineering, and environmental engineering. So my specialty was in the environmental engineering side of civil engineering.

Q You have a paper listed. "Sorption and transport of Atrazine Alachlor and Fluorescent Dyes in Alluvial Aquifer Sands."

Was that your Ph.D thesis?

A Yes. Part of it.

Q What was the other part? If you could identify it for us.

A I'd have to remember back at my papers, but there was another paper that was published out of my dis-- but it was same topic.

Q Was it published around the same time?

A Yes.

Q After your Ph.D, you became an assistant professor and then a full professor at the University of Oklahoma?

A Assistant, and then associate, and then full. Yes.

Q And I believe you said now, you're a professor emeritus?

A Emeritus. Yes. No problem.

Q Sorry about that.

A No problem.

Q And do you still teach classes?

A Yes.

Q What classes do you teach?

A I teach a course on fundamentals of water security, quantity, quality, and equity in a changing climate.

Q Anything else?

A That's the only university course I teach. I teach a short course to industry.

Q And what course is that?

A It's fundamental and applied aspects of surfactants.

Q And you teach that to the industry you said?

A Yes.

Q So what does that mean?

A We go to industries that -- as associate director of the Institute for Applied Surfactant Research, we have industrial sponsors of our institute and they ask us to come and teach a two-and-a-half-day short course at their company. And we'll go -- my colleague and I go and we team teach -- trade off teaching -- for two and a half days, this course to chemical companies.

Q In either of those courses, the one to students or the one to industry, do you talk about Camp Lejeune?

A Briefly in the water security, in one lecture, I briefly mention that -- I talk about superfund and show a map of the United States of all the superfund sites. And then I mention that Camp Lejeune is one of those contaminated sites.

Q Besides that one mention in terms of superfund sites --

A No. That's all.

Q No.
Is there a PowerPoint or anything you put together for that class?
A Yes.
Q We would just request a copy of that PowerPoint.
A Okay.
MS. BAUGHMAN: Well, we'll talk about that later. I don't -- you didn't -- I mean there was no official request for that so I don't think we'll be providing that. But you can follow up with me. I didn't see a document request for such a document.
MS. HORAN: Sure. We can deal with that on the back end, but we just request it.
THE WITNESS: Okay.
Q (BY MS. HORAN) And you as a professor emeritus --
MS. BAUGHMAN: Emeritus.
Q (BY MS. HORAN) Emeritus.
THE WITNESS: Yeah.
Q (BY MS. HORAN) -- are you retired from your role as a professor or do you -- is that considered a retirement role or how does that work?

MS. BAUGHMAN: Objection to -- objection to the form.

THE WITNESS: It's my -- I don't -- I don't know how to say this. Quazi retired.

Q (BY MS. HORAN) Quazi retired.

Do you still get a salary from the University of Oklahoma?

A When I teach a course, I do. But not on a monthly -- when I'm not teaching a course, I don't.

Q You're a professional engineer; correct?

A Correct.

Q And you've taken and passed both of the professional engineer tests?

A Yes.

Q Have you ever failed a test to become a professional engineer?

A No.

Q Your report has David Sabatini, Ph.D, PE, BCEE on the front.

The PE stands for professional engineer?

A Correct.

Q What does the BCEE stand for?

A It stands for board certified environmental engineer.

Q And could you describe for me what that licensing or certification is?

A It's through the associate -- American Association of Environmental Engineering and Scientists. And it's -- you can gain that designation either by taking a written and an oral exam -- or if you're considered a person of eminence, your record can gain you that recognition.

Q And when did you receive that recognition?

A Oh, goodness.

Q More than 20 years ago? More than ten?

A I'd say 15 to 20 years ago. In that range. I'd have to look to my records.

Q Sure.

And you would look at your resumé to find that out?

A Say again.

Q Or where -- where would you look to find that information out?

A I guess I don't have it on my resumé. I think I do have my PE. But anyway, I'm not sure.

Q Other than your professional engineering licensure and your BCEE certification or

licensure, do you have any other licenses?
A No.
Q You've worked on projects regarding cleanup at military bases; correct?
A Correct.
Q And which projects have you worked on?
A Oh, there's a range. Hill Air Force Base. Dover Air Force Base. What's the one in California? Naval Air Station. Those are -- there are several. I'd have to look at my records to remember.
Q Where -- where would you look to remember?
A Should be in my...
Q It should be in your resumé?
A Yeah.
Q Okay. You mentioned Hill. Could you describe your role in that project?
A The -- it was a research project to look at developing advanced technologies for cleaning up groundwater contamination.
Q You mentioned Dover. Could you describe --
A The same -- same type. We developed a technology in the laboratory and approved

successful so then we went to these field sites to demonstrate.

Q You said "we". Who did you work with on this project?

A Well, colleagues at the University of Oklahoma.

Q Okay. And you mentioned one in California.

A Yeah.

Q What was your role in that?

A Same. Field demonstration.

Q How did you become involved in the Hill project?

A We competed nationally for a large research grant to take our technology from the laboratory into the field. It was funded by the Environmental Protection Agency.

Q Is that the same way you became involved with the Dover project? Or how did you become involved there?

A That was the same program funding.

Q And is that the same with the California project?

A Yes. That -- I'd have to look back at my records. But yes, the same general. That may

have actually been our company. We started a company, Surbec Environmental, that was implementing our technology. That may have been a Surbec project.

Q And the "we" is your colleagues at the University of Oklahoma still?

A Yes.

Q You mentioned receiving funding from the EPA; correct?

A Correct.

Q Have you ever received funding or grants from any other government agency?

A Yes. Department of Defense. Department of Energy. As I recall.

Q Did the grant you received from the Department of Defense have anything to do with groundwater?

A Remediation. Yes.

Q And what was that grant related to?

A I'd have to look back in my -- I'd have to look -- same. I don't recall the specific details. That's 30 years ago. Twenty-five years ago.

Q Sure.

And then the -- do you recall what the

grant funding from the Department of Energy was for?

A It's all related to the groundwater remediation.

Q Were you involved in the groundwater contaminant cleanup at Camp Lejeune?

A Say again.

Q Were you involved in the groundwater contaminant cleanup or remediation at Camp Lejeune?

A No.

Q Did you ever compete for a grant to be involved in the Camp Lejeune contaminant cleanup?

A No. Not to my knowledge.

Q To the best of your memory, were you ever asked to be involved in the contaminant cleanup at Camp Lejeune?

A No.

Q Do you know anyone who was involved in the contaminant cleanup at Camp Lejeune?

A Not to my knowledge.

Q Have you ever personally served in the military?

A No.

Q Have you ever been to a military base?

A The bases that we described.
Q So part of your work with Hill, Dover, and the project in California was you going to the base.
A We were physically implementing the technology at those sites.
Q Other than your -- through your professional work on Hill, Dover, and the California base, can you recall ever visiting any other military bases?
A Tinker Air Force Base in Oklahoma City. Military base in Germany where I taught a short course, but that base was being closed. That's all I can remember.
Q What was the course you taught in Germany?
A It was on groundwater contamination remediation.
Q And you said it was -- the base was being closed? Is that fair?
A Say again.
Q Did you say that the base was being closed?
A Yeah. They were -- yes.
Q Were you there to help them close the

base?

A No. No.

Q Why were you there?

A As part of reverting their base back to the home country, there was value added in terms of buildings, but there was value detracted by virtue of contamination. And so the personnel were gaining understanding of contamination remediation to help understand that aspect of the base reversal.

Q Have you ever been to Camp Lejeune?

A No.

Q Do you have any training or hist- -- or strike that.

Do you have any training or education in history?

A History? No.

Q Do you have any formal training or education in historical military practices?

A No.

MS. BAUGHMAN: Wait. Wait. Did you want to amend your answer?

THE WITNESS: Well, I mean, I've taken several -- I guess it's not training. I've taken several courses on Lincoln from history. And I'm

writing a book on Lincoln and engineering. So I don't know if that constitutes the degree of -- and I guess I would say when we do research, we -- it depends upon what you mean by history. When we do research, we have to research the history of what we're working on to be able to build upon it. So anyway. That's -- I guess that's what I wanted to say.

Q (BY MS. HORAN) Sure.

And your -- I believe you said your -- you've studied the Lincoln era and you're writing a book on the Lincoln era.

Are there any other eras of history or military history that you've spent more time interested in?

A In saying that Lincoln was an engineer, one of my advisors on my book said, well, write about the engineering presidents. And three of those were military academy graduates. So I've studied their time period and their history. So I don't know if that fits in to what you're talking about or not. But that would be Grant, Eisenhower, and Carter.

Q So have you spent any time studying or received any education on historical military

practices from the 1950s to the 1980s?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Well, Eisenhower is in that period, but I guess I'd say no.

Q (BY MS. HORAN) Have you ever taught any courses on history?

A I've given seminars. Not semester-long courses, but I've given seminars on Lincoln. Leadership Lincoln and engineering. Lincoln's faith journey.

Q Other than seminars on Lincoln, have you taught any other history seminars or courses?

A I teach a Bible class at church which gets into a lot of history. But other than that, I'd say no.

Q Could you turn back to Exhibit 2 which is your report? Actually, I think you still have it in front of you.

A I'm sorry. Which?

Q Your report. You've got it in front of you.

A Okay. I thought you mentioned a page number.

Q I'm going to get there. If you could turn to Page 1 of Exhibit 2, the last sentence

reads, "My background and experience sufficiently and uniquely qualify me to comment on the fate of contaminants in Camp Lejeune water treatment plants and distribution systems as well as the ultimate delivery of contaminated drinking water to marines and their family members."

Did I read that correct?

A Correct.

Q So you're not offering opinions in this case on the fate and transport of contaminants in the groundwater at Camp Lejeune.

Fair?

A Correct.

MS. BAUGHMAN: Object to the form.

THE WITNESS: Correct.

Q (BY MS. HORAN) And you're not offering opinions on the fate and transport of contaminants through the soil at Camp Lejeune; correct?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Correct.

Q (BY MS. HORAN) You can set that exhibit aside.

A (Witness complies.)

Q When was the first time you became aware

of the water modeling happening related to Camp Lejeune?

A After I was contacted about the case.

Q So when this -- or strike that.

When the water modeling was happening in the early 2000s, you were unaware of it.

Is that fair?

A Correct.

Q Have you read the ATSDR reports on water modeling done at Camp Lejeune?

A Yes. Well, yes. There are many, many, many reports. And I've read many of them. The ones focused on -- yes.

Q Which -- to the best of your memory, which ones have you read or what was the subject matter of the reports that you've read?

MS. BAUGHMAN: Objection. Object to the form.

THE WITNESS: Certainly read the summary reports for both, in detail. And then some of the other supporting ones. I'd have to look back to remember.

Q (BY MS. HORAN) And would all of the reports that you've read relating to the ATSDR water modeling be on your updated materials

considered list?

A Yes.

Q I'm happy to have you look at that list. It should be next to you.

A This list? (Indicating)

Q Yes. So that's Exhibit 3 that you have in front of you now. So could you identify which of the ATSDR reports you've read in detail?

MS. BAUGHMAN: So those are listed throughout the documents. You'll have to go page by page and just look at -- because they're not separated by these are the ATSDR. So it's listed by the -- the first author.

THE WITNESS: So you're asking me just to look through the list and try and recall.

Q (BY MS. HORAN) Sure. Exactly.

MS. BAUGHMAN: The question is, if he's read them or reviewed them?

MS. HORAN: Uh-huh.

MS. BAUGHMAN: Okay.

MS. HORAN: The question is whether --

Q (BY MS. HORAN) Which ATSDR reports, sitting here today, do you recall reading in detail?

MS. BAUGHMAN: In detail. Okay. Object

to the form.

THE WITNESS: There's so many of them it's hard to remember which specific ones.

Q (BY MS. HORAN) Just what you can remember, Dr. Sabatini.

MS. BAUGHMAN: Take your time.

THE WITNESS: Okay. On Page 2. I'm really hard-pressed to remember just specifics, but I do remember several.

Q (BY MS. HORAN) Well, perhaps --

MS. BAUGHMAN: Wait. Were you finished answering?

THE WITNESS: Yes. I'm -- I might be able to identify the few specifically, but I'm not sure I'll be able to identify all that I've reviewed.

Q (BY MS. HORAN) Sure. If you could identify the few specifically, that would be great.

A Okay. I remember the Faye, et. al. Faye on Page 2.

Q All of those?

A No, no. I'm...

Q Okay.

A As I recall, the best of my recollection

-- I don't want to speculate. I think F and C. 2007. 2008. Really I think it's the...

Specifically, ATSDR you asked?

Q Uh-huh.

A I guess the -- Page 4. There may have been others that I'm missing. Page 4, Maslia 2005 Expert Peer -- Peer Review Panel. Maslia 2009 Expert Panel. Maslia Chapter A, 2007. Maybe Chapter I. 2013. Chapter A.

So those -- just to highlight some.

Q Sure.

A Some of the ones.

And some I looked at in lesser details. Those would be the ones I recall looking at in detail.

Q Sure.

And you mentioned also looking in detail of the summaries of both Hadnot Point and Tarawa Terrace?

A I think those were the As.

Q Sure.

A As I recall.

Q You can set that aside.

A (Witness complies.)

Q But again, if you ever need it during

the deposition, feel free to take a look at it.

A Okay. Thank you.

Q Other than your opinion that the ATSDR model indirectly accounts for VOC losses during the water treatment storage and distribution, you are not offering opinions on the ability of ATSDR water model to determine historic contaminant exposure levels in the water supply for individuals; correct?

MS. BAUGHMAN: Object to the form.

THE WITNESS: There's a lot to that statement. Could you repeat that?

Q (BY MS. HORAN) Sure.

Other than your opinion that the ATSDR model indirectly accounts for VOC losses, you're not offering any opinions on the ability of ATSDR's water model to determine historic contaminant exposure leaves in the water supply for individuals who lived at Camp Lejeune.

MS. BAUGHMAN: Objection to form.

THE WITNESS: I'm not sure if my second opinion which says that they did use treated water to calibrate their model may fall in to what you're saying.

Q (BY MS. HORAN) Sure.

So other than that opinion --

A Other than my three opinions.

Q Sure. And only your second opinion relates to the ATSDR model. Is that fair?

MS. BAUGHMAN: Objection to form.

THE WITNESS: To the extent that it demonstrates that treated water samples were used in the -- in the analysis.

Q (BY MS. HORAN) Sure.

A Correct.

Q Your opinion 1 does not reference the ATSDR water modeling; correct?

A No.

Q And your opinion 3 does not reference the ATSDR modeling; correct?

A Correct.

Q So other than your second opinion which references the ATSDR model, you're not offering any other opinions on the ability of ATSDR's water model to determine historic contaminant exposure levels in the water supply for individuals who lived or worked at Camp Lejeune.

Is that fair?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Excluding the impact this

might have had, no. I agree.

Q (BY MS. HORAN) We've been going about an hour. Would you like to take a short break?

MS. BAUGHMAN: Just if you need it. If you're good to go, we can keep going.

THE WITNESS: We can go a little bit longer.

Q (BY MS. HORAN) Okay. And I don't remember if I said this at the beginning, but if I didn't, if you ever need a break, happy to take it whenever you would like it.

A Thank you.

Q I just ask that if the question is pending, you just answer the question and then we'll take the break.

A Sounds good.

Q Okay. You've read the expert report of Dr. Alex Spiliotopoulos; correct?

A I glanced at it.

Q And you haven't offered any opinions in your report commenting on Dr. Spiliotopoulos --

A Oh, his report. I'm sorry.

(Simultaneous crosstalk)

THE REPORTER: Wait. Any opinions in your report.

MS. HORAN: Commenting on Dr. Spiliotopoulos's opinions.

THE WITNESS: And I -- I should restate what I said. I was -- when you asked the question, I was thinking his deposition.

No, I did read his report fully.

Q (BY MS. HORAN) And you haven't offered any opinions in your report commenting on Dr. Spiliotopoulos's opinions in his report; correct?

A Correct.

Q You can -- if you can open your report again which is Exhibit 2. And turn to Page 2.

A (Witness complies.)

Q The second paragraph says, to start, "My methodology for assessing Dr. Hennet's expert report opinions 2, 10, and 13..."

Do you see that?

A Yes.

Q So you've only assessed Dr. Hennet's opinions 2, 10, and 13?

A Correct.

Q You did not assess Dr. Hennet's other opinions; correct?

A Correct.

Q And you agree with Dr. Hennet that there

would be VOC losses during the storage distribution -- strike that.

You agree with Dr. Hennet that there would be VOC losses during the storage treatment and distribution of water at Camp Lejeune; correct?

MS. BAUGHMAN: Objection to form.

THE WITNESS: I agree that there was a potential for losses.

Q (BY MS. HORAN) And your disagreement with Dr. Hennet is in the amount of VOC losses at the water treatment plants and its reservoirs.

Is that fair?

MS. BAUGHMAN: Objection to form.

THE WITNESS: In -- yes.

Q (BY MS. HORAN) And you agree with Dr. Hennet that there would be VOC losses through the use of water buffaloes.

Is that fair?

MS. BAUGHMAN: Objection to form.

THE WITNESS: The potential for losses. Yes.

Q (BY MS. HORAN) You said, "The potential for losses." What do you mean by that?

A The -- the potential is there. It's a

question of the magnitude of the losses.

Q Sure.

So there would be losses. And your disagreement with Dr. Hennet is in how much of the losses.

A The degree --

MS. BAUGHMAN: Objection to form.

THE WITNESS: Yeah. The degree.

Q (BY MS. HORAN) And as to water buffaloes, your disagreement with Dr. Hennet again is in the amount of losses through the filling and use of the water buffaloes.

Fair?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Correct.

Q (BY MS. HORAN) Throughout today, if I refer to VOCs or contaminants of concern, then I'm referring, collectively, to PCE, TCE, Benzine, 12TDCE, and BC .

Do you understand that?

A Yes.

Q And if I'm referring to one of those contaminants of concern, then I'll call it by name.

Does that work for you?

A You'll refer to it as...
Q If I'm referring to one of those contaminants, I'll just use its name.
Is that fair?
A Sounds good.
(Government Exhibit 4 marked for identification)
Q (BY MS. HORAN) I'm marking as Exhibit 4 -- this is a document with a Bates CL_PLG-expert_Sabatini_0000002424.
Dr. Sabatini, have you seen these before?
A Yes.
Q And what are they?
A They are my notes.
Q And what are they your notes from?
A Notes from my conversation with Chris Mattingly.
Q And who is Chris Mattingly?
A Chris Mattingly is the director of water utilities for the City of Norman and formerly operated the Norman Water Treatment Plant.
Q Is Mr. Mattingly retired?
A Say again.
Q Is he retired?
A No.

Q What is his role now?
A He's currently -- he's currently the Norman director of water utilities.
Q And you met with Mr. Mattingly on December 18, 2024. Is that fair?
A Correct.
Q And did you write these notes in your meeting with Mr. Mattingly or did you get home and write them later in time?
A Sometimes, I take notes, and then to make them more presentable, I rewrite them.
Q Is that what you did with these?
A I don't -- I don't recall. Likely.
Q Did you meet with Mr. Mattingly in person or was it via the phone?
A It was on the phone.
Q And why -- or strike that.
Did -- did you reach out to Mr. Mattingly to talk to him?
A Yes.
Q And why -- what was the purpose of your reaching out to Mr. Mattingly?
A The main purpose was because of the recarbonation basin operation.
Q And what did you want to ask Mr.

Mattingly about the recarbonation basin?

A Relative to the operation of a recarbonation basin, the CO2 injection into the recarbonation basin.

Q So did you want to know how much CO2 was injected or what -- what was your -- finding out how it worked? What was your goal?

A Hennet -- Hennet had suggested that there be significant losses during recarbonation, and as I recall, he used the analogy of air stripping. And I knew that air stripping has a very high air-to-water ratio to promote air stripping where as I know in recarbonation basin, you're trying to dissolve all the carbon dioxide into the water.

So I wanted to get a handle on kind of that carbon dioxide-to-water ratio versus an air-to-water ration in an air stripper.

Q And is that -- the fifth bullet you have --

A Right.

Q -- on this list is about the recarbonation basin.

A Correct.

Q Is that the notes you have in reference

to your questions about recarbonation basin?
A That was helpful information he provided.
Q Have you ever seen a recarbonation basin --
A Oh, yes.
Q -- basin at a water treatment plant?
A Yes. Many.
Q And where was that?
A Oh. Of the 30 some water treatment plants I visited on many -- well, Norman, for sure. I'd have to go back through my memory bank to remember the other ones. But it's a common process. You add --
MS. BAUGHMAN: Just -- just she asked where.
THE WITNESS: Yeah. Yeah. It's a common process.
Q (BY MS. HORAN) You said you've been to roughly 30 water treatment plants?
A Around that. I -- yes.
Q Was that in your capacity as a professor at the University of Oklahoma in your professional --
A Yes.

Q Other than to talk about the recarbonation basin, did you have any other purpose in talking to Mr. Mattingly?

A Yes.

Q And what were those?

A General operating conditions for basins at the treatment plant. But that was not guiding me so much for Camp Lejeune. That was just more general background information.

Q And what, to the best of your memory, did you ask him?

A I asked about operation of the raw water, clear well, and water tower basins.

Q And what did he tell you?

A Just what's on the document.

Q And that's bullet number 2 on your notes?

A Yes.

Q And that reads "Asked about water" -- strike that.

The notes -- the second bullet reads, "Asked about raw water, clear well, and water towers-confirmed that they are all enclosed; not open at the top with no forced air exchange."

Did I read that correctly?

A Correct.
Q What did you mean when you wrote "no forced air exchange"?
A They were vented, but there was not forced air going through the -- the vessels.
Q And when you say "forced air", you mean there was no fan or something like that?
A Correct.
Q But you did understand that they were vented.
A Yes.
Q What made you believe that the information you received from Mr. Mattingly would be applicable to Camp Lejeune?
A To get a handle on the recarbonation basin as a contrast to Hennet's suggestion that it was analogous to an air stripper.
Q And why did you believe that what Chris Mattingly had to say about a recarbonation would be applicable to that at Camp Lejeune?
A I didn't expect it would be directly applicable, but I expected it to be order of magnitude that it would -- where as an air stripper has a very high air-to-water ratio, this was much lower CO2-to-water ratio.

Q And the water ratio that Mr. Mattingly told you about was 1 to 20 or less?
A Right.
Q Do you know if Mr. Mattingly has ever been to Camp Lejeune?
A No. Not to my knowledge.
Q Going back to your second bullet, why did you ask Chris Mattingly about whether the water towers were enclosed?
A Just curious. To confirm my understanding.
Q Your second bullet, going back to the no forced air exchange, you would agree that a lack of forced air exchange is consistent with tanks with regular changes in water levels?
MS. BAUGHMAN: Object to the form.
THE WITNESS: Say that again.
Q (BY MS. HORAN) Sure.
You would agree that a lack of forced air exchange is consistent with tanks with regular changes in water levels?
MS. BAUGHMAN: Object to the form.
THE WITNESS: Ventilation allows the water level to go up and down without changing the pressure in the system.

Q (BY MS. HORAN) And you agree that vented tanks with regular change in water levels will experience air exchange without force?

MS. BAUGHMAN: Object to the form.

THE WITNESS: To a degree.

Q (BY MS. HORAN) What do you mean when you say "to a degree"?

A The -- there would be -- as the water level goes down, the air would enter to replace. As the water level goes up, the air would escape. But that's not complete exchange of the air.

Q You would agree that a lack of forced air exchange is consistent with a vented tank; correct?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Say that again.

Q (BY MS. HORAN) A lack of forced air exchange is consistent with a vented tank.

MS. BAUGHMAN: Object to the form.

THE WITNESS: No, I would not.

Q (BY MS. HORAN) And why not?

A Repeat -- repeat it one more time.

Q Sure.

You would agree that a lack of forced air exchange is consistent with a tank being

vented.

A No.

MS. BAUGHMAN: Object to the form.

THE WITNESS: To me, forced air exchange is what happens in an air stripper where you're intentionally sweeping air through the system continuously to encourage vent -- the volatilization. And that's not what's happening when the water level goes up and down in a tank with venting.

Q (BY MS. HORAN) But you would agree that if a tank does not have forced air exchange, the air -- as the water levels go up and down, there has to be a way for the air to escape via --

A Yes.

Q -- a vent.

So you would agree that structurally, if there's no forced air exchange, then it would be consistent that the tank would have a vent.

MS. BAUGHMAN: Object to the form

Q (BY MS. HORAN) Is that fair?

THE WITNESS: No, I would not.

Forced air, to me, is you're -- you have some kind of a fan or pump or something that's forcing the air. When the water level goes up

and down, that's just natural; that's not forced. I would not agree with the terminology "forced air exchange" to what happens as the water level goes up and down in a reservoir.

Q (BY MS. HORAN) Sure.

And when you have a reservoir where the water's going to go up and down in level, the air has to escape somehow.

A Correct.

Q And the way for it to escape would be through a vent.

Fair?

A Last part again.

Q The way for the water -- or strike that.

The way for the air to escape as the water levels are rising and dropping throughout time would be through a vent.

A Correct. But that's natural. That's not forced. It happens naturally as the water level goes up and down. There's no energy put into the system to force that to happen.

Q And the water -- strike that.

And the air going through the vent as the water level rises and drops is also natural.

A That's what I'm saying.

MS. BAUGHMAN: Object to the form.
Yeah.
THE REPORTER: I'm sorry. Repeat. That's what I'm...
THE WITNESS: That's what I am saying is, that's a natural. That's not a forced.
Q (BY MS. HORAN) Sure.
I think I might have already asked you this, but I can't remember. Have you been to Camp Lejeune?
A No.
Q So you wrote your rebuttal report without inspecting the Hadnot Point or Holcomb Boulevard water treatment systems.
Fair?
A In -- correct.
Q And you wrote your report without examining any of the reservoirs or water tanks at Camp Lejeune?
A Any of the...
Q Reservoirs or water tanks at Camp Lejeune.
A Correct.
Q And you've never inspected any of the spiractors at Camp Lejeune?

A Correct.
Q Have you ever personally inspected a water buffalo?
A No.
Q Have you ever seen a water buffalo in person?
A I likely have on my visits to military bases to do the remediation research.
Q As part of your work in this case, you have not --
A No.
Q -- personally inspected a water buffalo?
MS. BAUGHMAN: Try to wait until she finishes her whole question before you answer.
THE WITNESS: Thank you.
MS. BAUGHMAN: The court reporter has a hard --
THE WITNESS: Sorry.
MS. BAUGHMAN: -- time. Okay.
Q (BY MS. HORAN) Do you have any memory of ever observing the filling of a water buffalo at any of the military bases where you may have seen one?
A No.
Q Prior to submitting your rebuttal

report, had you ever taken any actions to visit Camp Lejeune?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Say that again.

Q (BY MS. HORAN) Sure.

Prior to submitting your rebuttal report, had you ever taken any actions or asked to visit Camp Lejeune?

A No.

Q So you did not think it was important to go to Camp Lejeune in order to offer your opinions in your rebuttal report.

Fair?

MS. BAUGHMAN: Object to the form.

THE WITNESS: I had the information at hand that I needed.

Q (BY MS. HORAN) Sitting here today, do you want to visit Camp Lejeune?

A Say that again.

Q Sitting here today, do you want to visit Camp Lejeune?

A Want to or need to?

Q We'll start with want and then we can go to need.

A I always like to tour water treatment

plants. I don't need to.

Q You don't need to.

So there's no need for you to visit Camp Lejeune for the opinions that you've offered in this case?

MS. BAUGHMAN: Object to the form.

THE WITNESS: The only reason I would want to is in response to Hennet's visit in February.

Q (BY MS. HORAN) And what about Dr. Hennet's visit in February would make you want to go to Camp Lejeune?

A Because he was rebutting my rebuttal through his visit. And so while I didn't need -- I had all the information I needed in the AH documents to do my calculations. Given that he went on a rebuttal to my rebuttal trip, it would be nice to have the same opportunity.

Q And what information do you hope to gain from that visit that you don't have today?

MS. BAUGHMAN: Object to the form.

THE WITNESS: We don't really know exactly what Hennet did and who he talked to and what he saw. So it would be just to have that same background information that he had.

Q (BY MS. HORAN) Did anything from that Dr. -- or strike that.

You attended Dr. Hennet's deposition; correct? And you've read it?

A Right. Correct.

Q And you've received the photos that Dr. Hennet took at that visit; correct?

A Correct.

Q And you've reviewed the photos of his measurements that he took at Camp Lejeune?

A Correct. To my knowledge. Correct.

Q And so if I'm -- what, for your calculations information, would you seek to get at Camp Lejeune if you were to visit?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Say that again.

Q (BY MS. HORAN) What -- for your calculations and opinions, what specific information would you seek to get from the visit at Camp Lejeune?

MS. BAUGHMAN: Object to the form.

THE WITNESS: My calculations were based upon AH's extensive study and I felt that I had all the information I needed. Nothing that I have seen -- I -- I really don't know what Hennet

-- there wasn't report associated with his visit so I don't know what all he did or what all it meant. So I don't really anticipate -- I don't see that there would be any changes -- I don't -- I'm confident in my calculations as they stand today.

Q (BY MS. HORAN) Your water treatment plant opinions are related to Hadnot Point and Tarawa Terrace.

Fair?

A Say again.

Q Your water treatment plant opinions are related to Hadnot Point and Tarawa Terrace.

Fair?

A Yes. Correct.

Q And you agree that the water going through the water treatment plant at Holcomb Boulevard was not contaminated with VOCs; right?

MS. BAUGHMAN: Object to the form.

During what timeframe?

MS. HORAN: Ever.

THE WITNESS: Yeah, it's --

Laura, I -- please stick to form and foundation.

THE WITNESS: To the -- all the

information I've seen suggests that's true. That's correct. Through the water treatment plant.

Q (BY MS. HORAN) Yes. That was the question.

A That's just different than the distribution system.

Q Yes. The question was just related to the water treatment plant.

A Just wanted to clarify that.

Q Yep.

And you agree that the wells that supplied water to the water treatment plant at Holcomb Boulevard were never determined to be contaminated with VOCs.

MS. BAUGHMAN: Objection. Form and foundation.

THE WITNESS: That's outside the scope of my report.

Q (BY MS. HORAN) So you have no opinion on that sitting here today?

A I'd have to review the documents to -- to make a statement on that.

Q I'm about to switch topics. Are you still good or do you want to take a little break?

A We can go a little bit longer.
Q Okay.
Your report uses Coke bottles to show how Henry's Law works.
Do you recall that?
A Yes. It's a common teaching method I use when I talk about volatilization in air stripping.
Q So you use the Coke analogy as a teacher as well?
A Students 20 years later remember it.
Q And the general premise is that the Coke and the head space in the Coke bottle reach an equilibrium of carbon dioxide which is different than that found outside the bottle because of the bottle barrier between the inside of the bottle and the outside of the bottle.
A Correct.
Q And if you leave the cap off the Coke, the CO2 will reach equilibrium with the ambient air and go flat; correct?
A Correct.
Q And the reason that a flat Coke doesn't fizz is that the ratio of concentration of carbon dioxide left in the Coke to the concentration of

the carbon dioxide in the ambient air is equal to Henry's constant for carbon dioxide.

Fair?

A That's -- that equilibrium is achieved. Correct.

Q The cap of a Coke is similar to a vent in that if you cut a vent into the side of the bottle, it'll have the same effect as taking the cap off.

MS. BAUGHMAN: Object to the form.

Q (BY MS. HORAN) Is that fair?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Say that again.

Q (BY MS. HORAN) Sure.

If you cut a vent in the side of a Coke bottle, it would have the same impact as taking the cap off.

MS. BAUGHMAN: Object to the form.

THE WITNESS: I disagree.

Q (BY MS. HORAN) And why is that?

A Has to do with the area. So if you put a small hole in the Coke bottle, that's different than taking the cap off.

Q Sure.

But CO2 would still go through the small

hole or vent. Is that fair?

A To a lesser degree. Much lesser degree.

And part of the -- part of the breakdown -- well, part of -- the pressure of the CO2 in that head space is different from the VOC levels in the area that we're talking about.

Q Even with a small hole in a Coke bottle, over time, will it eventually reach equilibrium with the ambient air outside the bottle?

A Over an extended time.

Q And most people have probably experienced that before when they've picked up a can of Coke and it was flat.

Fair?

MS. BAUGHMAN: Object to the form.

THE WITNESS: I guess there's that rare occasion.

Q (BY MS. HORAN) How much time does it take for a Coke with a vent -- or strike that.

How much time would it take for a Coke with the cap off to equilibrate and go flat?

A I -- I couldn't say.

Q And I think I understand this, but your opinion is that it would be a shorter amount of time than if it was just a pinhole in the side of

the Coke bottle.

A Yes.

Q And if you had something in between a pinhole and the whole cap off, that would fall somewhere in between on the timeframe of how long it would take to equilibrate.

MS. BAUGHMAN: Object to the form.

THE WITNESS: In general, I would agree.

Q (BY MS. HORAN) Another example you use in your report is heat flow wherein heat flow is lost from the home in proportion to the temperature difference between the inside and outside the home surface area and the insulation in the home.

Do you remember that?

A Yes.

Q And the heat is lost due to diffusion?

A Yes.

Q And the water equivalent of this would be a sealed bucket wherein the water is warmer than the outside air?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Say that again.

Q (BY MS. HORAN) The water equivalent to the home example you have in your report would be

a sealed bucket wherein the water is warmer than the outside air.

MS. BAUGHMAN: Object to the form.

THE WITNESS: In general. Yes.

Q (BY MS. HORAN) Would you agree that in a sealed bucket wherein the water is warmer than the outside air, if the water was being mixed in the bucket, then the heat loss is not fully diffusion controlled?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Say that again.

Q (BY MS. HORAN) Sure.

Would you agree that in a sealed bucket wherein the water is warmer than the outside air, if the water is being mixed in the bucket, then the heat loss is not fully diffusion controlled?

MS. BAUGHMAN: Object to the form.

THE WITNESS: This is all very speculative. Depends upon lots of factors.

Q (BY MS. HORAN) What are the factors?

A I'd need to know more about the situation you're describing.

Q What would you need to know?

A Well, explain to me further the bucket. Is it full of water? Is it water and air? Is --

I need to know more details.

Q So you would need to know the amount of water in the bucket?

A The amount and the -- I'd just need to know the whole system. I'd have to have a schematic of volume of water, volume of air, what kind of mixing, et cetera.

Q So if it's a -- if everything is controlled -- so it has the same amount of water in it and the only difference is that it's being mixed, would you then agree that the heat loss is not fully diffusion controlled?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Ultimately, it's diffusion. Mixing -- well, ultimately, it's diffusion.

Q (BY MS. HORAN) Is there anything -- agree that it would be faster when mixing?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Say again.

Q (BY MS. HORAN) Would you agree that the diffusion would be faster when the water is being mixed?

A I wouldn't agree that diffusion would be faster. Diffusion's a molecular property.

Q Do you agree that the loss of heat would be faster when the water is being mixed?

MS. BAUGHMAN: Object to the form.

THE WITNESS: It all -- it's all speculative. I can envision cases where it would be and maybe other cases where -- I mean if it's uniform temperature throughout, then mixing would have little limited impact.

Q (BY MS. HORAN) And when you say "uniform throughout", are you talking about the water in the bucket or are you talking about the temperature outside?

A Water in the bucket. Well, both actually.

Q Okay. So you do not agree that if the water in the bucket's being mixed, then the heat loss would be faster than if the water was stationary.

MS. BAUGHMAN: Object to the form.

THE WITNESS: I'd have to know the situation again. But diffusion is -- would be independent -- the diffusion process itself would be independent of the mixing.

Q (BY MS. HORAN) The rate of diffusion-controlled volatilization losses for

immobile water body does not apply to flowing mixing water; correct?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Say that again.

Q (BY MS. HORAN) The rate of diffusion-controlled volatilization losses for immobile water body does not apply to flowing or mixing water; correct?

MS. BAUGHMAN: Object to the form.

THE WITNESS: One more time.

Q (BY MS. HORAN) The rate of diffusion-controlled volatilization losses for immobile water body --

A Immobile...

Q An immobile water body does not apply to flowing or mixing water; correct?

MS. BAUGHMAN: Object to the form.

THE WITNESS: For an im- -- I'm trying to parse the nuances of the question. For --

MS. BAUGHMAN: I'm going to object to the form.

THE WITNESS: One more time.

MS. BAUGHMAN: If you don't understand, you can tell her that.

THE WITNESS: Yeah. It's -- well,

there's nuances in the question.
Q (BY MS. HORAN) What are the nuances in the question that are --
A Clarify -- read it one more time.
Q Sure.
The rate of diffusion-controlled volatilization losses for immobile water body does not apply to flowing mixing water; correct?
A Immobile water body --
Q Uh-huh.
MS. BAUGHMAN: Mobile or immobile?
Q (BY MS. HORAN) Immobile.
A Im- -- okay. Immobile.
I'd have to disagree.
Q So it's your opinion that the rate of diffusion-controlled volatilization losses would be the same for both immobile water bodies and flowing or mixing water.
MS. BAUGHMAN: Object to the form.
THE WITNESS: Same two-film transfer concept applies in both cases. There are -- there are other nuances.
Q (BY MS. HORAN) And the rate would be the same for both immobile water bodies and flowing mixing water?

MS. BAUGHMAN: Object to the form.
THE WITNESS: What do you mean by "rate"?
Q (BY MS. HORAN) The rate of diffusion-controlled volatilization losses would be the same for both immobile water bodies and flowing, mixing water.
Is that your opinion?
MS. BAUGHMAN: Same objection.
THE WITNESS: That's a very broad question. It all comes down to interfacial area and so that's what it's a function of. So I mean, if you're talking about a lake versus a stream -- is that what you're getting at?
Q (BY MS. HORAN) I'm just asking about the -- the baseline principle.
MS. BAUGHMAN: Object to the form.
THE WITNESS: I'd have to have more details to answer the question.
Q (BY MS. HORAN) If the water mixes, would it increase the facial area?
MS. BAUGHMAN: Object to the form.
THE WITNESS: Depends upon what you mean by mixing. If it's splashing, then that could have an increase on the area. It depends.

Q (BY MS. HORAN) What if there -- or strike that.

You describe a two-film mass transfer process in your report on Page 5. This is Exhibit 2.

Do you see what you've marked as equation 3-3?

A Yes.

Q Would this equation 3-3 apply to the rate of volatilization losses for a body of water with mixing?

A Yes.

Q Would it, in your opinion, accurately predict, or over predict, or under predict the rate of volatilization losses for a body of water with mixing?

MS. BAUGHMAN: Object to the form.

THE WITNESS: If you quantify all the parameters correctly, it would be accurate.

Q (BY MS. HORAN) If you had a bucket of water with TCE dissolved into it and you didn't mix it, is it your opinion that the losses would be diffusion controlled?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Bucket of water with TCE

in it.

Q (BY MS. HORAN) Uh-huh. But you're not mixing it.

A No mixing. Well, it would be diffusion and film transfer.

Q Diffusion and film transfer would be the two processes that would control the losses?

A Correct.

Q And assuming you have a spinning propeller in the bottom of that, that mix the water around, would volatilization be increased?

A Would it be...

Q Increased.

MS. BAUGHMAN: Object to the form.

THE WITNESS: It could be.

Q (BY MS. HORAN) And when you say it could be, what would be the factors that would increase it?

A If the mixing keeps the concentration more uniform throughout the system, then it would help reduce diffusion limitations.

Q Anything else?

A (Shakes head.)

Q Do you know how much water enters the reservoir at Camp Lejeune per day?

MS. BAUGHMAN: Object to the form.
THE WITNESS: It's in the report.
Q (BY MS. HORAN) Oh. Where was that?
A How much water enters the...
Q Reservoir at Camp Lejeune per day.
MS. BAUGHMAN: Object to the form.
THE WITNESS: Yeah. That's all documented in the AH -- the water treatment. And they have the -- that's information that's in the report.
Q In your expert report --
A No.
Q -- or in the AH Environmental?
A AH Environmental.
Q Okay. And you relied upon what AH Environmental put in their report about that?
A Correct.
Q And is it your understanding that AH Environmental also says how much water exits the reservoir at Camp Lejeune per day?
A Say again. That...
Q That the AH Environmental report also says how much water exits the reservoir at Camp Lejeune per day.
MS. BAUGHMAN: Objection to form.

THE WITNESS: Specifically, that's -- what goes in comes out.

Q (BY MS. HORAN) Can you describe the process for how water moves through the Camp Lejeune water treatment plant?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Described in the schematics.

Q (BY MS. HORAN) Which schematic are you referencing?

A For example, 3-1 in my report. Page 3.

Q So you agree that the water goes through the raw water reservoir, into the spiractors, into the recarbonation basin, through the gravity filters, and then into the finished water reservoir?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Correct.

Q (BY MS. HORAN) And that's for the Hadnot Point --

A Right.

Q -- water treatment plant; correct?

A And the next figure's for -- and these are just from -- well, from AH. And I believe Hennet had these in his as well.

Q Do you agree that the reservoir mixes water?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Say again.

Q (BY MS. HORAN) The reservoir mixes water.

MS. BAUGHMAN: Object to the form.

THE WITNESS: No.

Q (BY MS. HORAN) And what's your basis for not agreeing that the reservoir mixes water?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Well, when you say "mixes water," I mean, in a water treatment plant, mixing has a propeller that man- -- forcefully mixes the water.

Q (BY MS. HORAN) And it's your understanding that Camp Lejeune does not forcefully mix water in the reservoirs?

A That's my understanding.

Q And you would agree that there are VOC losses at the spiractors at Camp Lejeune; correct?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Calculations indicate as much.

Q (BY MS. HORAN) And you would agree that there are VOC losses at the sand filters at Camp Lejeune?

MS. BAUGHMAN: Object to the form.

THE WITNESS: I'm sorry. At the...

Q (BY MS. HORAN) The sand filters.

MS. BAUGHMAN: Object to the form.

THE WITNESS: I deem that to be negligible, as did Hennet.

Q (BY MS. HORAN) So yes, but a small amount? Or --

MS. BAUGHMAN: Object to the form.

Q (BY MS. HORAN) -- what do you mean when you say "negligible"?

A As possibility, but it's very minor. Negligible.

Q Would you agree that there are VOCs lost in the treated water reservoirs?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Possibility, but likely very minor.

Q (BY MS. HORAN) Would you agree that there are VOC losses in the water towers?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Possibly, but very minor.

Q (BY MS. HORAN) And when you say "possibly," what -- what do you mean?
A Any -- it's certainly possible that there might be some minor losses.
Q Would you mind if we take a break at this point?
A Sure.
Q Thank you.
THE VIDEOGRAPHER: We're off the record at 10:47 a.m.
(Short break from 10:47 a.m. to 11:00 a.m.)
THE VIDEOGRAPHER: We're back on the record at 11:00 a.m.
Q (BY MS. HORAN) Welcome back, Dr. Sabatini.
A Thank you.
Q You understand you're still under oath?
You're still under oath.
A Thank you. Yes. Understood.
Q Right before the break --
A And is now a good time to --
MS. BAUGHMAN: No. You -- no. Just answer her questions.
THE WITNESS: Okay.
Q (BY MS. HORAN) Right before the break,

you said -- or I think I understood. I had asked you if you would agree that the reservoir mixes water, and you had referenced a mechanical mixing.

Do you recall that?

A When you -- when you -- yes, I do.

Q Okay. The water reservoirs at Camp Lejeune, setting aside mechanical mixing, would organically mix; correct?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Depends upon what you mean by "organically mix."

Q (BY MS. HORAN) Sure.

So as water is drawn into the reservoir, it will -- the flow rates and the -- or the changes in flow rates in the diffusion will move the water around in the reservoir; correct?

MS. BAUGHMAN: Object to the form.

THE WITNESS: To a certain degree.

Q (BY MS. HORAN) And when water is pulled out of the raw water reservoirs, or any of reservoirs, it will again mix the water in the reservoir; correct?

MS. BAUGHMAN: Object to the form.

THE WITNESS: To a very limited degree.

Q (BY MS. HORAN) And why would that be limited?

A Because when we talk about reactor design, there's a well-mix system where you have widespread mixing. What you're describing would be more minor, localized mixing.

Q Would it mix throughout the entire water reservoir? Or when you say limited local, what did you mean?

MS. BAUGHMAN: Object to the form.

THE WITNESS: My vision would be if the water enters, there might be a little bit of mixing right there. But that wouldn't necessarily mix throughout the basin. It would be localized to the inlet.

Q (BY MS. HORAN) And is the same -- your understanding or opinion the same for where water is drawn out of the reservoir?

MS. BAUGHMAN: Object to the form.

THE WITNESS: To a lesser degree even. That would be less even than at the inlet. Typically, it's flowing out by gravity.

Q (BY MS. HORAN) And as that gravity pulls the water out, would it mix around the reservoir?

MS. BAUGHMAN: Object to the form.
THE WITNESS: To a much lesser degree.
Q (BY MS. HORAN) Other than the expert reports produced in this case and the AH Environmental report, do you recall relying on any other sources to learn about the structure of the water treatment plants at Tarawa Terrace or Hadnot Point?
MS. BAUGHMAN: Object to the form.
THE WITNESS: And you mentioned -- the two you mentioned were...
Q (BY MS. HORAN) Other expert reports or the AH Environmental report.
MS. BAUGHMAN: Object to the form.
THE WITNESS: There were some CLWs that provided some information.
Q (BY MS. HORAN) And what -- could you describe what those documents either were or what information was contained in them, to the best of your recollection?
MS. BAUGHMAN: Object to the form.
THE WITNESS: Oh, I'd have to go back and review my notes. But well, some of it, I guess, is in my report in terms of the concentrations, pre-treatment and post-treatment

plant. Some of that was from the CLW. There was information on water level variations in a reservoir that was a CLW.

Q (BY MS. HORAN) So prior to submitting your expert report, it was your understanding that the water levels in the water reservoirs would fluctuate?

A Yes.

MS. BAUGHMAN: Object to the form.

THE WITNESS: Yes, I recognize there would be some up and down.

Q (BY MS. HORAN) Do you recall if you ever looked at any building schematics for the water treatment plants?

A Building schematics meaning?

Q You're an engineer so I think I'll defer to you on what you would consider a --

A Well, I --

Q -- building schematic.

A Well, I looked at some schematics for unit processes in the -- in the treatment system. I didn't look at schematics for the fit building that the processes were in.

Q Do you recall looking at any design plans?

A In -- in -- in general, I do. Yes. I think even in -- seems like there's one description of updating the plant.

Q Other than updating the plant, do you recall viewing any other design plans for the water treatment plants --

MS. BAUGHMAN: Object to the form.

Q (BY MS. HORAN) -- at Camp Lejeune?

A I'd have to go back and look through my notes.

Q Could you turn to Page 3 of your report which is Exhibit 2?

A (Witness complies.)

Q Figure 3-1 we already talked about, but that's the Hadnot Point water treatment plant schematic.

A Yes.

Q In the paragraph above, you say, "Not shown in Figure 3-1 is the 300,000 gallon water tower filled from the finished water reservoir."

Do you see that?

A Yes.

Q And what source did you rely upon in reaching the conclusion that there was only one water tower at Hadnot Point?

MS. BAUGHMAN: Object to the form.

THE WITNESS: The AH Environmental.

Q (BY MS. HORAN) Sitting here, anything besides the AH Environmental?

A Say again.

Q Sitting here today, do you recall relying on anything other than the AH --

A No.

Q -- Environmental for that proposition?

A No.

Q Okay. When you reviewed Dr. Hennet's report, did you review the underlying documents that he relied upon as well?

MS. BAUGHMAN: Object to the form.

THE WITNESS: There were -- yes. Well, I specifically remember several documents.

(Government Exhibit 5 marked for identification)

MS. HORAN: I'm handing to the witness a document that I'll mark as Government Exhibit 5, and it's Bates number CLJA_watermodeling_07-0000003171, and it runs through the Bates ending in 3184.

Q (BY MS. HORAN) Dr. Sabatini, I'll give you a minute to -- to page through it. But have you seen this document before?

A Parts of it look familiar. Parts of it look familiar.

Q You see the first page, the Bates ending in 171, says, "Hadnot Point Building Number 20 --

A Yes.

Q -- capacity 5MGD. With 40 deep wells lime softening plant."

Do you see that?

A Yes.

Q Do you have any reason to doubt that this is an accurate schematic of the Hadnot Point Water Treatment Plant?

MS. BAUGHMAN: Objection. Form and foundation.

THE WITNESS: I have no idea where this came from. So I'm -- it's hard for me to comment on -- on -- ask the question again.

Q (BY MS. HORAN) Sure.

I was just wondering if you had any reason to doubt its accuracy having looked at it.

MS. BAUGHMAN: Objection. Form and foundation.

THE WITNESS: Not knowing where it came from, I'd have to know more details to...

Q (BY MS. HORAN) Do you see on the first

page there are five spiractors?
A Yes.
Q And do you see that there are five sand filters?
A Yes.
Q And those numbers align with the numbers included in Figure 3-1 of your report. And you're -- I'm happy to let you look through your report as well.
A Yes.
MS. BAUGHMAN: Object to the form.
THE WITNESS: Yes.
Q (BY MS. HORAN) Do you see that document -- or Exhibit 5 has four elevated water storage tanks?
A Yes.
Q Do you know how many elevated water storage tanks Hadnot Point water distribution had throughout time?
A I relied upon the AH Environmental.
Q You can set Exhibit 5 aside.
A (Witness complies.)
Q The Hadnot Point Water Treatment Plant has an 800,000 water -- raw water reservoir.
Do you agree?

A That's my understanding.
Q And you agree that that reservoir is vented?
A That would be the normal course. Yes.
MS. HORAN: I'm handing the witness what I'll mark as Exhibit 6. And this has Bates number Hennet_USA_0000000010. And Bates ending in 25, 30, and 31.
(Government Exhibit 6 marked for identification)
Q (BY MS. HORAN) Dr. Sabatini, have you seen these images before?
MS. BAUGHMAN: Objection. Form and foundation.
THE WITNESS: I'm -- they look similar to something I've seen before.
Q (BY MS. HORAN) Could you turn to the Bates ending in 31?
MS. BAUGHMAN: Object to the form.
Counsel, to the extent these are the pictures that Dr. Hennet took in February 2005 [sic] --
THE WITNESS: '25.
MS. BAUGHMAN: -- we've got a pending motion to exclude those from the case. So I'll let you ask limited questions with the

understanding that we may -- I would like the court reporter to note that this may be separated -- I would like it to be separated and marked because we're going to move to exclude testimony about this assuming our -- our motion is granted. If our motion is granted.

Go ahead.

MS. HORAN: Sure.

MS. BAUGHMAN: Because we don't know the foundation of this. Dr. Hennet wasn't asked questions about these. There's no report about them.

MS. O'LEARY: Objections are limited to form and foundation.

MS. BAUGHMAN: I understand.

MS. O'LEARY: We just said --

MS. BAUGHMAN: Not if -- not if it has to do with a motion pending before the court. I'm allowed to explain the basis of that motion.

And by the way, you're not the lawyer. She's the one who's supposed to be speaking here. One lawyer.

Please mark this because we're going to move to exclude testimony about this -- about this exhibit.

Go ahead.
MS. HORAN: Okay. Are you done?
MS. BAUGHMAN: Done.
MS. HORAN: Okay.
Q (BY MS. HORAN) Could you please turn to the one ending in 31? Do you see that? Okay.
Do you see there are two vents in this image?
MS. BAUGHMAN: Objection. Form and foundation.
THE WITNESS: Yes.
Q (BY MS. HORAN) Are those vents that you've seen similar to other vents you've seen on the top of a water reservoir?
A In general, yes.
Q And then could you turn to the Bates ending in 30?
A Which one? 30?
Q Yeah.
A (Witness complies.)
Q And do you see a vent in the image?
A Yes.
Q And is that vent similar to the vents you would have seen or expect to see on top of a water reservoir?

A Same. In general, yes.
Q Could you turn to Image 10 which is the first page.
A Number -- which number?
Q 10. It's the first page.
A 10.
Q Yeah.
And do you see a picture of a vent?
A Yes.
MS. BAUGHMAN: Objection. Form and foundation.
Q (BY MS. HORAN) And is this a vent the type you would expect to see on top of a water treatment reservoir?
MS. BAUGHMAN: Same objections.
THE WITNESS: At times.
Q (BY MS. HORAN) And you can see some measurements for the -- along the right side of it. Fair?
MS. BAUGHMAN: Objection. Form and foundation.
Q (BY MS. HORAN) Do you see that?
A Yes.
Q Is that the size and shape that you would expect to see of a vent atop a water

treatment reservoir?
A It varies, but not atypical.
Q And then could you turn to Page 25 which is the second page in the document?
A (Witness complies.)
Q Is this also the -- or do you see a vent in the image?
MS. BAUGHMAN: Objection. Form and foundation.
THE WITNESS: This one's a lot less clear. What it's showing.
Q (BY MS. HORAN) And why is this one less clear what it's showing?
MS. BAUGHMAN: Same objections.
THE WITNESS: The others all seem to be -- this one seems to...
Q (BY MS. HORAN) Ah. So is this just a different shaped vent?
MS. BAUGHMAN: Objection. Form and foundation.
Q (BY MS. HORAN) Is that what you're referencing?
A I'm not sure what this one is.
Q Have you ever seen a vent that looks like the vent in Image 25?

A I'm not sure what this is.
Q Do you know one way or the other whether this looks like a vent?
MS. BAUGHMAN: Objection to form.
THE WITNESS: I'd need to -- I'd need to know more to comment on this one.
Q (BY MS. HORAN) What would you need to know, Dr. Sabatini?
A Where is it? What is it? What's it's purpose?
Q Does this structure in Image 25 look like something that could vent a water treatment reservoir?
MS. BAUGHMAN: Objection. Form and foundation.
THE WITNESS: Based on this picture, I can't comment.
Q (BY MS. HORAN) Okay. You can put those aside.
A (Witness complies.)
Q I rent -- -- strike that.
A vented raw water reservoir will maintain an atmospheric pressure; correct?
MS. BAUGHMAN: Objection to form.
THE WITNESS: In general, yes.

Q (BY MS. HORAN) You would agree that the VOCs in the water at a vented raw water reservoir will dissipate to reach equilibrium with the VOCs in the atmosphere at the ratio of Henry's constant?

A Say that one more time.

Q Sure.

You would agree that the VOCs in the water at a vented raw water reservoir will dissipate to reach equilibrium with the VOCs in the atmosphere at the ratio of Henry's constant?

A I would not agree.

Q And why not?

A Because there's a kinetic aspect, time-dependent aspect. So given enough time, I would agree. Given enough time to reach equilibrium. But the kinetics determine how close you're able to get to equilibrium in a limited amount of time.

Q Sure.

So the equilibrium would be attached to the rate at which the air could flow through the vents of the raw water reservoir.

MS. BAUGHMAN: Objection to form.

THE WITNESS: Say that again.

Q (BY MS. HORAN) The time it would take to reach equilibrium would be controlled in some manner by the rate of flow of air through the vents.

We can move on.

A Say again.

Q I'll withdraw the question. We can move on.

In your Coke analogy, having a vented raw water reservoir is similar to having the cap off of a Coke bottle; correct?

A No.

Q Why not?

A What you just described would be saying that the entire top of the reservoir was opened.

Q So your disagreement of a vent -- of comparing a vented raw water reservoir and the cap of a Coke bottle is the difference in size?

A Yeah, the -- the extent to which it's opened to the atmosphere.

Q Could you -- what -- strike that.

The -- would a vented raw water reservoir be similar to having a straw in a Coke bottle?

A No.

Q And why not?
A Well, for one thing, to have the straw in the Coke bottle, you have the lid off.
Q Oh, sure. Okay.
So you -- you've sliced a perfectly sized --
A If you drilled a -- well...
Q -- hole into the -- if you drilled a hole into the cap bottle for a straw, would that be sufficient?
A That would -- a very small hole.
Q Okay. So having a vented raw water reservoir is similar to having a Coke bottle with a straw-sized hole drilled into the cap.
MS. BAUGHMAN: Objection to the form.
THE WITNESS: A very small hole in the lid of the Coke bottle. Just look at --
Q (BY MS. HORAN) You would agree that the water towers are vented; correct?
A Correct.
Q And you agree that the water towers will maintain atmospheric pressure?
A Over time. Correct.
Q And you agree that the VOCs in the water at the vented water towers will dissipate to

reach equilibrium at the VOCs in the atmosphere at a ratio of Henry's constant?

MS. BAUGHMAN: Object to the form.

THE WITNESS: No.

Refer back to the kinetic discussion from before.

Q (BY MS. HORAN) So your disagreement is in the speed at which it will occur?

A (Nods head.)

Q But it will occur; correct?

MS. BAUGHMAN: Object to the form.

Q (BY MS. HORAN) Or I can -- let me rephrase.

A Given an --

MS. BAUGHMAN: She wants to rephrase it so let her do that.

THE WITNESS: Okay.

Q (BY MS. HORAN) With sufficient time, the VOCs in the water at the vented water tower will dissipate to reach equilibrium with the VOCs in the atmosphere at the ratio of Henry's constant.

MS. BAUGHMAN: Object to the form.

THE WITNESS: I disagree because there's not sufficient time.

Q (BY MS. HORAN) And if there were sufficient time, would you agree?
MS. BAUGHMAN: Object to the form.
THE WITNESS: I'm tempted to go into teaching mode here.
Q (BY MS. HORAN) Just answer the ques- -- if that --
A No, it's not.
Q Please, go ahead.
A It's not the same.
Q Okay. So a vented water tower, even with days, weeks --
A It --
MS. BAUGHMAN: Wait. Let her finish.
Q (BY MS. HORAN) -- even with however much time, would never equilibrate with the atmosphere at Henry's constant.
MS. BAUGHMAN: Object to the form.
THE WITNESS: Depends upon how you define "sufficient time." Given an infinite amount of time, yes. Or not even infinite. I mean, given a dramatically larger time, yes.
Q (BY MS. HORAN) And a dramatically larger time than what?
A Than the detention time in the basins.

Q And I believe we got to a place where if it's a Coke bottle with a hole drilled in the top, then that would be similar to a vented water tower.

Is that fair?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Yes. There's one caveat. Where my Coke bottle analogy breaks down is the carbon dioxide in the head space is pressurized.

Q (BY MS. HORAN) Uh-huh.

A It's pressurized CO2. That's how you get the carbonation into the water. It's pressurized.

Q Uh-huh.

A Where as the VOCs in the head space above the water are not pressurized. So that's a difference between the -- that's the place where the Coke bottle analogy breaks down to water reservoirs.

Q Sure.

And in the water towers, as the water levels fluctuate throughout the day or week, the air will naturally be pushed out or sucked in to the water tower; correct?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Right.
Q (BY MS. HORAN) And that's also different than a Coke bottle because once it's sealed, no more liquid goes in.
A Correct. Although, in one of my analogies, I suggested Coke was flowing into and out of the Coke bottle. But correct.
Q Do you know whether the water buffaloes used at Camp Lejeune from 1950 to 1987 had vents?
A Are...
Q Had vents.
MS. BAUGHMAN: Object to the form.
THE WITNESS: It depends upon what you mean by vents. They had filler caps and they had manholes. Not -- not vents, to my knowledge, of the nature that -- I'm not sure. I'm unclear.
(Government Exhibit 7 marked for identification)
Q (BY MS. HORAN) I'm marking as Exhibit 7 -- this is a document with the Bates Brigham_USA_00000044016. And it runs through the Bates ending in 4038.
MS. BAUGHMAN: Which number is this one?
MS. HORAN: 7.
THE WITNESS: 7.
Q (BY MS. HORAN) And I'll represent this

is a document that you -- it's on your materials list. But it's -- I did cut off -- it didn't print off of the document so this is a shortened version of it.

Have you seen this before, to the best of your recollection?

A Looks -- looks familiar.

Q And you agree this is for the M107 water buffaloes?

A Say again.

Q This is for the M107 water buffaloes?

A I'm looking for that designation.

Q If you turn to Page 4017. The --

A Oh, down there. Seems to be for the trailer.

Q So is it trailer tank water one, one half-ton two-wheel 400-gallon, and then it says M107A1, M107A2, M107A2C.

A Okay.

Q Do you see that?

A Yes.

Q Okay. Could you turn to the page ending in 4031?

A (Witness complies.)

Q And do you see the top of the page, it

says C, the letter, M107 series water tank trailer?

A Yes.

Q Okay. And then a little bit further down the page, there's a key and a chart. And the second thing listed is the component vent.

Do you see that?

A Yes.

Q And the description of the vent is "allows air circulation in the tank".

Do you see that?

A Yes.

Q And do you see that that is keyed to number 21?

A Yes.

Q And number 21 in the image points to the water buffalo just in front of the manhole.

A Yes.

Q Okay. Do you agree that the M107 water buffalo series had vents?

MS. BAUGHMAN: Object to the form. Foundation.

THE WITNESS: Based on this document, that seems to be the suggestion.

Q (BY MS. HORAN) Did you consider, in

your calculations, water buffaloes having any vents?

A Not a vent specific, but with the filler pipe and the manhole acting as a venting basis.

Q Would the manhole continue to vent the water even after it's closed?

A No.

Q Would you -- do you know, one way or the other, whether the vent in this image would allow the water to continue to be vented even after the manhole is closed?

MS. BAUGHMAN: Objection. Form and foundation.

THE WITNESS: Say again.

Q (BY MS. HORAN) Sure.

So the vent in this image that says "allows air circulation in tank," do you know whether that is, I guess, a permanent vent or whether...

A I'm -- I'm not sure.

Q In your opinion -- in preparing your opinions on water buffaloes, did you do any work to determine whether any other models had vents or when they were installed?

MS. BAUGHMAN: Object to the form.

THE WITNESS: We looked at the different forms over time. Not specifically looking for an individual component, but looking at the overall nature of the water buffaloes.

Q (BY MS. HORAN) And do you recall looking at whether those components included a vent?

MS. BAUGHMAN: Object to the form.

THE WITNESS: No. Not that I recall. I'd have to go back and look at my -- have to go back and look at my materials.

Q (BY MS. HORAN) Sure.

A Because a vent seems -- anyway. Go ahead.

Q So turning -- turning to water flow. So the water flows in -- the water system at Camp Lejeune flows from water towers into the distribution system where it eventually ends up in peoples' homes.

Is that fair?

A Yeah. That would be the -- correct.

Q And then between the time that the water leaves the tap and when it's ingested, there would be some additional VOC losses.

Is that fair?

MS. BAUGHMAN: Objection. Form and foundation.

THE WITNESS: That's hard to say. There's that possibility, but it's hard to know without more details.

Q (BY MS. HORAN) It would depend on the time that the water is out of the tap and the way the water's used.

Is that fair?

A And the spray and the surface area and time.

Q And if the water is boiled when it's exposed to the atmosphere, the losses will occur faster than if it's left exposed to the atmosphere at room temperature.

Is that fair?

A Would typically be the case.

Q And when the water is mixed, losses will occur faster than if it's left exposed to the atmosphere and not mixed.

Fair?

MS. BAUGHMAN: Objection to form. Foundation.

THE WITNESS: In general, yes.

Q (BY MS. HORAN) And Henry's Law would

continue to govern equilibrium concentrations?

A Say again.

Q Henry's Law would continue to govern the equilibrium concentrations?

A Henry's Law governs the equilibrium concentration. But always have to remember kinetics.

Q Sure.

And because there are essentially no VOCs in the atmosphere, Henry's Law dictates that the water exposed to the atmosphere will lose essentially all VOCs.

MS. BAUGHMAN: Objection to form.

THE WITNESS: Again, that's a time-dependent question.

Q (BY MS. HORAN) And given sufficient time, the answer is yes?

MS. BAUGHMAN: Objection to form.

THE WITNESS: And then the question is, what is sufficient time? So yes. Given an ultimate amount of time, that would be the case.

Q (BY MS. HORAN) You agree that the water treatment plant will not add VOCs to the water.

A It's -- it's hard to imagine how that would be. No, I agree that that's very, very,

very unlikely.

Q Have you ever been involved with a project or experienced anything where a water treatment plant added VOCs to the water?

A No.

Q I want to turn to the AH Environmental report that is attached to your report. So I'm turning back to Exhibit 2. And you have it attached to your report as Exhibit D.

I think we've mostly been doing this, but if I refer to the AH Environmental report, you'll understand I mean Exhibit D of your report; correct?

A (Nods head.)

Q Is that yes?

A Correct. Sorry. Correct.

Q When did you first read this report?

A Oh, that would be probably -- roughly a year ago.

Q And I -- where did you -- strike that.

Did you find this on the Internet?

A No.

Q Was this provided to you?

A Yes.

Q Do you -- so this doesn't have any Bates

numbers on it. Do you understand what Bates numbers are?

A I'm sorry?

Q Do you -- so a Bates number. Are you familiar with that term?

A I've become familiar with it.

Q Fair enough.

In your AH Environmental report, the -- the one that you received did not have Bates --

A No.

Q -- numbers on it either? This is --

A Yeah, this is what I received.

Q Okay. I believe, earlier, you testified to having spoken with Mr. Maslia a handful of times.

Was counsel present for all of those meetings?

A Say again.

Q When you spoke with Mr. Maslia --

A Maslia. Yes.

Q -- was counsel present for those meetings?

A Yes.

Q Could you turn to Page 1-1 of the AH Environmental report?

A (Witness complies.)
Q Okay. The final paragraph, first sentence, reads, "AH Environmental Consultants, Inc., AH, was retained by MCB Camp Lejeune under contract number DACW5603R1013 to assist ATSDR in obtaining information required for the modeling efforts in the epidemiological study."
Did I read that correctly?
A Yes.
Q Do you agree with AH Environmental Consultants that an estimation of VOC removal at the water treatment plant would be important information, even required, for the modeling efforts of epidemiological studies at Camp Lejeune?
MS. BAUGHMAN: Objection. Form and foundation.
THE WITNESS: Say that again.
Q (BY MS. HORAN) Sure.
Do you agree --
MS. BAUGHMAN: Can you show him where it says that? I don't see where it says that in the document. Important and required information.
MS. HORAN: Well, it says, "Obtaining information required for the modeling efforts,"

in 1-1. Do you see the first sentence in the last paragraph, Laura?

MS. BAUGHMAN: (Nods head.)

MS. HORAN: Okay. I'm going to ask my question.

Q (BY MS. HORAN) Do you agree with AH Environmental Consultants that an estimation of VOC removal at the water treatment plant is required information for the modeling efforts in the epidemiological study at Camp Lejeune?

MS. BAUGHMAN: Objection form; objection foundation.

THE WITNESS: I agree that that statement's in the document.

Q (BY MS. HORAN) And do you personally agree with that?

MS. BAUGHMAN: Objection. Form and foundation.

THE WITNESS: Depending upon the degree of volatilization.

Q (BY MS. HORAN) Is it your understanding that the purpose of the water modeling efforts at Camp Lejeune were in support of epidemiological studies?

MS. BAUGHMAN: Objection. Form,

foundation.

THE WITNESS: That was beyond the scope of my expertise or involvement.

Q (BY MS. HORAN) So you have no opinion on the purpose of the water modeling at Camp Lejeune?

A My understanding was it was related to potential exposures. But that's the extent of my understanding.

Q Exposures in the sense of epidemiological studies? Or individuals? Or what do you mean when you say "exposures"?

MS. BAUGHMAN: Objection. Form and foundation.

THE WITNESS: My involvement was focused on the water quality. So I wasn't involved in the specifics of what was going to happen beyond that.

Q (BY MS. HORAN) When you say your involvement was in the water quality, what do you mean by that?

A Well, what we're talking about. My expert report.

Q Oh, okay. And you don't intend to offer any opinion in court about that purpose of the

water modeling.

A Say again.

Q You don't intend to offer any opinion in court on the purpose of the water modeling?

A Not beyond what's in my expert report.

Q Okay. You can set that aside. Or, I guess, actually turn to Page 7.

A 7?

Q Yeah. Of your report. Which is Exhibit 2.

A (Witness complies.)

Q So looking at your first opinion which begins on Page 7, you opine that only minor VOC losses occurred in these systems.

Do you see that?

A Correct.

Q And "these systems" refers to storage treatment and distribution of water at Camp Lejeune?

A Correct.

Q You underline the word "minor".

Do you see that?

A Yes.

Q Why?

A Show its contrast to Hennet's

substantial.

Q And you define minor as less than 6 to 12 percent VOC loss.

Is that fair?

MS. BAUGHMAN: Objection to form.

THE WITNESS: It's a relative term to substantial. Yes.

Q (BY MS. HORAN) You're not a toxicologist, are you?

A No. Say again.

Q You're not a toxicologist?

A No, I'm not. No.

Q And you're not a medical doctor?

A No.

Q So when you say that 6 to 12 percent VOC loss is minor, you're not speaking about in terms of someone's exposure.

Is that fair?

MS. BAUGHMAN: Objection. Form and foundation.

THE WITNESS: That's beyond the scope of my efforts.

Q (BY MS. HORAN) You're not qualified to make the assessment of 6 to 12 percent VOC loss as minor, are you?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Well, from a water chemistry perspective which is a focus of my work, I would consider that minor. And that was the extent of my focus.

Q (BY MS. HORAN) Sure.

And you're not making the assessment that 6 to 12 percent VOC loss is minor in the context of someone's exposure; correct?

A That's beyond my expertise and involvement.

Q And when you say 6 to 12 percent is minor, how did you come to the determination that that's minor?

MS. BAUGHMAN: Objection to form.

THE WITNESS: It was in response to Hennet's substantial. Suggestion that there was substantial losses. Also just -- well, I think actually AH Environmental said negligible -- said 10 percent was negligible losses in their expert review panel meeting. So minor, in a way, is more generously negligible.

Q (BY MS. HORAN) So are you repeating someone else's characterization or --

A Yes.

Q -- is it your characterization as minor?
A AH Environmental represented Pomm- -- Pommerenk or -- his name -- in the 2005 expert panel -- was asked about losses. And said 90 percent goes through, 10 percent losses, and consider that negligible.
Q So when you wrote "minor" in your report, you were adopting what you believed to be Mr. Pommerenk's characterization --
MS. BAUGHMAN: Objection to form.
Q (BY MS. HORAN) -- or what an I --
MS. BAUGHMAN: Objection to form.
THE WITNESS: I wasn't adopting, no. I was saying, in a relative sense, these losses to me seemed minor relative to Hennet, relative to Pommerenk, et cetera. I felt justified in choosing the term minor.
Q (BY MS. HORAN) If you -- so you put in your report -- and this is on Page 6.
A 6?
Q 6. Yeah. So just to go over it.
The last sentence of the first bullet says, "Rather than 15 to 32 percent losses by Dr. Hennet's calculations, I estimate less than 6 to 12 percent losses for the range of VOCs."

Do you see that sentence?
A Yes.
Q Page 14 of your report, Table 5.3, is your calculations for losses.
Fair?
A Yes.
Q None of those numbers are less than 6.
A Well --
Q Fair?
A None of the numbers listed in the table.
MS. BAUGHMAN: I'm going to object to the form.
THE WITNESS: Granted, I rounded 6.3 down to 6 which is mathematically...
Q (BY MS. HORAN) Sure.
But none of your numbers come up as less than 6. Is that fair?
MS. BAUGHMAN: Objection to the form.
THE WITNESS: They do to the extent that I say less than 1 percent in the storage tanks and less than 1 in other losses.
Q (BY MS. HORAN) So when you were saying, on Page 6, you estimate less than 6 to 12 percent losses for the range of VOCs, you were breaking that to include individual components of your

overall calculation?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Those individual components are included in the 6.3 value.

Q (BY MS. HORAN) Sure.

I'm just -- I'm just wondering why you included less than 6 if the lowest number I see on your chart is --

A Yeah.

Q -- 6.3.

Is it just a typo? I mean, I'm just --

A It's -- you could -- from Table 5.3, I'm saying the lowest value might have been less than 6. 6.3, 6. So I was just carrying that forward to my summary statement.

Q Okay. So you used less than 6 percent because Table 5.3 for benzine says less than 6.3.

A Correct.

Q Okay. As you've used it in your report, how do you define raw water?

A Water --

MS. BAUGHMAN: Objection to form.

THE WITNESS: Water -- generally, in the water treatment industry, raw water is the water coming into the water treatment plant.

Q (BY MS. HORAN) So raw water as defined in your report is pre-treatment.

Fair?

A Yes.

Q It's your opinion that assumptions that Dr. Hennet made in his calculations are what led to the overestimation of his VOC loss calculations.

Is that fair?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Say again.

Q (BY MS. HORAN) It's your opinion that assumptions that Dr. Hennet -- I'll start again.

Is it your opinion that assumptions in Dr. Hennet's calculations led to overestimation?

A Assumptions of value that he assume -- values he assumed.

Q On Page 7 of your report, Figure 5.1 -- I think you have it in front of you. As to Hadnot Point, you agree that VOCs would be lost in the raw water storage reservoirs?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Possibility for minor losses.

Q (BY MS. HORAN) And in the schematic

which is Figure 5.1, there's losses at each stage of Hadnot Point except for the supply wells and the water distributions to your homes.

Is that fair?

MS. BAUGHMAN: Objection to form.

THE WITNESS: One more time. I'm sorry.

Q (BY MS. HORAN) Sure.

Figure 5.1 on your report.

A (Indicating.)

Q Yep.

VOCs would be lost at each stage except for the supply wells and the water distribution in the houses, but every other stage shown in that image would incur VOC losses.

Fair?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Possibly. It's a possibility. Minor losses.

Q (BY MS. HORAN) And when you say "a possibility of minor losses," do your calculations -- is it just you're disputing the volume of losses or that they would happen at all?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Just calculations indicate

that the losses that are possible would be very minor.

Q (BY MS. HORAN) And why would they only be possible?

A Say again.

Q Why would the losses only be possible based on your calculations?

A Why would they only be possible?

Q Right.

Wouldn't your calculations suggest that they're probable?

A Minor --

MS. BAUGHMAN: Objection to form.

THE WITNESS: Minor losses.

Q (BY MS. HORAN) Sure.

So there would be at least minor -- or strike that.

It's your opinion that there would be at least minor losses in all of the areas shown in Figure 5.1 except supply wells and water distribution.

MS. BAUGHMAN: Objection to form.

Q (BY MS. HORAN) Is that fair?

THE WITNESS: I'd say there's a possibility of minor losses. That doesn't mean

necessarily that there will be -- they may be negligible.

Q (BY MS. HORAN) And even if they were negligible, there would be some loss.

Fair?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Yeah, if you consider neg-- I wouldn't necessarily consider negligible losses some losses, but there might be minor negligible losses.

Q (BY MS. HORAN) You've used the term "negligible". How do you determine what's negligible in this field?

A That's probably a relative term. Well, not relative. I mean it's -- I would consider less than 1 percent, for example, is negligible.

Q And is that negligible in your --

A Of course, I say that, and AH considered -- referred to 10 percent loss as negligible. So it's hard to pin that down. It depends.

Q The negligible losses that you -- or strike that.

When you say negligible losses, are you saying negligible in your capacity as a professional engineer or are you saying

negligible in the context of determining someone's overall exposure as it relates to health?

A No. Water -- drinking water treatment perspective.

Q Okay. So you're not saying negligible in the sense of how it might impact someone's overall exposure as it determines --

A That's beyond my -- (simultaneous crosstalk)

THE REPORTER: As it determines what?

MS. HORAN: Any type of health issue.

THE WITNESS: Sorry.

That's beyond my expertise to comment on.

Q (BY MS. HORAN) Okay. Could you turn to the AH Environmental report on Page 5-1?

A (Witness complies.) Yes.

Q Do you see the last paragraph? The second sentence reads, "The only significant VOC removals must have occurred at the spiractor effluent pipe where the falling water undergoes some aeration."

Do you see that?

A Yes.

Q Do you agree with AH Environmental that significant VOC removals would occur at the spiractor effluent pipe?

MS. BAUGHMAN: Objection to form.

THE WITNESS: "Significant's" a relative term. I read what they're saying is, the only quantifiable losses unless they use the word "significant".

So what do you mean when you say "significant"? So I think what they meant by "significant" was later in the expert meeting, they referred to these losses as minor negligible. But here, they're saying the potential loss -- as I read what they're saying, my interpretation is they're saying, of potential losses, this was the one that was most evidenced.

Q (BY MS. HORAN) And do you agree that there's -- the most evidenced losses would be at the spiractor effluent pipe?

A Yes.

Q Okay. And those numbers -- or strike that.

The amount of losses at the VO -- strike that.

The amount of VOC losses at the

spiractor effluent pipe would not be negligible.
Fair?
MS. BAUGHMAN: Object to the form.
THE WITNESS: Under these conditions.
Q (BY MS. HORAN) Is that yes?
A Yes. Not negligible. Again, that term negligible -- because again, in their 2005 expert panel review, they referred to this level of losses as minor negligible. So it -- it's a relative term.
Q So turning back to your report on Page 7.
A Okay.
Q Looking at Figure 5.1. Of the structures identified in that schematic, the structure with the most significant VOC losses would be the spiractor.
Fair?
MS. BAUGHMAN: Objection to form.
THE WITNESS: Based on the analysis and calculations, that would be fair.
Q (BY MS. HORAN) Okay. Turning to your opinion on spiractor which begins on Page 8 -- and you're, of course, welcome to reference your report at any point during the deposition.

A Thank you.
Q Your opinion on the percentage loss of TCE and PCE differs from Dr. Hennet's in that you find that the effluent fall height is 1 foot and Dr. Hennet used 2 feet.
Is that fair?
A That's correct.
Q Other than the fall height, is there anything about Dr. Hennet's opinion related to VOC losses at spiractors that you disagree with?
MS. BAUGHMAN: Objection to form.
THE WITNESS: Not in terms of the calculation, no. I would qualify that by saying I did comment that the spiractor water converges in the center versus weir where it would be flowing over the edge. And so it's not a difference with Dr. Hennet's calculation, but it is a qualification to the method applied.
Q (BY MS. HORAN) Sure.
And on Page 9, in the paragraph -- the last full paragraph, nine lines down.
A Right. Yeah.
Q You say, "Thus, while I am not aware of a better approach than Nakasone 1987 for making this estimate, it is my opinion the estimated

values of VOC losses will be conservative higher than actually experienced."

A Correct.

Q Did I read that correctly?

A Correct.

Q And so in materials of the weir that you just described --

A No.

Q -- you're not aware of a better approach for adding it to this calculation.

A No. Correct.

Q So you and Dr. Hennet essentially agree on the methodology for calculating spiractor losses and you disagree about one input.

Is that fair?

A Correct.

Q And you conclude that AH Environmental used 1 foot for the water drop in the spiractor effluent pipe, and that's justified.

Is that fair?

A Correct.

Q You're not offering any independent assessment of the effluent pipe fall height.

A Correct.

MS. BAUGHMAN: Objection to form.

THE WITNESS: Correct.

Q (BY MS. HORAN) Is there any information besides the AH Environmental report that you relied on in determining the fall height of 1 foot is more justified?

A No.

Q Did you review the photos in AH Environmental's report and determine for yourself that the fall height was 1 foot or did you rely on AH Environmental's analysis?

A I reviewed the figures and understood the reasons for why they selected the 1-foot fall height.

Q AH Environmental determined the spiractor effluent pipe diameter was 12 inches.

Do you agree?

A That's the number that they used. Correct.

Q Do you know precisely how they made that measurement?

MS. BAUGHMAN: Objection to form.

THE WITNESS: It's in -- what I know is it's in their document.

Q (BY MS. HORAN) And sitting here today, what's your understanding of how they made that

measurement?

MS. BAUGHMAN: Objection to form. Foundation.

THE WITNESS: They made it based upon a flowing system where they were able to see the constricted water down gradient reducing the fall height, and they made an estimate based upon the visual observation. It's my understanding. And I think that's documented, and probably best to actually go there.

I forget exactly where it is in the report where they describe -- here it is. Page 3-7.

Q (BY MS. HORAN) Uh-huh.

A The fall height was estimated visually based on recent photographs. And then on -- so you see that?

Q I do. Yes. So --

MS. BAUGHMAN: Were you finished?

THE WITNESS: No.

Q (BY MS. HORAN) Oh.

A I'm sorry.

So then if we go to Figure 4-1, Page 4-2.

Q Uh-huh.

A You see a Hadnot Point spiractor showing the evidence of the downstream constriction limiting the fall height versus --

Q Sorry. Where are you looking?

A 4- -- Figure 4-1.

Q Yes. Oh, you're saying this image shows that to you. You're not pointing to text in the report.

A No, no.

Q Okay.

A I'm sorry. I'm looking at the figures.

Q Okay.

A And there -- well, in the text, they do say they -- I've lost over where they say that. But they picked 1 foot. But the pictures they're relying upon, 4-1, you can see that the water isn't free flowing in like it is in 4-3.

Q Uh-huh.

A And so Holcomb Boulevard, they said they did get the 2-foot drop fall height where as in Hadnot Point, because of the downstream constriction from the recarbonation basin, that back -- what I'll call back water, water wasn't able to flow freely out of this pipe because of that. And so we have the 1-foot drop.

Q For Figure 4-1, do you know whether gravity filters were being backwashed when this photo was taken?

A No. That's 4-2. They point out that 4-2 was after backwash filter went -- so that clearly dem -- they were clearly demonstrating the additional impact of the backwashing the filters. With that -- well, I'll leave it at that.

Q So I -- the -- I think -- so I understand on 3-7, you pointed me to language that says that the fall height was estimated visually. But I believe -- do you know how they measured the pipe diameter?

A No, I do not.

Q Okay. So we're at 12:05. Do we want to take a break for lunch?

A I can go a little bit longer or --

MS. BAUGHMAN: If you want to, we can. It's up to you.

He's willing to go.

So you decide.

THE WITNESS: Go another 15 minutes or so. Fifteen, 20 minutes.

Q (BY MS. HORAN) Sure. We can keep

going. Okay.

Okay. So you agree that AH Environmental did not measure the Hadnot Point effluent fall height; they just visually estimated it. Fair?

MS. BAUGHMAN: Objection to form. Foundation.

THE WITNESS: I would say that they made a measurement based on a visual -- they made a measurement based on a visual product.

Q (BY MS. HORAN) Sure.

They didn't measure it. They made a visual estimation. Fair?

A They didn't go out and measure it. They measured it from the picture which is a measurement in and of itself.

Q Sure.

But they didn't go into the field, as far as you're aware, and measure it with a measuring tape. Fair?

A Not to my knowledge. But I'll add that a measurement on an empty pipe is of less value than a measurement on a flowing pipe. Because an empty pipe doesn't give you the indication of the -- what we're seeing in Figure 4-1. The

important value is how far does that water fall before it hits bottom, the water.

Q Uh-huh.

A And that's the volatilization. And so just measuring the pipe -- measuring the fall height, for example, from Figure 3-2, you have no indication of where the water level is dropping to in that pipe. You don't have any idea of the actual fall height. All you know is what's the dimension for an empty spiractor effluent pipe.

So for me, a visual measurement from a picture, we're actually seeing the constricted water decreasing the fall height is more valuable than a measurement on an empty pipe where you have no idea what it was like under operating conditions.

Q Do you know if AH Environmental estimated based on image of a pipe being used or an empty pipe?

A Let's find their discussion. Okay. Just above Figure 4.4-1. Okay. So let's start with only a small vortex.

Do you see that?

Q Uh-huh.

A Formed over the submerged effluent pipe

4-1 on one spiractor and they developed an nappe after a backwash filter went back online. Because of the downstream recarbonation basin at that plant, available head does not appear to allow fall height of greater than 1 foot. And so -- indicating that they were taking into account the downstream recarbonation basin reducing the fall height. Then they go on to say, however, at Holcomb Boulevard -- because there was no recarbonation basin, water falls 2 feet.

Q So based on 4.1, you determined that it was reasonable for there to be a 1-foot fall height at Hadnot Point based on this image?

MS. BAUGHMAN: Objection to form.

THE WITNESS: That confirmed in my mind their decision to go with a 1-foot fall height versus Figure 4-3 for Holcomb Boulevard where there's no evidence of that back -- that constriction reducing the fall height they said there would be 2 feet.

Q (BY MS. HORAN) Okay. And how they determined the 1 foot, what image did you use from AH Environmental besides -- or maybe there's none.

Did you use any images besides 4.1 to

confirm your belief that 1 foot was a reasonable estimation?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Figure 4.1 confirmed in my mind why they chose a 1-foot fall height. And I know they were -- they had a longer term contract at this site. So I trusted that, being professional engineers, they were taking appropriate measures to make these determinations.

Q (BY MS. HORAN) Could you turn to 3-8?

A 3-8?

Q Yeah.

A Yes.

Q You see the image says Hadnot Point Water Treatment Plant spiractor effluent pipe, 1941, 1942?

A Correct.

Q Is it your understanding that AH Environmental is representing that this image was taken in 1941 or '42? Or what's your understanding of that?

MS. BAUGHMAN: I'm sorry. Are you on Page 3-8 or Figure 3-8?

MS. HORAN: Page 3-8.

THE WITNESS: Page 3-8.
MS. BAUGHMAN: Okay. Thank you.
THE WITNESS: Can you ask that again?
Q (BY MS. HORAN) Sure.
You see the figure says Hadnot Point water treatment plant -- well, it says WTP -- spiractor effluent pipe 1941 to 1942?
A (Nods head.)
Q Is it your understanding that AH Environmental is representing that this photo was taken in 1941 or '42 or what -- what do they mean by that?
Do you know?
MS. BAUGHMAN: Objection. Form and foundation.
THE WITNESS: I couldn't speak to that.
Q (BY MS. HORAN) Have you ever personally measured a spiractor pipe?
A No.
Q Do you know if it's even possible to measure the fall height of a spiractor while it's in use?
A Say that again.
Q Is it even -- strike that.
Is it possible to measure the fall

height of a spiractor effluent pipe while the spiractor is in use?

A I mean I guess, theoretically, it would be possible. But if you look at the -- looking for the schematic. So if you look at Figure 3-1.

Q Uh-huh.

A On Page 3-7.

Q Yep.

A The effluent pipe is in the center of a 10-foot diameter reactor. So that would make it -- certainly would -- certainly be possible.

Q And it's also in the middle of a 22-foot drop. Fair?

A Correct. Correct.

Q So to measure an effluent pipe from a spiractor, you have to figure out how to get some type of measurement perched over a 22-foot drop in the middle of a 10-foot wide metal container of sorts.

Is that fair?

A Well, let's look at Page 2-9. Figure 2-4.

Q Uh-huh.

A I mean, if we're talking about the realms of possibility.

Q How would you go about measuring a spiractor effluent pipe while a spiractor is in use, to determine the fall height?

A Well, I might take a picture.

Q All right. You would take a picture?

A I might. I mean that...

Q And from Image 2.4 -- or Figure 2.4 on 2-9 that you pointed us to, can you figure out the fall height from this image? Or what type of image would you need?

A No, no. Not this picture itself. Let me -- the picture that they have here would be one way to approach it. The --

MS. BAUGHMAN: You have to say what "here" is.

THE WITNESS: I'm sorry. Figure 4-1. Sorry.

Q (BY MS. HORAN) So if an image of -- like 4-1 was sent to you, you could figure out the fall height based on this image alone?

MS. BAUGHMAN: Objection to form.

THE WITNESS: That would be -- that would be one approach. Probably be a safer approach. But you could potentially try to rig up some kind of a -- I don't know. Today, maybe

we'd use a drone.

MS. BAUGHMAN: You have to explain what you're looking at when you say that.

THE WITNESS: Oh, I'm sorry. Figure 2-4 Page 2-9.

If we're trying to get that, you could rig up some kind of mechanism and try and figure that out.

Q (BY MS. HORAN) What mechanism would you rig up?

A I'd have to think about it.

Q Well, it might be a good time for lunch then.

A Okay.

MS. HORAN: Can we go off the record, please?

THE VIDEOGRAPHER: Off the record. 12:16 p.m.

(Lunch break from 12:16 p.m. to 1:16 p.m.)

THE VIDEOGRAPHER: We're back on the record at 1:16 p.m.

MS. BAUGHMAN: Okay. I just want to put on the record, before we start, that I stated, off the record, a few minutes ago, that the materials considered list -- that there's some

confusion about that in that the vast majority of the documents that start at Page 9 of 30, additional materials considered, are materials that were provided well -- a year or more -- let me see -- at least six months before Dr. Sabatini's rebuttal report was prepared, and are background materials not specifically relied upon for the volatilization opinions or any opinion in his rebuttal report, exception being the ones that are -- didn't exist at the time which are depositions, and another exception being a document with the Bates stamp CLW0000005176 through 5182. And --

MS. HORAN: Could you read the title of the document? Because I think --

MS. BAUGHMAN: Grainger Laboratories Inc., Letter of August 10, 1982. It's possible this was disclosed earlier, but if not, then that might be one that's new that hadn't been disclosed before as something that Dr. Sabatini is relying on that does relate to volatilization.

So in other words, we received -- the reason I'm saying this is we received an email from Adam Bain which I read during lunch that complains about the new documents and the

reliance list, and the point being that with the exception of one document, and with the exception of documents that didn't exist at the time that the rebuttal report was submitted to the -- to the government, there is only one new document. Which I can give you a copy of now, if you want. And the rest of this is pure background information about Camp Lejeune not specifically relied upon for his opinions.

Now, there could be -- I'll say one caveat. There could be an overlap in that documents on Pages 1 through 8 may be duplicative of documents from 9 through 30. If it's in 1 through 8, what I've said does not apply.

MS. HORAN: Okay. Sure. Yeah, could you give us the copy of the document? And I believe you said, during the break, that there were three. Is it just the one --

MS. BAUGHMAN: It's just the one.

MS. HORAN: -- or were there three?

MS. BAUGHMAN: It's just the one, but the one has different parts to it, if that makes sense. Like --

MS. HORAN: Well, I'll look at it.

MS. BAUGHMAN: You'll see. It's one.

MS. HORAN: Okay.

Q (BY MS. HORAN) Welcome back, Dr. Sabatini.

A Thank you. Hope you had a good lunch.

Q I hope you did as well.

A Thank you. Stella Nova. One of my family's favorites.

Q Yeah. Good for you.

Have -- you understand you're still under oath to tell the truth?

A Yes.

Q Okay. And when we left right before the break, we were talking about how one could go about measuring the spiractor fall pipe while the spiractor is being used. So while there's water in it. And I -- do you have any new or -- thoughts on how one would go about doing that?

A Not beyond what we discussed before and not -- not beyond that. No.

Q Okay. And you've never measured a spiractor while it's filled or unfilled.

Is that fair?

A No.

Q No, you have never done it?

A I have not done that.

Q Okay. Did AHE or you measure the relative elevation between the recarbonation basin water level and the effluent pipe rim level?

A I can't speak for AH. I assume that they did a thorough analysis of all the systems as they document at the beginning of their report. That they studied all basins and all plans and schematics and everything. So I can't speak to what they did. But I did not.

Q Turning to your report which was marked as Exhibit 2, if we turn to Page 9 -- I'll let you get there. Table 5.2. In Table 5.2, you compare AH Environmental and Dr. Hennet's loss calculations.

Fair?

A I compare AH Environmental's corrected numbers based upon the transposed exponent that Hennet noted. So yes, it's AH's numbers versus Hennet's numbers, but AH's corrected numbers.

Q Thank you for that clarification.

And then you adopt AH's clarified numbers for your own calculations.

Fair?

A Adopt the 1-foot fall height which leads

to the same -- same numbers.

Q Sure.

So you used the numbers in Table 5.2 that are attributed to AH Environmental for your calculation --

A Those are actually my -- sorry. Pause before I answer.

MS. BAUGHMAN: Wait until she finishes, and pause and answer.

THE WITNESS: Count to three. One, two, three.

I -- I adopted my corrected -- the number's actually my calculations based upon AH's 1-foot fall height.

Q (BY MS. HORAN) Okay. And using a 2-foot -- as opposed to a 1-foot -- fall height nearly doubles the losses; correct?

A It has -- approaching that effect.

Q Turning to -- back to the AH Environmental report in Figure 5 -- 4.2 which is on Page 4-3.

A Okay.

Q Do you see that Figure 4.2 shows a -- a nappe?

A Yes.

Q And did you see Figure 4.3 right below it has a more regular water sheet?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Yes. Non-constricted.

Q (BY MS. HORAN) And did you notice that the Hadnot Point effluent pipe has a heavy crust deposit compared to the none or less deposit on the Holcomb Boulevard pipe?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Ask again.

Q (BY MS. HORAN) Did you notice that the -- there's a heavier crust deposit for the Hadnot Point effluent pipe -- which is Figure 4.42 -- compared to the no or less deposit in the Holcomb Boulevard pipe which is 4-3?

MS. BAUGHMAN: Objection. Form and foundation.

THE WITNESS: Yeah, I wouldn't be able to make that discernment based upon this picture.

Q (BY MS. HORAN) Could a crust on a effluent pipe be responsible for the nappe?

MS. BAUGHMAN: Objection to form.

THE WITNESS: I would refer back to Figure 4-1. Which doesn't have -- show the same nappe. And AH attributes the difference between

4-1 and 4-2 to the backwashing of the filters.

Q (BY MS. HORAN) So let's turn back to that. On 4-2, in the -- the text above it on Page 4-2.

A Oh, on Page 4-2. I was on Figure 4-2. Okay.

Q Yep.

The text above it, there's a sentence that reads, "Only a small vortex formed over the submerged effluent pipe, Figure 4-1, on the one spiractor, and then developed a nappe after a backwash filter went back online, Figure 4-2."

Do you see that?

A Yes.

Q Okay. Is it your understanding that for Figure 4-1 was when the backwash water was being filtered through the effluent pipe?

A No.

Q What is your understanding?

A I know that when the backwash filter -- when a filter's being backwashed, more water is forced through fewer systems. And so that -- you get a backup of water, a constriction, as they described. And so it's clear to me the difference between 4-1 and 4-2 is the

constriction due to the hydraulics of the filter being backwashed resulting in the nappe, Figure 4-2.

Q So it's your opinion that the nappe is from the backwashed water --

A That the --

Q -- and the vortex is when there's no backwash water.

MS. BAUGHMAN: Objection to form.

THE WITNESS: When -- in the absence of the backwash constriction.

Q (BY MS. HORAN) So turning back to 4-2, the language where it says -- the second half of the sentence I previously read, "And then developed a nappe after a backwashed filter went back online."

Doesn't that suggest to you that the nappe was formed after the backwashed filter was back on?

A Yeah, I don't understand that wording. I would -- so Figure 4-1, the way I interpreted it, was at the end of the backwash process, just as they were putting it back online, that's when they would have had the greatest impact of a backwashed filter on the hydraulics. And so that

-- that's when you'd get the maximum hydraulic impact. So from a hydraulics perspective, that's how I would interpret that sentence.

Q So why would there be more constriction when there's not backwashing?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Now, my comment would be that there would be more constriction when there was a filter being backwashed.

Q (BY MS. HORAN) And more constriction would be the development of a vortex; correct?

A No. No. You would have more -- it would be harder for the water to go through the pipe so you would get more backup of the water in the pipe, and you'd have this scenario, 4-2, versus the scenario in 4-1.

Q When you say more "water in the pipe," do you mean the -- which part -- part of the pipe are you referencing there?

A The pipes flowing between the basins.

Q So when the spiractor has more water in it. Or are you talking about the effluent pipe?

A Right. Because one filter's offline. All the water's having to go through the other filters creating a constriction and a build-up of

water prior to that point.

Q Okay.

A For me, looking at this picture, Figure 4-1 to 4-3 tells, to me, a big story. In that obviously, you have less free fall of water in the Hadnot Point effluent pipe than you have in the Holcomb Boulevard.

Q So just looking at the two, though, of Hadnot Point, one has a -- Figure 1 is shown as having a vortex in the description and Figure 4-2 is it shown as having a nappe in the -- in the description.

Do you agree with that?

A Yes.

Q Okay. And it's your opinion that when the backwash filter is back online, there would be a vortex and not a nappe.

MS. BAUGHMAN: Objection to form.

THE WITNESS: I couldn't speak to the vortex -- to the nap. But what I -- what is clear to me is that there's less free fall in the 4-2 than the 4-1, and there's less free fall in 4-1 than in 4 -- Figure 4-3.

Q (BY MS. HORAN) Sure.

But what is your understanding of the

process as it relates to the backwash filter, whether it was on or off, or how it was being used, for Figure 4-1?

A My understanding is, at the end of the backwash cycle, they have the greatest impact on the effluent pipe from the spiractor. And when that backwash filter was brought back online, the hydraulics changed back to the previous condition.

Q Why would you have less free fall when the water is less backed up in the spiractor effluent pipe?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Say again.

Q (BY MS. HORAN) Why would you have less free fall when the water is less backed up in the spiractor effluent pipe?

A No. What I was saying, there would be more water backed up. And so the -- you would have less free fall because there was more water being backed up.

Q And when there's -- is it your opinion that Figure 4-1 shows more or less free fall than Figure 4-2?

A My impression would be more. Just based

on visual observation.

Q So just so I understood that correctly, your opinion is that 4-1 shows more free fall than Figure 4-2? Or did I get that wrong?

A That would be my visual observation.

Q Okay. Turning to Page 3-11 of the AH Environmental report.

Dr. Sabatini, do you remember earlier this morning, we talked about mixing in the reservoirs?

A (Nods head.)

Q The first full paragraph on 3-11. Do you see it reads, "In a quiescent tank, e.g., raw and finished water reservoirs, filter beds, and spiractors, the water is assumed to be well mixed, and the bulk concentration of a contaminant is equal to the effluent concentration and can be estimated from a material balance. VOC volatilization is a first-order rate process and the remaining fraction of a chemical can be expressed as follows." And then it has an equation.

Do you see that?

A Yes.

Q Do you see that AH Environmental assumed

that the reservoirs would be well mixed?

A It depends upon what you mean by "well mixed." Certainly, the spiractor, I would agree, was extremely well mixed because of all the flow coming in. The reservoirs -- as the water comes into that reservoir, you have a certain amount of energy that causes that flow to go into the reservoir. So you could get a degree of mixing from that. Which would be, I might choose to say mix -- a degree of mixing as opposed to well mixed. To me, well mixed, from a reactor design perspective, means you have some kind of a turbine or something mixing the water to get it well mixed.

So I can imagine that what they're trying to say is that the water coming in creates a degree of mixing. But I probably wouldn't choose to use the term "well mixed."

Q And that's because you would only use the term "well mixed" if there was some kind of mechanical process involved?

A Yes. Mechanical or -- you can achieve it in different ways, but not just water flowing into a -- a basin. And part of that assumption makes the calculations easier.

Q Could you turn back to Figure 4-2? Which is Page 4-3.

A (Witness complies.)

Q Would you agree that Figure 4-2 which shows the development of a nappe, that the -- it would imply -- or strike that.

Would you agree that Figure 4-2 which shows a nappe -- a nappe would imply more surface area for water-to-air contact?

A Say that again.

Q Sure.

Do you see 4-2 creates a nappe?

A Yes. I...

Q Okay. And would you agree that a nappe will create more surface area for water-to-air contact?

A That's a hypothetical question.

Q Why is that a hypothetical question, Dr. Sabatini?

A Well, visually, you may see more area towards the top of the pipe, but there's less free fall which has area associated with it as well. So it would be harder for me to definitively say what the combined impact would be.

Q I'm -- so I'm not asking about the combined impact. I'm just asking about the -- the nappe creation.

A Well --

Q At the top of the pipe, would that create additional surface-to-air contact with water?

MS. BAUGHMAN: Objection to the form.

THE WITNESS: I'd have to study that more.

Q (BY MS. HORAN) You said you couldn't make an overall assessment because the fall height might be lower because the pipe would be more full.

Why would a -- the creation of a nappe mean that the pipe was more full?

A I would --

MS. BAUGHMAN: Objection to form.

THE WITNESS: I would attribute that to the -- again, to the downstream constriction causing the -- causing that condition.

Q (BY MS. HORAN) Okay. Turning next to storage tanks, you agree with Dr. Hennet's use of the approach laid out in Thomas, 1990 as opposed to the approach used by AH Environmental;

correct?

A The same that AH Environmental used and Hennet used, yes. I...

Q And you --

MS. BAUGHMAN: Well, I'm going to object to the form and object as non-responsive. I don't think he heard the question.

THE WITNESS: Oh, I'm sorry.

MS. BAUGHMAN: Because he answered something different from what you asked.

THE WITNESS: Can you rephrase the question?

Q (BY MS. HORAN) I thought you answered it, but I will ask it again.

You agree with Dr. Hennet's use of the more generalized approach laid out in Thomas, 1990 as opposed to the approach that was used by AH Environmental; correct?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Yeah, I'd have to go back and refresh my memory on the terminology.

Q (BY MS. HORAN) Okay. Could you turn to Page 10 of your report?

A (Witness complies.)

Q The second paragraph suggests that --

A Yeah. That's what I --

MS. BAUGHMAN: Wait. Wait. Wait.

THE WITNESS: I'm sorry.

MS. BAUGHMAN: Let her finish.

THE WITNESS: Sure. I'm sorry.

Q (BY MS. HORAN) -- suggests that AH Environmental used the Southworth approach, and you did not agree that that was the appropriate approach. You agreed rather with Dr. Hennet that their more generalized approach was better.

Correct?

A Yes.

Q Okay. On that same page, the first sentence of the second full paragraph says, "The approaches outlined in Thomas, 1990 are for systems open to the atmosphere, e.g., a pond, lake, or river. In contrast, the Camp Lejeune water treatment tanks, from raw water to clear well to water towers, are covered. They are not open to the atmosphere."

Did I read that correctly?

A That's correct.

Q Is it your opinion -- or strike that.

Dr. Sabatini, you agree that the water treatment tanks, from raw water to clear well to

water towers, would experience air exchange through venting?

A As the water level goes up and down, there would be atmospheric air. As water level goes down, then atmospheric air would replace that amount of water that went down. Yes.

So in terms of my terminology, what I meant by open to the atmosphere was completely open, like a lake, versus a cover that has small inter -- or has intermittent vents that's not completely open.

Q But you would agree that the water treatment tanks have some ability to interact with the open atmosphere through these vents.

Fair?

A There is a degree of interaction with the atmosphere.

Q Had you seen any photos of the treatment tanks at Camp Lejeune prior to submitting your expert report?

A I relied upon the AH Environmental documents. I'm trying to remember if I had or not. I don't recall.

Q How did you determine that the Camp Lejeune water treatment tanks were not open to

the atmosphere?

A That was my impression from the information I had at hand.

Q Anything in particular?

A Well, for one thing, I've never known them to be open to the atmosphere. That's just allowing for surface contamination of your water.

Q Do you know whether there are any drying beds at Camp Lejeune?

A I'm sorry. Whether there are...

Q Drying beds.

A No, I don't.

Q Prior to issuing your report, did you do anything to try to find out whether there were drying beds at Camp Lejeune?

A That wasn't critical to my calculations.

Q And why wasn't that critical to your calculations?

A It didn't bear in to the losses of concern.

And I might just add to that. I didn't find such information in Hennet's report either.

(Government Exhibit 8 marked for identification)

Q (BY MS. HORAN) So I'm marking as Government Exhibit 8 -- this is a document, EPA

Region 8 Drinking Water Tech Tips.

Dr. Sabatini, have you seen this document before?

A It doesn't look familiar.

MS. BAUGHMAN: Do you have the date, by the way? It doesn't --

MS. HORAN: No. I don't have a date.

MS. BAUGHMAN: Okay.

Q (BY MS. HORAN) Do you see the paragraph at the top that starts "Finished water storage sanitary protection"?

MS. BAUGHMAN: I'm going to -- you can take your time and read the document, if you've never seen it before, before you answer questions.

THE WITNESS: (Reviews document.)

Okay.

Q (BY MS. HORAN) Do you see the paragraph at the top of the document? The first full paragraph? The second sentence reads -- or did you have a chance to read that whole paragraph?

A Yes.

Q Do you disagree with anything in that paragraph?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Not in my general -- do you have a specific question about the paragraph?

Q (BY MS. HORAN) That was my question. When you read it, was there anything that you disagreed with?

MS. BAUGHMAN: Object to the form.

You can carefully read the whole thing before you answer.

MS. HORAN: Laura, I'd like him to --

MS. BAUGHMAN: He -- this is his first deposition.

MS. HORAN: I know. And I --

Q (BY MS. HORAN) I'm not pushing you, Dr. Sabatini --

A Yeah.

Q -- on any document all day.

A Yeah, I just read it quickly --

Q Sure.

A -- not realizing you were...

Q Yeah. Take your time.

A (Reviews document.)

Okay. In this first reading, it all seems appropriate.

Q Okay. Do you see the second sentence reads, "The air pressure inside of a tank is

always trying to equalize with the air pressure outside as the water level rises and falls in the tank"?

Do you see that?

A Yes.

Q Do you agree with that?

A Yes.

Q Okay. You can put that aside.

A By the way, this reminds me back to the water buffalo and the vent.

Q Sure.

A It would seem somewhat analogous. You have a small vent pipe on a big surface area water tank to help equalize pressures.

Q Sure.

A In the same way that you have here.

Q An air exchange would happen in the same way.

A Through the same way.

Q Through the vent; correct?

A Yeah. In -- as water level rises and falls. Not forced ventilation.

Allergies. I don't know if you can hear it in my voice. I can.

Q If you need a break, let us know.

A A lozenge.

MS. O'LEARY: Just also, there's some water if you'd like.

THE WITNESS: Thank you. Very kind. Thank you.

MS. BAUGHMAN: This is yours, too, if you need it.

Q (BY MS. HORAN) You would agree that fluctuation will occur every day in both the water reservoirs and the towers; correct?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Under normal course of operation, you would expect that. Although, that one CLW showed there were days -- hours and days where there were minimal fluctuation in a water reservoir.

Q (BY MS. HORAN) What CLW are you referencing?

A Well, I don't have that with me right now, but it was...

Q Could you just describe the document, to the best of your recollection?

A Yeah. It was a document that showed every four-hour water elevations in a storage tank over the course of, I think, seven or eight

days. And so it showed the water level fluctuations. It varied from zero to 2 feet maximum over the seven to eight days. And the average water fluctuation was 1 foot.

Q And where did you first see that document or -- strike that.

When did you first see that document?

A I don't recall exactly.

Q Do you recall if it was before or after you submitted your expert report?

A I believe before. Yes. I believe before.

Q Do you know if you cite that document in your report?

A Not sure if I did or not. I don't see it listed.

Q So I guess based on this document, is it your understanding that the fluctuation is, on average, 1 foot per day in the Camp Lejeune reservoirs? Or did I misunderstand that?

A In this one set of data that they collected, that was the case.

Q Do you recall when the data was from?

A '85.

Q '85?

A Yeah. It's what I recall.
Q And was the data from a reservoir or water tower? Both?
A Reservoir is what I recall. Yeah, reservoir.
Q How much fluctuation is there per day at a Camp Lejeune water tower, if you know?
A I don't recall.
Q The -- I understand -- or strike that.
You're -- what you've told me today that there -- it's your understanding that there's 1-foot fluctuations in the Camp Lejeune water reservoirs.
How does that impact your opinions, as to reservoirs, in your report?
A In my analysis, I assumed that there would be some fluctuation. I guess that's the answer. I assumed. So I took that into account. There would be a certain level of water fluctuation.
Q Sure.
And would it matter if it was 1 foot or 2 feet of fluctuation for your opinion?
A Not -- not -- no.
Q So the amount of fluctuation is not a

pertinent -- or the quantification of the amount of fluctuation is not a pertinent factor, to your opinion, as to reservoirs?

A Not in that range that you just mentioned. Now, if the tank emptied and went from empty to full, the magnitude of the fluctuation could make a difference. But the other big difference is -- well, I'll stop there. That answers your question.

Q How about -- would -- would a 3-feet fluctuation make an impact to your opinion?

A I'd say no. Because there's other factors that go into it.

Q A moment ago, you said, well, the other big factor is, but I'll stop there.

What is the other big difference that you were alluding to?

MS. BAUGHMAN: Objection to form.

THE WITNESS: The Thomas method, lake opened to the atmosphere, you have air movement over the surface. And that increases the volatilization rate where as in a covered tank, even vented, you don't have air flowing over the surface like you would in a -- in a lake. And so that's another factor that goes into the

volatilization rate in the Thomas method.

Q (BY MS. HORAN) Sure.

Do you know how many times per day the water levels change at Camp Lejeune in the reservoirs?

MS. BAUGHMAN: Objection to form.

THE WITNESS: The CLW I referred to provided some every-four-hour information, as I recall, in the '85 timeframe. It gives some indication of that.

Q (BY MS. HORAN) Do you know how fast the water is flowing in the reservoirs or in the water tanks?

A I don't know that number off the top of my head. It's something I could calculate, but I don't know that number off the top of my head.

Q Did you calculate it for your opinions?

A No.

Q And why not?

A Because it's not part of the -- the Thomas method takes detention time into consideration.

Q So instead of determining the flow rate, you determined detention time?

A That was what -- that's what feeds into

the...

Q Do you know how much water flows through a Camp Lejeune water reservoir per day?

A I can refer to my report. Or actually, I guess AH Environmental. So it's in the report.

Q In the AH Environmental report?

A Yes.

Q We've talked about mixing in the reservoirs. Did you take mixing in the reservoirs into account when you were doing your calculations for the water reservoirs?

MS. BAUGHMAN: Objection to form. Foundation.

THE WITNESS: The Thomas method assumes completely mixed systems. So to that -- yes, I did.

Q (BY MS. HORAN) Could you identify where, in your report, you address the reservoir depth fluctuations? Are they in your report?

A No.

Q No. Okay.

The flow -- as the water flows through the reservoirs and tanks, would it induce turbulence in the water?

A As it flows through the reservoir, no.

There might be -- no. As it flows through the reservoir.

Q How do you know there would be no turbulence?

A As the water enters the reservoir, there may be a little splashing. But just the nature of the reservoir is such that you wouldn't -- from a hydraulics perspective, you wouldn't see turbulence.

Q You say, "The Nature of the reservoir." What do you mean by that?

A Just the tension time. The dimensions of the basin. Just from a reactor engineering perspective.

Q Have you ever observed the water flow through a water reservoir?

A No. I have not. But I've done hydraulic analyses of such basins.

Q What do you mean by you've done hydraulic analyses of such --

A Well, that's part of hydraulic -- of the --

MS. BAUGHMAN: Wait. Wait. Let her finish.

THE WITNESS: Sorry. Sorry.

MS. BAUGHMAN: Go ahead and ask again. I don't know if it's on the record.

Q (BY MS. HORAN) What do you mean by such -- hydraulic analyses of such basins?

A It's part of what you do in design of treatment plants is, you do reactor engineering analyses. Hydraulic analyses.

Q Have you ever designed a water treatment plant?

A Yes. Based on -- I teach classes on design of water treatment plants.

Q And what class is that?

A Physical chemical processes for water treatment.

Q Do you still teach that class today?

A As an emeritus professor, I no longer teach that class. So I last taught it -- well, I no longer teach that class.

Q When did you last teach it, Dr. Sabatini?

A Just before I retired. So three years ago.

Q And was that a class that you taught every semester?

A Say again.

Q Did you teach that every semester?
A Every year. Every year or every other year.
Q And other than teaching a class, have you ever designed a water treatment plant that was built?
A Not as a practicing consulting engineer. I've consulted with former students who were designing water treatment plants. But not myself. I understand all the basic principles.
MS. BAUGHMAN: Would you mind if we take a quick break?
MS. HORAN: Not at all.
MS. BAUGHMAN: Thank you.
MS. HORAN: We can go off the record.
THE VIDEOGRAPHER: Off the record. 1:59 p.m.
(Short break from 1:59 p.m. to 2:06 p.m.)
THE VIDEOGRAPHER: We're back on the record at 2:06 p.m.
Q (BY MS. HORAN) Dr. Sabatini, I believe you mentioned that your water storage tank calculations took into account some depth fluctuations of the reservoirs.
A Say again. Some...

Q Sure.

I believe you said earlier that your calculations as -- under storage tanks took in some reservoir depth fluctuations.

A I assumed that that was the case when I went through my calculations.

Q And how did you take those into account in your calculation?

A I just assumed that that was the case that -- that's implicit in the Thomas method, was that there's air for volatilization to occur into.

Q I'm marking as Exhibit 9. This is Volatilization from Water, by Richard G. Thomas.

(Government Exhibit 9 marked for identification)

Q (BY MS. HORAN) Dr. Sabatini, do you recognize this as the document you've been referencing as Thomas today?

A Yes. Appears to be the same document. Yes.

Q Great.

So you've seen this before?

A Yes.

Q Okay. Could you turn to 15-4?

A Okay. (Witness complies.)

Q The first full paragraph, the third sentence reads, "In the atmosphere, vertical diffusion is usually more rapid than in the water and chemicals are transported from the interface quickly."

Do you see that?

A Yes.

Q Do you agree?

A I agree that molecules diffuse faster in the air than in water. Yes.

Q So that means that once VOCs volatilize out of the water, they'll diffuse upwards quickly. Fair?

A Depends upon what you mean by quickly. That's where the two-film transfer equation comes in, in terms of mass transfer across that interface.

Q They'll diffuse more quickly than if they were in the water.

Is that fair?

A Yes. They -- molecules diffuse more quickly in air than in water.

Q And that will cause the concentration gradient at the water air surface to stay higher than if the VOCs did not quickly diffuse upwards.

Fair?

MS. BAUGHMAN: Objection to form.

THE WITNESS: In the general principle, yes. That's fair.

Q (BY MS. HORAN) And that will cause the rate of volatilization to be faster than it would be if the VOCs did not quickly diffuse upwards; correct?

MS. BAUGHMAN: Objection to form.

THE WITNESS: The questions seem to be hitting on fairly fundamental concepts. But yes.

Q (BY MS. HORAN) And because that gradient is the delta C in the two-film mass transfer equation in your report which is the equation 3-3 I believe you just referenced, and when the delta C increases, the rate of mass transfer J will also increase; correct?

A Say that again. As the delta...

Q Sure. And if you would like to open your report to look at the equation, that would be fine, too. It's equation 3-3 in your report.

A Sure. Yeah. Thank you. Very familiar with that equation.

Q Do you have it in front of you?

A Yes.

Q Okay. Because the gradient is the delta C in the two-film mass transfer equation in your report which you have in front of you and when delta C increases, the rate of mass transfer which is J will also increase; correct?

A Yes. Correct.

Q Okay. Turning back to Exhibit 9 which is the Thomas study, could you turn to Page 15-20?

A (Witness complies.)

Q You relied on table 15-3 to determine that .0046 is the proper oxygen reaeration coefficient for ponds; correct?

A Yes.

Q And you agree with Dr. Hennet that ponds are the proper example to use.

MS. BAUGHMAN: Objection to form.

THE WITNESS: Yes.

Q (BY MS. HORAN) Was that yes?

A Yes.

Q How did you reach that determination?

A Between the alternatives -- lake, river, and pond -- pond is most appropriate.

Q And why was the pond the most appropriate?

A More similar -- in this range of options, it's more similar to the reservoir situation.

Q In what way?

A Size.

Q Anything besides size?

A Size would be surface area.

Q That's it?

A Yes.

Q Okay. And you used the .0046 oxygen re -- reaeration coefficient to reduce Dr. Hennet's calculations of volatilization by about 58 percent. Fair?

And again, you're welcome to look back at your report.

A Reduce them 2 -- 2.58 times his estimates. Yes.

Q And you agree that Thomas, 1990, the literature values for oxygen reaeration coefficients for ponds is between .0046 and .0096.

Do you see that?

A Literature values?

Q Yes.

A Yes.

Q So you use the lowest literature value for ponds possible. Fair?
A Fair.
Q And ponds don't have flowing water. Is that fair?
A Generally, no. They may. But generally not.
Q And flower -- flowing water causes greater reaeration; correct?
A Correct.
Q And that's why in Table 15-3, the values for rivers are up to two orders of magnitudes greater than ponds. Fair?
A Fair.
Q And you agree that water storage tanks do experience some water flow; correct?
MS. BAUGHMAN: Objection to form.
THE WITNESS: I would say more in the mode of pond than river certainly.
Q (BY MS. HORAN) But they do experience water flow. Fair?
MS. BAUGHMAN: Objection to form.
THE WITNESS: Well, depends upon what you mean by flow. It's -- I mean there is some minor movement across the -- the tank. So yes.

Q (BY MS. HORAN) Well, every day, a water storage tank or reservoir has water coming in and water going out.

A That's true.

Q Fair?

A Correct.

Q So every day, there's new water that appears that flows through the system. Fair?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Fair.

Q (BY MS. HORAN) And ponds don't necessarily have water that flows in and flows out of them on a daily basis leading to fluctuations. Fair?

MS. BAUGHMAN: Objection to the form.

THE WITNESS: It depends. To a lesser degree than a river or lake certainly.

Q (BY MS. HORAN) And how would you compare it to a water reservoir in terms of flow between a pond and a water reservoir?

A Probably comparable to more. Probably more.

Q The water reservoir has more flow than a pond?

A Well, that's hard to say. I need to

have more of the parameters.

Q What parameters would you need?

A Well, what particular pond? What ponds did they use for this study? What were the conditions in that pond? So it would be hard for me to make a general statement.

Q Okay. So sitting here today, you don't have an opinion on whether a water reservoir wherein water flows in and out every day has more or less flow than a pond?

A In general, I would agree, but I wouldn't want to make that as an overall conclusion in all cases.

Q Sure.

So there may be exceptions. But generally, you agree.

MS. BAUGHMAN: Objection to form.

THE WITNESS: Sure. I agree.

But I might add, back to your analogy to the river, more than the flowing of the water, it's the ripples and the surface area that's associated with that that would have the impact.

Q (BY MS. HORAN) So you're saying it's the ripples in a --

A Ripples or waves or undulations that

increase the surface area for mass transfer.
Q Sure.
So can we call that turbulence at the top?
MS. BAUGHMAN: Objection to form.
THE WITNESS: As a hydraulic person, "turbulence" has a very --
Q (BY MS. HORAN) Okay.
A -- specific meaning.
Q Okay.
A Laminar flow. Turbulent flow. So...
Q Sure.
So what were the terms that you used? Ripple?
A I said ripples and waves surface area.
Q Do you know whether water that flows through a water reservoir or a water tank, as it comes in and out throughout the day, would create ripples or waves?
A That would be extremely hard. No, I would -- I would say not.
Q And why would you say no?
A Just the nature of the flow system.
Q And what about the nature of the flow system leads you to say no?

A Just the -- well, laminar turbulent flow conditions. They'd be very much in the laminar flow regime.

Q And why is that?

A Because of the velocities and the nature of the flow.

Q But you've never seen inside a water reservoir to determine whether there are any ripples or waves across the top as it's filled throughout the day.

Fair?

A I have not. But the engineering calculations suggest as much.

Q You would consider a water treatment plant reservoir that can accommodate 5 million gallons of water treatment per day to have a limited flow?

A To say -- I'm sorry. Repeat. To...

Q You would consider a water treatment plant reservoir that can accommodate 5 million gallons of water treated per day to have a limited water flow?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Not a limited water flow. Limited water velocity.

Q (BY MS. HORAN) What is the difference between water flow and water velocity?

A Flow is gallons per day. Volume per time is flow. Velocity is flow divided by area which gives you a velocity of feet per -- feet per second. So if -- if you have a large flow but a large area, you have a smaller velocity.

Q Okay. So if -- so you would say that a water reservoir that has 5 million -- can take 5 million gallons of water per day would have a low velocity but high flow?

MS. BAUGHMAN: Objection to form.

Q (BY MS. HORAN) Did I understand that correctly?

A Again, you can take the flow and divide it by the area to get the velocity. So if you have a big flow but a big area, your velocity doesn't have to be that great.

Q Do you know what the velocity of the water at the Hadnot Point Water Treatment Plant is in the reservoir?

A I could calculate it, but I don't know that off the top of my head. But all this -- my discussion of velocity is related to laminar versus turbulent flow conditions. You're asking

about turbulence.

Q Sure.

And you're saying that these are more laminar which is more like a pond. Fair?

A Right.

Q Okay. And do you know what the area of a Hadnot Point water treatment reservoir is?

A It's in the -- it's in their report.

Q And without doing the calculations to determine velocity of the flow in and out of the reservoirs, how did you determine that it was more like a pond than a river or a lake?

A Just engineering judgment. I mean it's -- I didn't feel -- just my -- I made the same assumption that Hennet did and AH Environmental did. I saw no reason to view it differently from how they viewed it.

Q Sure.

Except for you and Dr. Hennet disagree on what oxygen reaer- coefficient -- fair? To use.

A But for the pond.

Q Sure.

A We did differ on this discussion.

Q So for -- without doing the calculations

to determine the velocity, how did you determine that the best oxygen reaeration coefficient was the lowest possible value for a pond?

A Because unlike a pond which is open to the atmosphere with a breeze flowing over it, the reservoir has no breeze flowing over it.

Q Any other factors that led you to choose the lowest possible oxygen reaer- -- reaeration coefficient?

A That -- that was the main one. That was the -- that was the reason.

Q Did you consider the velocity of the water in any capacity when you were making that determination?

A Just as Hennet and AH Environmental, I followed the Thomas approach.

Q Sure.

But when -- in choosing which coefficient to use in Thomas 1990, you've told me that the -- the largest reason you chose the lowest coefficient was because there was no air flow across the top like a pond. And I'm wondering if you considered at all the velocity of the water traveling in and out of a water treatment reservoir, if that factored into your

decision --

A It's not a part of -- it's not a part after the Thomas. So...

Q So no?

A No. Not beyond the context that it's incorporated into the Thomas approach.

Q Dr. Hennet, to the best you can recall, did not use the highest available oxygen reaeration coefficient found in the literature for ponds.

Fair?

A I'd have to look back and remember what value he used.

Q And when you were doing your calculations, you took into account that the tanks and water reservoirs are vented; correct?

A Correct.

A Another -- I'm looking now. He used .008 --

Q Uh-huh.

A -- which if we're looking at the Thomas method Table 15-3 on Page 15-20, that is the only number and a calculated value. So I also used the literature value. And his calculated value is towards the high end of the literature value

range. So in response to your earlier question.

Q Sure.

And the higher range of the literature value is point point -- excuse me -- .0096.

A 96.

Q Okay. And Dr. Hennet used .008.

A 8.

Q Fair?

A Fair.

Q Okay. So it's lower than the highest value by .0016. Fair?

A Fair.

Q Okay. Could you turn to 15-8?

A (Witness complies.)

Q The last paragraph begins, "In view of these observations and the difficulty of performing in-situ volatilization experiments, it is not possible to quantify the error in the calculated values of the volatilization rate constants."

Do you see that?

MS. BAUGHMAN: I -- you said 15-8 -- 18?

MS. HORAN: Uh-huh. 15-8.

MS. BAUGHMAN: Oh. I'm on the wrong page.

THE WITNESS: Okay. I see the sentence. Yes.

Q (BY MS. HORAN) Do you agree?

A I have to defer to the document. So I agree that's what the document says.

Q In your professional capacity, do you agree with that statement?

MS. BAUGHMAN: Objection to form.

THE WITNESS: To agree that's their interpretation, I would agree.

Q (BY MS. HORAN) The paragraph continues. "The lake example indicates that the error may be as large as a factor of 10, although laboratory data suggests that it could be much less. When one is applying the results of calculations to actual environmental situations, it would probably be advisable to assume that the value -- values of volatilization rate may be high by a factor of 10 at most, and low by a smaller factor of possibly three."

Do you see that?

A Yes.

Q And you see that they are discussing an example of a lake?

A Yes.

Q You see this is based on it not being possible to quantify the error to the calculated values of the volatilization rate constants.

So this is about error. Fair?

A About...

Q Error.

A Error in the estimates. Yes.

Q "Agree that Thomas is saying that for lakes, losses should be assumed to fall somewhere within a range that is somewhere between three times smaller than the calculated and 10 times bigger than the calculated."

MS. BAUGHMAN: Objection to form.

THE WITNESS: Says the air may be as large as a factor of 10 in the volatilization rate.

Q (BY MS. HORAN) Sure.

And then the second sentence says, "When one is applying the results of calculations to actual environmental situations, it would be -- it would probably be advisable to assume that the values of volatilization rate may be high by a factor of 10 at most, and low by a smaller factor of possibly three."

A So the estimates may be 10 times too

high.

Q That's your interpretation of that?

A Yes.

Q So you don't believe that Thomas is saying that for lakes, losses should be assumed to fall somewhere between a range that's three times smaller than calculated or ten times bigger than calculated.

MS. BAUGHMAN: Objection to form.

THE WITNESS: I -- that's not my interpretation. No.

Q (BY MS. HORAN) In your opinion, you applied the lowest pond oxygen reaeration coefficient and assumed, based on a lake example, that the volatilization rate may be overstated by a factor of ten.

Fair?

MS. BAUGHMAN: Objection to form.

Q (BY MS. HORAN) And you're welcome to look at your report.

A Say that again.

Q In your opinion, you applied the lowest pond aeration -- reaeration coefficient -- let me start over. Strike that.

In your opinion, you applied the lowest

pond oxygen reaeration coefficient and assumed, based on a lake example, that the volatilization rate may be overstated by a factor of ten.

MS. BAUGHMAN: Objection to form.

THE WITNESS: Yes.

Q (BY MS. HORAN) And you cite Thomas 1990 for the premise that Dr. Hennet's calculations should be further reduced to 10 percent of his calculations.

Fair?

A Correct.

Q Page 11 of your report. The first full paragraph, the second sentence says, "Given the disparity between the covered tanks of Camp Lejeune and the assumption of reservoirs open to the atmosphere in Thomas 1990, the calculation errors would obviously be on the high side."

Do you see that?

A Yes.

Q Thomas is not about reservoirs. Is that -- do you agree?

A You're referring to my sentence there.

Q Yes. I think it might just be an error --

A As a water resource engineer, I would

call a lake a reservoir. We often talk about reservoir engineering in terms of lakes and surface bodies. So I'm using the -- I'm using a more general water resource term there to refer to a lake or...

So I wasn't implying that it was the same as a tank at the water treatment.

Q And you considered that all of the water reservoirs at Camp Lejeune -- and I mean -- when I say "water reservoirs", I'm talking about the -- the water reservoirs in the water treatment plant.

A Yes. Thank you.

Q Okay. And you took into account that the water reservoirs and the water tanks were vented when you offered your opinion that the volatilization rate was overstated by a factor of ten.

Correct?

A Yes.

Q Turning to your opinion on recarbonation basins. Would use of the recarbonation basin as designed contribute to the loss of VOCs at Camp Lejeune?

MS. BAUGHMAN: Objection to form.

THE WITNESS: One more time. I'm sorry.
Q (BY MS. HORAN) Sure.
Would use of the recarbonation basin as designed contribute to the loss of VOCs at Camp Lejeune?
A It's possible.
Q Why is it possible?
A Well, on any of the basins, could possibly open to the atmosphere. Could result in volatilization. The detention time in the recarbonation basin was very low. So that would minimize the opportunity.
Q Any other reason?
A Not beyond what we've already discussed.
Q If the water -- did you do a calculation on what percentage of TCE would have been lost from the water being recarbonated as the recarbonations were designed at Camp Lejeune?
A Say again.
Q Sure.
Did you do a calculation to determine what percentage of TCE would have been lost from the -- if the recarbonation basins were used as designed?
A Not a calculation. Hennet assigned zero

loss.

Q Do you know if the recarbonation basin is open to the atmosphere?

A It's my understanding.

Q You've referenced Peter Pommerenk a couple times, I think, in this deposition.

A The -- yes.

Q Who is Peter Pommerenk?

A To my knowledge, he's AH Environmental person that was part of the project and part of the expert panel of 2005.

Q Outside of your knowledge of his work with Camp Lejeune, are you familiar with any of his other work?

A No.

Q I'm handing -- or marking as Exhibit 10. This is a document with a Bates 00897_PLG_00000066207. And it runs through the Bates 6365.

(Government Exhibit 10 marked for identification)

Q (BY MS. HORAN) Dr. Sabatini, have you seen this before?

A Yes.

Q And you recognize this as the expert panel assessing ATSDR's method and analyses from

April 29th to the 30th 2009?

A Yes.

Q Turning to Page 111. And that's just the regular page number. The last paragraph, the sixth line down, it begins, "Where as VOC removal."

Do you see that sentence?

A Say again. Where...

Q So six lines down, there's a sentence that begins, "Where as VOC removal."

A Yes.

Q Do you see that?

A (No response.)

Q Okay. So do you see that that reads, "Where as VOC removal from other unit processes at the plant was incidental and probably minor, substantial removal more than 90 percent might have occurred in the recarbonation basin. As with an aeration process, the gas injection creates substantial turbulence and mixing, and can facilitate partitioning and removal of the contaminants from the liquid phase. Therefore, it is recommended that research be conducted to determine when the recarbonation was operated, under what conditions, gas flow rate, et cetera,

and what the likely rate of VOC removal was."

Did you see that?

A Yes.

Q So in addition to Dr. Hennet, you also disagree with Dr. Pommerenk that a recarbonation basin can remove a substantial amount of VOCs more than 90 percent.

MS. BAUGHMAN: Objection to form.

THE WITNESS: Yes.

Q (BY MS. HORAN) Do you know whether ATSDR ever followed Dr. Pommerenk's recommendation to research when the recarbonation basin was operated, under what conditions, and a likely rate of VOC removal?

A I can't speak to that. I -- I don't know one way or the other.

Q You would agree that there's no direct reference to VOC losses at the recarbonation basin in the formula ATSDR used to determine monthly VOC levels at Camp Lejeune?

MS. BAUGHMAN: Objection to form and foundation.

THE WITNESS: That's a rather sweeping statement. Can you state it again?

Q (BY MS. HORAN) Would you agree that

there's no direct reference to VOC losses at the recarbonation basin in the formula ATSDR used to determine monthly VOC levels at Camp Lejeune?

MS. BAUGHMAN: Objection to form.

THE WITNESS: I -- I can't say yes or no to that. I don't know either way. I'm...

Q (BY MS. HORAN) Have you seen any documents or anything suggesting one way or the other whether the recarbonation basin was considered or not?

MS. BAUGHMAN: Objection. Form, foundation.

THE WITNESS: The AH Environmental report.

Q (BY MS. HORAN) So, sorry.

In the ATSDR formula, have you seen any documents or any information that suggests whether the recarbonation basin was considered or not?

MS. BAUGHMAN: Objection. Form; foundation.

Can you show him the -- the ATSDR formula you're talk -- I don't know what formula you mean. What are you referring to? Object to the form. Object to foundation.

Q (BY MS. HORAN) So I'm -- I'm thinking of the formula that they used to come up with their numbers.

Do you know --

MS. BAUGHMAN: I don't know where that is.

Object to the form. Object to foundation.

Q (BY MS. HORAN) Dr. Sabatini, do you know whether ATSDR directly considered the recarbonation basin in determining the monthly VOC levels at Camp Lejeune?

MS. BAUGHMAN: Objection, form; objection, foundation.

THE WITNESS: No.

Q (BY MS. HORAN) Have you ever seen a recarbonation basin that was operating?

A Yes.

Q Where?

A Norman, Oklahoma, to begin with. Many times.

Q And is that -- why were you looking at the recarbonation basin in Norman, Oklahoma?

A As -- take classes on field trips there. Visit there. It was a part of a -- water

treatment studies, et cetera.

Q And how large is the recarbonation basin at the Norman, Oklahoma water treatment plant?

A I couldn't speak to the dimensions, but the water treatment plant is 10 million gallons per day. So it would be the size of one or two of these tables.

Q Thirty feet in length?

A Yeah, maybe. Twenty feet. That would be -- I probably shouldn't guesstimate.

Q Do you know how much carbon dioxide bubbled into an operating recarbonation basin reaches the surface?

A How much it...

Q How much of the carbon dioxide bubbled into an operating recarbonation basin reaches the water surface.

A No. Not quantitatively. I can see visually.

Q And visually, what percentage would you suggest?

A Be hard to put a number to that. But again, the goal is for it to dissolve. Some of it makes it to the surface.

Q And you, sitting here today, don't have

an opinion on what percentage makes it to the surface?

A Would be hard-pressed to -- that's in part why I asked...

Q Are you looking for the notes from Chris Mattingly? Exhibit 4.

A The -- so that really doesn't address how much makes it to the surface. But the ratio is dramatically different from, say, a stripping operation.

Q Okay. So sitting here today, you don't have a percentage -- or an opinion on what percentage makes it to the surface --

A I wouldn't know -- (simultaneous crosstalk) wouldn't know at this point. No.

Q No.

You can set aside Exhibit 10.

A (Witness complies.)

I will say that on the recarbonation, it seemed like there was another issue of just how long it was operated.

Q Yeah. Do you know if ATSDR ever looked into how long it was operated for?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Not -- not to my

knowledge.

Q (BY MS. HORAN) As part of your expert work in this case, did you ever look into how far -- or how long the recarbonation basin was operated for?

A Just studying the reports that were available.

Q And what did you find in the reports that were available about whether the recarbonation --

A The lack of knowledge -- (simultaneous crosstalk)

THE REPORTER: I'm sorry. Start over.

Q (BY MS. HORAN) Whether the recarbonation basin was in operation.

A Now I've forgotten the question.

Q Okay. We'll start from the top.

Did you, as part of your work in this case, ever look into whether and how long the recarbonation basins were in operation?

A Just looking at the available documents.

Q And what available documents are you referencing?

A AH Environmental report. Hennet's report.

Q And did you find anything about whether the recarbonation basins were in operation?
A Just a lack of knowledge.
Q You agree that if the recarbonation basin wasn't used, there would have been losses of VOCs at the recarbonation basin; correct?
A Possible losses. Yes.
Q Would you agree that there were probable losses at the recarbonation basin?
MS. BAUGHMAN: Object to the form.
THE WITNESS: Speculating. But potential would be greater than just water flowing through the basin.
Q (BY MS. HORAN) When you were at the Norman, Oklahoma water treatment plant, could you see bubbles reaching the surface at the recarbonation basin when it was operating?
A A limited number. Yes.
Q I want to turn next to sorption. Which your opinion on sorption begins on Page 12 of your report, if you'd like to -- to take a look.
So when I say "sorption", I'm meaning both adhesion of VOC molecules to material surface and VOC molecules permeating into the bulk of material.

Fair?
A Say that one more time.
Q Sure.
A Please.
Q When I say "sorption", I mean both adhesion of VOC molecules to material surface and VOC molecules permeating into the bulk of material.
Fair?
A Fair.
Q Does sorption occur at the water treatment plants at Camp Lejeune?
A Say again.
Q Does sorption occur at the water treatment plants at Camp Lejeune?
MS. BAUGHMAN: Objection to form.
THE WITNESS: That would be speculation.
Q (BY MS. HORAN) You don't know?
A I have not quantified it. My professional judgment would be it would be very minor, but I have not -- I -- to my knowledge, no one else has quantified it.
Q Is there organic material in the spiractor solids?
A The spiractor is designed to remove

hardness as a inorganic precipitant.

Q Is that a yes or a no?

A So that would be the dominant thing present in the spiractor.

Q So you agree that there is organic material in the spiractor solids?

A I'd be speculating. It's -- I'd be speculating.

Q Sitting here today, you don't know one way or the other whether there's organic material in the spiractor solids?

MS. BAUGHMAN: Object to the form.

THE WITNESS: I guess my statement would be it's predominantly inorganic material. If there were -- happened to be inorganic material, it would be very minor in my estimation.

Q (BY MS. HORAN) And what is that based off of? What is that assessment based off of?

A That the reason the spiractor there is to remove inorganic materials. Hardness.

Q So your experience with other --

A Water treatment.

Q With water treatment plants.

A Yes.

Also, I would add to that if it were

lake water, there might be more natural organic matter associated with the lake water. Low levels. But since this is groundwater, I'd even expect lower -- I wouldn't -- wouldn't expect there to be organic matter present.

Q So it's your opinion that there would not be organic material in the raw water at Camp Lejeune.

Am I understanding that?

MS. BAUGHMAN: Objection to form.

THE WITNESS: Based upon the groundwater source, I would expect it to be very limited to negligible.

Q (BY MS. HORAN) If you assume that the spiractor solids contain some organic material, would some TCE sorb to that material?

MS. BAUGHMAN: Objection. Form and foundation.

THE WITNESS: Yeah, that's very speculative. I'd need to know what kind of organic matter. If it's just humic and fulvic plant decay or is it biochars or -- I would expect not.

Q (BY MS. HORAN) You would expect that the TCE would not sorb to the organic material in

the spiractor solids?

MS. BAUGHMAN: Objection. Form and foundation.

THE WITNESS: It's all very speculative. I would expect that if there were inorganic matter present matter, if, it would be minor and -- and not that absorptive for these compounds because of the nature of the organic material.

Q (BY MS. HORAN) You mentioned it matters what type of organic material would be in the spiractor, and you listed a few.

Would TCE only sorb to some of those or would TCE sorb to all of the organic materials that you listed?

A Depends.

Q On what?

A Well, again, on the nature of the organic material. Could be negligible. Could be minor. Depending upon the nature of the organic material.

Q In your PhD, you studied sorption of organic chemicals in a sand aquifer.

Fair?

A Fair.

Q Any sorption taking place there?

A Yeah, those are -- yes.
Q Is there sorption taking place in the filter beds that have to be backwashed to remove clogging?
MS. BAUGHMAN: Objection to form.
THE WITNESS: Again, you're removing inorganic materials in the backwashing. Fines that have made it out of the spiractor to the filter beds. So we'd be talking about the same materials. So the same --
Q (BY MS. HORAN) So yes?
A Same comments from before would apply.
Q You mentioned before -- well, strike that.
Do you know, or in your studies, have you determined whether TCE sorbs to organic material?
A Trying to remember. We looked specifically at TCE. We looked at a number of different compounds. Certainly would have the potential to.
Q And I believe you said it would be negligible or minor. Am I remembering that correctly?
A Based on the inorganic materials being

removed in the spiractor, that would be my expectation.

Q Okay. So there would be some sorption of TCE in the inorganic material, and it's your opinion that it would be minor or negligible?

MS. BAUGHMAN: Objection to form.

THE WITNESS: We're assuming that there is any organic material to begin with.

Q (BY MS. HORAN) Yes. I'm asking you to make that assumption.

A Which I'm uncomfortable making.

Q Why is that?

A Well, just I'm not anticipating for groundwater that that would become an issue. But none the less, if somehow, that happened to be the case, you could imagine some potential sorption.

The other factor is the timeframe involved. Kinetics of its sorption.

Q Why does the timeframe matter?

A Because it -- you mentioned if -- if it has to diffuse into the matrix to get to the sorption site, that takes time.

Q So why would -- strike that.

But how would the time impact whether

TCE can sorb to organic material?

A It may not have time. Even if there were organic material and even if the TCE did absorb, there may not be sufficient time to achieve the potential sorption.

Q Is there any sorption on inorganic surfaces?

A The Schwartzenbach paper referenced some level of sorption to inorganic materials, but for highly hydrophobic compounds.

Q So is that a yes?

A There is that possibility.

Q Is there any coprecipitation on the mineral that precipitate in the spiractor?

A Coprecipitant of...

Q On the mineral that precipitate in the spiractors. The VOC.

MS. BAUGHMAN: Object to the form.

THE WITNESS: VOCs don't precipitate. The minerals would precipitate. So VOCs wouldn't precipitate.

Q (BY MS. HORAN) Would there be any coprecipitation on the mineral with the VOC that precipitate in the spiractor?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Ask that one more time.
Q (BY MS. HORAN) Would there be -- do you know if anthracite is part of the sand filter medium?
A I'd have to look at the document.
Q So sitting here today, you don't know one way or the other?
A I don't recall.
Q Assuming that there is --
A Well, let me -- to that point.
Q Sure.
A AH says it's a dual filter media. Filter media consisted of 26 inches of sand on top of 18 inches of gravel. So AH says no.
Q So you believe there's no anthracite as part of the sand filter medium?
A According -- rephrase the question.
Q It's your understanding that there's no anthracite as part of the sand filter medium?
A That's according to AH.
Q Okay. Assuming that there is anthracite, would anthracite sorb some of the TCE?
MS. BAUGHMAN: Objection to form and foundation.

THE WITNESS: I have to not put on my teacher hat here and talk about the difference between anthracite and activated carbon.

Very minimal.

Q (BY MS. HORAN) Would VOCs --

MS. BAUGHMAN: Wait. Wait.

THE WITNESS: Because -- because -- I am going to go into a little bit of my teacher mode.

Anthracite is a carbon-based mineral material like activated carbon, but the difference is activated carbon has been activated to give it an extremely high surface area where as anthracite has not been activated. So while it is a carbonaceous material, it would -- has dramatically less, if -- if any absorption, minor relative to activated carbon.

It's the explanation I had to give to my chemical engineering colleagues.

Q (BY MS. HORAN) So it would be less than if it was active carbon, but there would be some sorption.

MS. BAUGHMAN: Objection to form.

THE WITNESS: Possibly. Possibly.

Q (BY MS. HORAN) Would VOCs coprecipitant with minerals in the spiractor?

A I just struggle with the concept of VOCs precipitating. Coprecipitating to me is incorporated into the mineral. Another mineral being incorporated in with a mineral.

So based -- based on the way the question is phrased, I'm confused by the question.

Q Would VOCs come out of the water with minerals in the spiractor?

A One more time. I'm sorry. I keep asking you to repeat, but...

Q No. That's okay.

A Thank you for your patience.

Q No. Thank you for ensuring that you understand the question.

Would VOCs come out of the water with minerals in the spiractor?

MS. BAUGHMAN: Objection to form and foundation.

THE WITNESS: I would not envision them being enmeshed with the precipitant. I would say no.

Q (BY MS. HORAN) And why wouldn't you envision it?

A Because they're dissolved in solution

versus precipitates.

Q And when you say dissolved in solution, you mean water?

A In water. Yes.

Q You state that the backwash water, after settling, may be reused at the plant.

Do you recall that?

A Yes.

Q Do you know if that was the case at the Hadnot Point water treatment plant?

A No.

I'll say comments in response to Hennet's suggestions of these items.

Q So you don't know if that was the case at the Hadnot Point water treatment plant?

A I don't. No.

Q So you would agree that that would lower the losses even though there's no data supporting that?

MS. BAUGHMAN: Objection to form, foundation.

THE WITNESS: Can you ask that again?

Q (BY MS. HORAN) Do you agree that bringing this conservative element into your opinion would lower the losses even if there's no

data supporting that?

MS. BAUGHMAN: Same objections.

THE WITNESS: I'm tempted to say that I was responding to a suggestion that had no supporting data.

Q (BY MS. HORAN) So you assumed the opposite without any data?

MS. BAUGHMAN: Objection to form.

THE WITNESS: I would say I was taking a more systematic approach to trying to address the question that was raised by someone else.

Q (BY MS. HORAN) So I'm about to switch topics. Are you good to keep going or did you want to take a break?

MS. BAUGHMAN: It's up to you.

THE WITNESS: Go for a little bit longer.

MS. BAUGHMAN: Okay. If you want to keep going. Sure.

Q (BY MS. HORAN) Turning to your second opinion which is -- starts on Page 14 of your report.

A Have we moved off the first opinion?

Q I believe so. Did -- yes.

A Because there was one comment I'd like

to offer.

Part of what reinforced my assessments -- well, it leads into the second opinion so let's go to the second opinion.

MS. BAUGHMAN: It's really best if she just asks the questions and you answer.

THE WITNESS: Yeah.

MS. BAUGHMAN: Okay.

THE WITNESS: Let's go to the second opinion.

Q (BY MS. HORAN) So the -- the second opinion begins on Page 14 of your report to the extent you're following along.

You would agree the ATSDR model does not directly account for VOC losses from the Camp Lejeune water treatment plant; correct?

MS. BAUGHMAN: Objection to form.

THE WITNESS: I was turning to the page here. I'm sorry.

Q (BY MS. HORAN) Sure.

You would agree the ATSDR model does not directly account for VOC losses from the Camp Lejeune water treatment plant.

MS. BAUGHMAN: Objection to form.

THE WITNESS: I would agree that it is

indirectly incorporated.

Q (BY MS. HORAN) Sure. Not directly.

Fair?

A I guess not explicitly, but implicitly.

Q Have you read Mr. Maslia's rebuttal report?

A Ms. --

Q Mr. Maslia's rebuttal report.

A I'm -- I'm sure I have.

Why do you ask?

MS. BAUGHMAN: She's going to get to it. Hold on.

Q (BY MS. HORAN) I'm marking as Exhibit 11. This is Mr. Maslia's rebuttal report.

(Government Exhibit 11 marked for identification)

THE WITNESS: Okay.

Q (BY MS. HORAN) Could you turn to Page 31, please?

A (Witness complies.)

Okay.

Q So beginning on Page 27, Mr. Maslia offers a section volatilization of VOCs during the water treatment process.

Do you see that?

A Yes.

Q Okay. And you agree that the ATSDR determined that VOC losses at the water treatment plant were negligible, and therefore, made the decision not to include them.

A I'm sorry. I was looking at Page 27.

Q Sure. Yeah, if you could just turn to Page 31.

A Okay. (Witness complies.)

Q Okay. The last sentence of the first full paragraph --

A Okay.

Q -- reads, "In light of the conclusions of AH Environmental consultants 2004 and the recommendation of its expert panels, ATSDR made the decision to consider any potential VOC losses from storage treatment and distribution as negligible."

Did I read that correctly?

A Yes.

Q Do you know what the ATSDR's decision to consider the losses as negligible meant with respect to the ATSDR model?

A What do you mean by that?

Q The ATSDR made the decision to consider the losses negligible. Fair?

A (Nods head.)
Q Do you know what impact that had on the ATSDR model?
MS. BAUGHMAN: Objection to form and foundation.
THE WITNESS: Well, I guess I would respond to that by virtue of my second opinion, that they did use post-treatment values in their model, finalizing their model.
Q (BY MS. HORAN) So you believe that their decision to consider them negligible meant that indirect consideration, as you've explained in your opinion, do.
MS. BAUGHMAN: Objection to the form.
THE WITNESS: I guess I would say yes, that they consider them implicitly through the use of those data.
Q (BY MS. HORAN) Do you know how ATSDR came to the conclusion that these losses were negligible?
MS. BAUGHMAN: Objection to form.
THE WITNESS: No. My impression is just what's here. That they took this -- I mean this is what I would say is that they took the input of Pommerenk -- if I'm saying his name right --

in this expert panel to support their approach.

Q (BY MS. HORAN) Do you know what the -- well, I might have asked you this before, but I can't quite remember.

Do you know what the purpose of the ATSDR water model was?

A You did ask that before.

MS. BAUGHMAN: Objection. Form and foundation.

THE WITNESS: My impression is to get a handle on VOC measurements -- VOC estimates in the drinking water.

Q (BY MS. HORAN) Would you agree that if you are trying to determine an individual's actual exposure to contaminants, it would be important to be as accurate as possible?

MS. BAUGHMAN: Objection to form. Foundation.

THE WITNESS: That's a generic question. Depends upon what you mean by "accuracy".

Q (BY MS. HORAN) How would you use accuracy when you're determining an individual's actual exposure to contaminants?

MS. BAUGHMAN: Objection to form; foundation; outside the scope.

THE WITNESS: There's always uncertainty in data. So accuracy is -- is a challenging thing to achieve. Obviously, you want to be as -- want to do as good a job as you can.

Q (BY MS. HORAN) You can set that report aside.

A By the way, to your earlier question, have I seen this, yes, I did review this.

Q Oh, okay. Great. Thank you for clarifying.

If you wanted someone to know what their contaminant exposure was and whether it may have caused an illness, it would be important to be as accurate as possible; correct?

MS. BAUGHMAN: Objection. Form and foundation, and outside the scope.

THE WITNESS: Thought we kind of asked and answered that question. Certainly want to be as -- do as good a job as you can.

Q (BY MS. HORAN) And you wouldn't want to be 5 or 10 percent off. Fair?

MS. BAUGHMAN: Objection. Form; foundation; outside the scope.

THE WITNESS: I guess that depends, in part, upon how the data is being used. What the

epidemiologists and toxicologists need for their side of the assessment.

Q (BY MS. HORAN) Is it your opinion that treatment losses were indirectly accounted for because some values of treated water were used in the calibration process?

A They were used in the model. Finalizing the model. Yes.

Q What do you mean "finalizing the model"?

A I'm -- whether it's calibration validation or when it was in the process that they used the data. And that wasn't my focus. I did know that they used it in their -- finalizing their model, however they used it, in that regard.

Q And you're not sure if it was calibration or validation. Is that fair?

A That was beyond the scope of my expert report. So...

Q How did you determine that the data was considered -- well, strike that.

A I'll look back at my --

MS. BAUGHMAN: She -- she said, "Strike that." That means she's not asking you that.

THE WITNESS: Okay.

MS. HORAN: So you're good.
Q (BY MS. HORAN) Could you please turn to your report, Exhibit 2, on Page 16?
A I'm sorry. Which page?
Q 16.
A (Witness complies.) Yes.
Q The last sentence of Section 2 is bolded. It reads, "Thus, for both the Tarawa Terrace and Hadnot Point systems, treated water samples were used in the calibration process" --
A Yeah.
Q -- "and the ATSDR did consider such losses in the treatment system."
A Yeah.
Q Did -- did I read that correctly?
A Yes.
Q So it's your opinion that because the values were used in a calibration process, they were indirectly considered in the ATSDR.
A Yes.
Q Okay. Is it your opinion that VOC treatment losses were accurately accounted for in the ATSDR model?
MS. BAUGHMAN: Objection to form.
THE WITNESS: Yes.

Q (BY MS. HORAN) If you'd turn to Page 14.

A (Witness complies.)

Q Starting with your Opinion 2 as to Hadnot Point, you state, "In fact, in his expert report, Maslia points out that the reconstructed concentrations versus the observed data in Table 1.7.15 Table 5-5 in this report demonstrates successful level for calibration indicating that the treated water samples were used in the final calibration step for Hadnot Point."

Do you see that sentence?

A Yes.

Q And that sentence -- part of that sentence is a direct quote from Mr. Maslia's report. Fair?

A Yes. I assume.

MS. BAUGHMAN: That's the rebuttal; not the original report.

THE WITNESS: Oh, okay.

Q (BY MS. HORAN) We'll --

A Yes.

Q -- look at his report in a moment.

It's your understanding, having now reread this part of your report, that for Hadnot

Point, the data points were used for level 4 calibration.

Is that fair?

A It's my understanding.

Q Do you mean that the model parameters were adjusted to fit the water distribution system data?

MS. BAUGHMAN: Objection. Form; foundation; outside the scope.

THE WITNESS: That wasn't part of my -- that wasn't part of my assessment, the model itself. How the model was calibrated.

Q (BY MS. HORAN) Do you know if any parameters were adjusted in light of the level -- or the data from the water distribution system?

A It's beyond my scope.

Q Are you offering the opinion that the Hadnot Point level 4 calibration was successful?

A My opinion --

MS. BAUGHMAN: Objection to form; foundation.

THE WITNESS: My opinion states that they incorporated these parameters in their process. I have not offered an opinion as to beyond that.

Q (BY MS. HORAN) So are you offering -- so you're not offering an opinion on whether the level 4 calibration was successful.

MS. BAUGHMAN: Objection. Form; foundation.

THE WITNESS: Well, my opinion states that...

Q (BY MS. HORAN) Well, you've quoted Mr. Maslia as saying a successful level 4 calibration, and I'm wondering if you're adopting that opinion or not.

A I'm not --

MS. BAUGHMAN: Objection to form; foundation.

I'm sorry. Where does -- I don't -- I'm looking for the word "successful".

MS. HORAN: It's the last row of Page 14. It says, "Demonstrates successful level 4 calibration" --

MS. BAUGHMAN: Gotcha.

MS. HORAN: -- "as part of the quote from Mr. Maslia's report."

Q (BY MS. HORAN) And I'm trying to understand if you're adopting that.

MS. BAUGHMAN: Objection to form.

THE WITNESS: What do you mean by "adopting"?

Q (BY MS. HORAN) Well --

A I'm agreeing with his professional judgment.

Q So you agree with Mr. Maslia that it was a successful level 4 calibration.

A That's his area of expertise and so I agree with his assessment.

Q Did you do anything to independently verify whether the level 4 calibration was successful?

A That was beyond the scope of my work.

Q Are you offering the opinion that the use of some treated water data points in the level 4 calibration means that the model accurately captured VOC losses at the water treatment plant?

MS. BAUGHMAN: Objection to form.

THE WITNESS: My opinion speaks for itself. That's the only opinion I have is what is stated.

Q (BY MS. HORAN) Yeah.

So my question is, whether that opinion means that the use of some water data points from

the water treatment plant means that the model accurately captures the VOC losses at the water treatment plant.

MS. BAUGHMAN: Objection. Form; foundation.

THE WITNESS: My opinion is response to Hennet's opinion that losses were not accounted for. So my opinion counters Hennet's opinion that there wasn't consideration of treated water.

Q (BY MS. HORAN) So you're not offering any opinion about whether the VOC losses were accurately -- or the use of some data in level 4 calibration means that it was done accurately or done well to include -- strike that.

I'm going to start over.

You're not offering the opinion that the use of some treated water data sample points in the level 4 calibration means that the model accurately captured the VOC losses at the water treatment plant. You're only offering the opinion that you believe they were indirectly considered.

MS. BAUGHMAN: Objection to form.

THE WITNESS: Yeah, that's my opinion. Certainly, I would say -- well, that's my

opinion, as stated here. I think, certainly, there was value added by doing so. That the model -- but my opinion is directed at Hennet's assessment.

Q (BY MS. HORAN) What do you mean there was value added by doing so?

A Just countering Hennet's suggestion that there was a lack in the model because it did not incorporate such data.

Q So -- I'm about to use another document. Would it be okay if we just take a quick break?

MS. BAUGHMAN: Of course.

THE VIDEOGRAPHER: We're off the record at 3:21 p.m.

(Short break from 3:21 p.m. to 3:34 p.m.)

THE VIDEOGRAPHER: We're back on the record at 3:34 p.m.

Q (BY MS. HORAN) I'm marking as Government Exhibit 12, this is the expert report of Morris Maslia, dated October 25, 2024.

(Government Exhibit 12 marked for identification)

Q (BY MS. HORAN) And if you could turn to Page 84.

A 8-4?

Q Yes.

A (Witness complies.)

Q The second full paragraph reads, "the reconstructed concentrations versus the observed data in Table 7.15 and Figure 7.25 demonstrate successful level 4 calibration as the observed data from the Hadnot Point Water Treatment Plant represents a separate unique data set that has been used, assessed, the goodness of fit of the calibrated Hadnot Point Holcomb Boulevard models."

Do you see that?

A Yes.

Q And that sentence is the sentence that you pulled the quote out in your report.

Is that fair?

A Looks right. Just to double check.

Q And that was on the bottom of Page 14 of your report.

A Yes.

Q Having read the rest of the sentence, is it still your understanding that the data in Table 7.15 was used in calibration of the Hadnot Point Holcomb Boulevard model?

A Well, maybe in terminology of calibration and validation. So I would say yes.

Q You can set aside Mr. Maslia's report.
A (Witness complies.)
Q If two water samples are taken simultaneously, one for raw water and one from the treated water, would the samples concentrations inform on treatment losses?
A Say that again.
Q Sure.
If two water samples are taken simultaneously, one is from the raw water and one is from the treated water, would the sample concentrations inform on treatment losses?
MS. BAUGHMAN: Object to the form.
THE WITNESS: Conform?
Q (BY MS. HORAN) Would they inform on treatment losses. Sorry.
MS. BAUGHMAN: Object to the form.
THE WITNESS: Under steady state conditions, yes.
Q (BY MS. HORAN) Are you familiar with the concept of a tracer sample?
A Define what you mean by tracer sample. I'm -- I'm familiar with the concept of tracers.
Q What is a tracer that you're familiar with?

A Well, there are a number of different tracers. For groundwater, for analyzing the hydraulics of a system in a water treatment plant.

Q Are you familiar with the concept of a tracer sample where you would identify -- create a sample in the raw water and then allow it to go through the water treatment plant and then test it again when it's through the treatment process?

A Yes.

Q Okay. Do you know if any tracer samples were done at Hadnot Point Water Treatment Plant?

A Not to my knowledge.

Q And you agree that tracer samples would inform on treatment losses at a water treatment plant?

A Depends upon how you do the tracer study.

Q So if you do the tracer study where you begin the tracer and the raw water and measure it and then the water goes through the water treatment plant, then you remeasure the tracer in the treated water plant reservoir, would you agree that that would inform on treatment losses?

A Well, it depends upon the tracer. What

kind of tracer are you talking about?

Q What kind of tracer would you use in that type of project?

A That depends upon what you're trying to achieve.

Q You're trying to measure VOC losses.

A Then under steady state conditions, yes.

Q Why say at steady state simultaneous samples would inform on treatment losses?

A Say again. Why?

Q Sure.

I believe you said earlier that at steady state, simultaneous samples would inform on treatment losses.

Fair? Do you recall that testimony?

A Well, there are several things working in these questions. I guess I'm curious what you're ultimately trying to get to. Typically when we do a tracer study at a water treatment plant, we're trying to analyze the hydraulics of a basin, and so we would introduce something like chloride, and we would put it in and we'd measure it coming out and that would tell us something about how ideal the reactor is.

What you seem to be talking about is

putting in a volatile chemical at the inlet and then measuring its concentration.

Q So you -- the -- the measurement would be the VOCs. I'm not offering any opinion on what substance you would add to become the tracer.

A Okay. Now, what I mean by steady state is you have a constant flow coming in, you have a constant operating process, and you have a constant flow going out. And so you have a steady of concentration of chemical in the inlet and then you have a steady concentration coming out the other side and then you can do a comparison.

But if you're introducing something and it's being diluted and it's going through other processes, it's not yet at steady state with the system, then that wouldn't give you the same information.

Q So your steady state assumes that the levels of contaminants of VOCs would be coming into the water treatment plant at the same level.

A That you're -- you're -- relatively the -- yes. Relatively the same. You're not -- you're not introducing something all at once and

then watching its appearance the other end.

Q And what if you didn't have a steady concentration of VOCs at the inlet to the water treatment plant, for example, because wells were being turned on and off?

MS. BAUGHMAN: Object to the form, foundation, incomplete hypothetical.

THE WITNESS: Yeah, it's a hypothetical. You'd have to take that into consideration.

Q (BY MS. HORAN) So if there was not a steady state, in other words, meaning that the VOCs were not at a constant level coming into the water treatment plant, would two samples that were taken simultaneously, one from the raw water and one for the treated water, inform on treatment losses?

MS. BAUGHMAN: Object to the form. Foundation.

THE WITNESS: Yes. Yes.

Q (BY MS. HORAN) So even without a steady state, the answer's yes?

A Well, depends upon how nonsteady state you're saying. Generally, you have -- generally, you have fairly steady state conditions. If you wouldn't want to do such a study when you per --

perturbated the system all at once. That wouldn't be the best time to do such an analysis.

Q Do you know if the VOCs at Camp Lejeune were in a steady state?

MS. BAUGHMAN: Object to the form.

Q (BY MS. HORAN) Entering the Hadnot Point or Tarawa --

THE REPORTER: Repeat.

MS. HORAN: Entering the Hadnot Point or Tarawa Terrace water treatment plants.

MS. BAUGHMAN: Object to the form.

THE WITNESS: I could imagine there were times when there were fluctuations, but I can imagine times when all the wells were -- when the wells were operating continuously some period of time you would approach steady state.

Q (BY MS. HORAN) In your report on Page 15, you point to three datasets. One on July 27, 1982, and two on December 4, 1984, that show insight into the fate of VOCs at the Hadnot Point Water Treatment Plant.

Is that fair?

A Yes.

Q And you say that while admittedly a small dataset, the data provide further support

for the minor to negligible VOC losses, you propose.

Fair?

A Yes.

Q Okay. Turning to the TCE sample from December 4, 1984, do you see that in Table 5-5?

A Do I see that as --

Q Do you see it in Table 5-5?

A Yes.

Q Okay. And do you see that for the untreated water, there was 46 micrograms of TCE?

A Yes.

Q And for the treated water, there was 200 micrograms of TCE?

A Yes.

Q So comparing these two data points from December 4, 1984, the treated water had over 400 percent TCE of the untreated water.

Is that fair?

A In these numbers, yes. Or I mean, it's larger. Haven't done the 400 percent. But yes.

Q And you would agree that this is not a tracer sample?

A That I couldn't say.

Q Have you ever, in your professional

experience, seen a time where a water treatment plant increased a VOC concentration by about 400 percent?

A No.

Q And you would agree that if you traced the 46 micrograms of TCE through the water treatment plant, the measurement would be lower as treated water.

Fair?

MS. BAUGHMAN: Objection; form, foundation.

THE WITNESS: I would say it would be -- there's no reason to expect it to be higher. It could possibly be lower.

Q (BY MS. HORAN) And your calculations, if you turn to Page 14, say it would be roughly 7.2 percent lower?

MS. BAUGHMAN: Objection to form.

THE WITNESS: That would be the -- yes.

Q (BY MS. HORAN) How does comparing the treated and untreated sample of TCE from December 4th support your opinion that there were losses of 7.2 percent at the Hadnot Point Water Treatment Plant?

A The data informed me that there were not

losses. Were not occurred.

Q You think the Hadnot Point Water Treatment Plant did not have any losses of VOCs?

A The data does not suggest -- there's no data to support that there was significant losses.

Q Is there data to support that there were not significant losses?

A The data I point to here indicate that there -- there's no evidence to support significant losses. So to me, that provides evidence. It provides evidence to support the conclusion.

Q So -- sorry, Dr. Sabatini. Are you saying that there was 7. -- your estimate is that there would be 7.2 losses of TCE from the water treatment plants or that there would be no losses from the water treatment plants?

MS. BAUGHMAN: Object to the form.

THE WITNESS: My calculations estimate 7.2 percent and the data -- these data suggest that the losses were negligible.

Q (BY MS. HORAN) How does 46 micrograms of TCE in the untreated water and 200 micrograms of TCE in the treated water suggest that the

losses were negligible?
A There's no indication of losses.
Q But you would agree that these are not tracer samples.
Fair?
MS. BAUGHMAN: Objection; form. Asked and answered three or four times.
Q (BY MS. HORAN) Fair? Yes?
A I'm sorry?
Q We can -- I can withdraw that question.
Next to the TCE numbers for December 4, 1984, the third column which is reconstructed, do you see the November 1984 shows 639 micrograms of TCE in the simulated model?
A November of 1984?
Q Yeah. So the December 4, 1984, data samples that we've been talking about of TCE are compared to -- in the chart to the reconstructed model for November 1984 which had 639 micrograms --
A Yes.
Q -- of TCE.
Do you see that?
A I see that in the table.
Q And it's your opinion that simulated

reconstructed values account for the water treatment losses.

Fair?

MS. BAUGHMAN: Object to the form.

THE WITNESS: My opinion is that the ATSDR model did indirectly incorporate treated water samples in its analysis. That's my opinion.

Q Sorry. It did or did not?

A It did.

Q It did. Okay.

So looking -- do you know how much time it takes TCE to be out of a water treatment plant after contaminated wells stop pumping?

MS. BAUGHMAN: Object to the form. Foundation.

THE WITNESS: That's a very open-ended question.

Do I know?

Q (BY MS. HORAN) How much time it takes for TCE to leave a water treatment plant after contaminated wells stop pumping?

MS. BAUGHMAN: Object to the form. Object to foundation.

THE WITNESS: That's an open-ended

question. I mean, not off the top of my head, no.

Q (BY MS. HORAN) Would you expect it to be days or weeks or hours?

MS. BAUGHMAN: Same objections. Incomplete hypothetical.

THE WITNESS: I would have to do -- I'd have to have more information and do some calculations to make a conjecture.

Q (BY MS. HORAN) Have you seen any data showing how much time it takes TCE to be out of a water treatment plant after contaminated wells stop pumping?

MS. BAUGHMAN: Objection, form. Objection, foundation. Incomplete hypothetical.

THE WITNESS: Same -- same response as before.

Q (BY MS. HORAN) I just asked if you've seen any data on it.

MS. BAUGHMAN: Same objections.

THE WITNESS: No.

Q (BY MS. HORAN) Agree that when a contaminated well stops pumping, the percentage of water from that well will gradually decrease in the raw, untreated reservoirs?

A Say that one more time. Lots of hypotheticals here.

Q When a contaminated well stops pumping, the percentage of water from that well will gradually decrease in the raw, untreated reservoirs; correct?

A Sure.

Q Turning to Tarawa Terrace. On Page 16 of your report, the last sentence of the first full paragraph reads, "once again, the fact that Tarawa Terrace level 4 calibration included treated water samples demonstrates the ATSDR indirectly considered losses during water treatment and distribution."

Did I read that correctly?

A Yes.

Q And if you could turn back to Mr. Maslia's report which has been marked as Exhibit 12. And turning to Page 60.

A 6-0?

Q Yes.

You see at Table 7.12 that says, "Computed and observed tetrachloroethylene concentrations in water samples collected at the Tarawa Terrace Water Treatment Plant and

calibration target range."

A Yes.

Q So I believe your report -- and you're welcome to look at it again -- identifies one set of data from July 28th that has raw untreated water.

One second.

A Yes.

Q Okay. Other than the one dataset you've identified in your report from July 28, 1982, can you tell if there was -- or do you know if any of the other data points in 7.12 are of treated water?

A I -- it may be -- I think the March 12, 1985, has a denotion of upstream and downstream of water treatment plant.

Q Sorry. Which date?

A What was the question again?

Q Yeah. Can you tell which of these samples were -- other than the one you've identified through using CLW 606, were from upstream and downstream? And you're saying -- did you say -- I just missed the date.

A So those were the two that I used comparison.

Q Uh-huh.
A And then the text.
Q Okay. And you point to the July 28, 1982, when the raw water was 76 micrograms and the treated water was 82 micrograms as supporting your opinion that the water treatment process would produce minor VOC losses.
A Yes.
Q How does an increase in PCE in the treated water show that there would be minor VOC losses at the Tarawa Terrace Water Treatment Plant?
A Similar to the discussion before that indicated -- did not indicate losses. There was not evidence of losses.
Q So it's your opinion that if upstream water has higher VOCs than downstream water, it's indicative that there are minor losses in a water treatment plant?
A Say upstream and downstream.
Q Sure. If there's -- if the -- the finish water and the water -- the treated water has higher micrograms of PCE than the untreated water, --
A Yes.

Q -- it's your opinion that that's indicative that there are minor losses at the water treatment plant?

A It does not -- certainly does not suggest that there were losses.

Q Do you know what percentage of water in the raw, untreated water samples at Tarawa Terrace on July 28, 1982, came from supply well Tarawa Terrace 26?

MS. BAUGHMAN: Objection, form and foundation.

THE WITNESS: Not off the top of my head. I'd have to look at records.

Q (BY MS. HORAN) What records would you look at to determine that?

A I'd have to study back through the reports.

Q Do you know if it was the same percentage of Tarawa Terrace 26?

MS. BAUGHMAN: Objection, form.

THE WITNESS: At this point, I don't know.

Q (BY MS. HORAN) Do you still have Mr. Maslia's report in front of you?

A Yes.

Q Okay. Great.

A I'm remembering now as well there was a COW where -- of Camp Lejeune Water Treatment Plant person commented on levels being very similar on either side of the water treatment plant.

I'm sorry. That's -- that -- I'm sorry. Go ahead.

Q Was that a document that you saw prior to submitting your expert report, or was that after you submitted your expert report?

MS. BAUGHMAN: If you remember.

THE WITNESS: I don't recall.

MS. HORAN: Thank you, Laura, but please keep it to form and foundation.

Q (BY MS. HORAN) Do you know the primary source of PCE at Tarawa Terrace? Do you know which well it was?

MS. BAUGHMAN: Objection, form and foundation. Outside the scope.

THE WITNESS: In my general background reading, I saw the dry cleaner and there were I think three different wells that were contaminated, but I don't remember the numbers.

Q (BY MS. HORAN) Looking at Table 7.12 in

Maslia's report on Page 60. The day that you compare the two samples, so July 28, 1982, the simulated value that's compared to that is 112 micrograms.

Is that fair?

A That's what the table says.

Q If you could turn to page 59.

A (Witness complies.)

Q Do you -- the first sentence of the last full paragraph reads, "the results shown in Figure 7.13 and Table 7.12 represent the calibrated model being compared to a separate dataset than that used for the calibration of the model, Figure 7.14."

Do you see that sentence?

A Yes.

Q You agree that the observed data in table 7.12 was not used for calibration of the Tarawa Terrace Water Treatment Plant?

A 7.13. I'm going back and looking at the --

Q Go ahead. Yeah. Take your time.

A So appears to me there's a calibration validation aspect to this which are both part of the verification. In my understanding both part

of the verification process.

Q Your report -- you can turn back to it if needed -- talks about calibration. It doesn't talk about validation.

Fair?

A I was reusing the terminology that Maslia was using.

Fair.

Q It's fair.

So if you turn to your report on page 16, your first paragraph indicates that the data in Table 7.12 was used to calibrate the Tarawa Terrace model.

A I was referring to Maslia's terminology. But calibration validation part of the verification process.

Q Okay. Where do you say -- strike that.

Your report indicates that the -- the data in Table 7.12 was used as the Tarawa Terrace level 4 calibration.

Fair?

A Relying upon Maslia's report. Yes.

Q And now having reviewed Maslia's report again, the -- the data in Table 7.12 was not used in the Tarawa Terrace calibration.

Fair?

MS. BAUGHMAN: Objection, form and foundation.

THE WITNESS: It seems to be mincing -- calibration validation to me are part of the model verification process.

Q (BY MS. HORAN) You did not write that in your report.

Fair?

You said that the data in Table 7.12 was used for calibration. You don't talk about validation; correct?

A Correct.

Q So in your opinion on Page 16 when you said thus, for both, and it's bolded in the middle of the page -- "thus, for both the Tarawa Terrace and Hadnot Point systems, treated water samples were used in the calibration process and ATSDR did consider such losses in the treatment system."

Did I read that correctly?

A Correct.

Q And having now reviewed Maslia's report, data -- treated water samples were not used in the calibration process for Tarawa Terrace.

Fair?

MS. BAUGHMAN: Objection, form foundation.

THE WITNESS: May be a choice of terminology calibration versus validation.

Q (BY MS. HORAN) You understand calibration to mean the same thing as validation?

MS. BAUGHMAN: Objection, form.

THE WITNESS: I see them both as part of the model verification process.

Q (BY MS. HORAN) And where does Maslia in his report talk about validation -- of using this data for validation?

A That I -- I'd have to go back and review his reports.

Q Okay. So can you agree with me that the data -- the treated water samples in Table 7.12 were not used to calibrate the Tarawa Terrace model?

MS. BAUGHMAN: Objection, form and foundation.

THE WITNESS: It's -- from Maslia's report, that seems -- seems to be correct.

Q (BY MS. HORAN) And if the Tarawa Terrace -- the ATSDR did not use treated water

samples to calibrate the Tarawa Terrace model, then they did not indirectly account for VOC losses during the water treatment storage and distribution.

MS. BAUGHMAN: Objection, form.

MS. HORAN: Laura, please stop shaking your head.

MS. BAUGHMAN: I wasn't shaking my head, for the record.

THE WITNESS: My opinion says -- my opinion doesn't speak to calibration.

Q (BY MS. HORAN) The last sentence bolded.

A 5.2 my opinion --

MS. BAUGHMAN: He wasn't finished. Can you let him finish his answer, please.

MS. HORAN: Sure.

THE WITNESS: 5.2 my opinion --

Q (BY MS. HORAN) Uh-huh.

A -- says that model indirectly counted for VOC losses and so I -- I feel like my opinion stands because they were considered.

Q Sure. And your opinion, too, rests upon all of your analysis for both Hadnot Point and Tarawa Terrace is -- rests on the belief that the

data was used in a calibration process; correct?

MS. BAUGHMAN: Objection, form. Objection, foundation.

THE WITNESS: Calibration, validation to me both point to model being -- accounting for the losses.

Q (BY MS. HORAN) And you don't talk about validation in your expert report.

MS. BAUGHMAN: Objection, form. Asked and answered about five times already.

THE WITNESS: I was re -- I was using Maslia's terminology when he said calibration.

Q (BY MS. HORAN) When he said calibration, you understood that to mean calibration or validation?

MS. BAUGHMAN: Objection to the form.

THE WITNESS: Had he used the term validation, I would have been equally comfortable pointing to validation. Whether used for calibration or validation for me in either, both cases it was accounted for in the model.

Q (BY MS. HORAN) And you don't know sitting here today whether ATSDR used the data in Table 7.12 in the Tarawa Terrace model for validation.

MS. BAUGHMAN: Objection, form.

THE WITNESS: All I can do is refer to Maslia's report and how he used the information.

Q (BY MS. HORAN) Okay. I want to turn next to your opinions on water buffaloes. Final opinion.

A And I guess as we leave --

MS. BAUGHMAN: No, no. She didn't ask you a question. Okay? Unless you feel like you had to correct something.

THE WITNESS: Okay.

Q (BY MS. HORAN) You agree with Dr. Hennet that there would be additional losses from the water treatment plant as the water buffalo is filled; correct?

A Correct.

Q So I want to actually turn first to your Appendix A which is response to reports of Remy J.C. Hennet and J. Brigham regarding water buffaloes.

Do you have that open?

Why did you attach a second expert report to your original expert report instead of just submitting one?

MS. BAUGHMAN: Object to the form.

To the extent that requires conversations with counsel, I'm instructing you not to answer per the order CMO 17 that we talked about earlier.

THE WITNESS: Okay.

Q (BY MS. HORAN) Can you answer that question without disclosing your conversations with counsel?

A No.

Q Are the opinions contained in Appendix A opinions you hold as an expert?

A Yes.

Q Did you write Appendix A yourself?

A Yes. It's my work product.

Q And if you turn -- so if I reference Appendix A, you'll understand that I mean your water buffalo --

A Yes.

Q -- opinions?

Okay. Appendix A has its own references list. Sitting here today, is the references list complete, or is there anything you'd like to add?

A Nothing to add.

Q In forming these opinions, you did not rely on any historical books.

Is that fair?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Historical book.

Q (BY MS. HORAN) Books on history. Textbooks on history.

A No.

Q You didn't rely on any historical studies?

A No.

Q How did you go about collecting documentation to form your opinions and conclusions in Appendix A?

A I reached out to legal staff and asked to help me identify documents pertinent to this, and then synthesized the material from those documents.

Q Outside of reaching out to counsel, did you do any independent searches for documents in Google or at a library or any of that?

A The materials that I was provided was -- were sufficient for me, so I didn't need to do personal, if that's what you're asking.

Q So you didn't do any additional research into documents outside of those that were provided to you by counsel.

Fair?

A Correct.

Q And you said that the documents you received were sufficient. How did you make that determination?

A They helped us to document the progression in water buffaloes over time.

Q Did you speak with anyone -- and I'm not asking about questions -- or conversations with counsel -- but any experts in the field or any members who have been part of the military about your opinions in Appendix A as part of your research in forming them?

A No.

Q You have received both the depositions of Mr. Hunt and Mr. Cagiano.

Fair?

A Read those. Yes.

Q And having read Mr. Hunt's deposition transcript, did anything jump out at you?

A Say again.

MS. BAUGHMAN: Objection. Object to the form.

Q (BY MS. HORAN) Having read Mr. Hunt's deposition transcript, did anything jump out at

you as relevant to your opinions in this case?
MS. BAUGHMAN: Object to the form.
THE WITNESS: Just -- not separate from what's in the document.
Q (BY MS. HORAN) So when you say the document, you mean Appendix A?
A Appendix A.
Q And when you read Mr. Cagiano's deposition transcript, did that have any impact on the opinions that you're offering in your Appendix A?
MS. BAUGHMAN: Object to the form.
THE WITNESS: No.
Q (BY MS. HORAN) Have you -- I'm sorry.
A Not beyond -- again, not beyond -- no.
Q Are you aware that Mr. Hunt and Mr. Cagiano have been deposed twice in this case?
A I believe --
Q You're welcome to look at your reliance list.
A I knew -- I knew there was a first interaction with them and then there was a deposition that followed.
Q Do you know if they were deposed prior to submitting your expert report?

A Well, I know -- let me refer to the document. What's it called in here?

Q You're -- you're welcome to look at your reliance list which is Exhibit 3 or the reference list. I'll represent to you I haven't seen that you've seen or reviewed their original deposition transcript from prior to submitting your report.

A I know they had affidavits.

Q Uh-huh.

A Yes. I know more that they -- they had affidavits before my report.

Q And are you aware that they had also been deposed before your report?

A I don't recall.

Q And if you had those deposition transcripts, those would be on either your reliance list or your references list?

A Yes. They...

Q Turning to Page 2. The last sentence of the first full paragraph says, "based on my review of historical documentation as discussed below, I disagree in part with Drs. Hennet and Brigham regarding how water buffaloes were filled at Camp Lejeune over time.

Do you see that?

A Yes.
Q What parts do you agree with Dr. Hennet and Brigham?
MS. BAUGHMAN: Objection to the form.
THE WITNESS: That they were filled. They were filled from stand pipes that -- and I have to refer back to -- I don't have Brigham's -- I remember Brigham had a number of things in his report that I agreed with.
Q (BY MS. HORAN) So you agree that they were filled via stand pipes?
A Well, that was -- yes. Stand pipes or at times suggestions was maybe fire hydrants.
Q Do you have any opinion on where the stand pipes or fire hydrants that the water buffaloes were filled were located on base?
A Just based on what's in the depositions and in the location to the industrial area where they said they were often filled.
Q Do you understand that there are parts of the base such as Camp Johnson wherein the plaintiffs have not alleged contamination of the water treatment system?
A Say that again.
Q Do you understand that there are parts

of the base wherein the plaintiffs have not alleged that there was contamination, and one of those would be Camp Johnson.

Just as --

A I'm not aware of that.

Q Okay. Is your opinion in Appendix A based on any -- strike that.

What knowledge, skill, experience, training, or education do you have such that your review of historical documentation on water buffalo filling would assist the judge in understanding how water buffaloes were filled between 1953 and 1987?

MS. BAUGHMAN: Object to the form.

THE WITNESS: In general, as a researcher we know how to review documents and synthesize information to get a background to work from when we're proposing our research. So those skills translate into trying to develop an outline of the background of what water -- water buffaloes how they transitioned over time based upon publicly available documents.

Q (BY MS. HORAN) Anything else?

A No. I guess that would be the main thing we talked before about my interest in

Lincoln, in history.

Q You said as a researcher. Do you mean as a -- in your capacity as an engineer? Strike -- strike that.

You're a civil engineer; correct?

A Correct.

Q Okay. When you said researcher, did you mean researcher in your capacity as a civil engineer, or what did you mean?

A Specifically to the research, that would be the case. I guess to my Lincoln hobby, I've taken several courses in history and had to do historical research relative to Lincoln documents. Of course, they weren't using water buffaloes in Lincoln's time. But...

Q Prior to this litigation, what was your experience with water buffaloes?

A Virtually none.

Q You say virtually none. Is that -- I think you talked it earlier you might have seen a few on a base?

A I might have seen a few on being -- I'm sorry. Pause, pause, pause.

I might have seen them when working on military bases for remediation projects.

Q But you never saw a water buffalo when used or being filled?
A Not being filled, no.
Q Prior to this litigation, had you ever read a manual on water buffaloes?
A No.
Q Prior to this litigation had you ever read a manual on how to fill a water buffalo?
A No.
Q Are you aware that the plaintiffs have a historian expert?
A Yes.
Q Have you met Dr. Longley or spoken with him on the phone or Zoom or email?
A No.
Q Have you read his reports?
A Yes.
Q Do you recall if you read his report before or after you submitted your rebuttal report?
A Before.
Q Earlier, you mentioned -- and consistent with your report -- that water buffaloes on base can be filled via a stand pipe with a fill hose or a fire hydrant.

Are there any other sources where a water buffalo would be filled on base that you're aware of?

A Not that I'm aware of.

Q A water buffalo filled via fire hydrant would have a lower fill time; correct?

A That would be the expectation. Certainly. Yes.

Q And there would be a lower fill time because of a higher flow rate there?

A Correct.

Q And a higher flow rate would cause more turbulence when filling the water buffalo.

Fair?

A Expect more splashing. I would use the word splashing. Because, again, turbulence -- laminar flow, turbulent flow, but yes.

Q Splashing is the preferred term?

A Not a highly technical term, but yes.

Q Fair enough.

And the splashing when filling a water buffalo or -- strike that.

The increased splashing when filling a water buffalo with a higher flow rate would lead to more VOC losses.

Is that fair?

A You'd have more surface area -- you'd have somewhat more surface area for mass transfer, so you'd expect that. You would have less time for volatilization in the downstream flow, but splashing would potentially add some more surface area.

Q I want to turn first to the M 106 model. And again, your report's in front of you. Please reference it as needed.

A What page?

Q If you could turn to Page 5.

A 5?

Q Uh-huh.

A (Witness complies.)

Q You agree that the M 106 -- strike that.

Throughout this next section, I might refer to a water buffalo just by its technical name like M 106 or M 107. You'll understand when I use one of those that I'm talking about that version of the water buffalo.

Fair?

A Fair.

Q Okay. You agree that the m 106 has a filler hatch and strainer; correct?

A Correct.
Q And you agree that the M 106 water buffalo could be filled through the hatch and strainer?
A Correct. Well, the 106 has a -- looks like a hand pump that can fill through the filler hatch. Figure 2.
Q Uh-huh.
A Yes.
Q Yep.
Is there -- okay. Yeah.
So you agree that the water buffalo could be filled through the hatch and strainer; correct?
A Correct.
Q And you said that there was a bell hose -- a bell strainer for the M106?
A Inserted into the filler.
Q Sure.
Is there any reason to think that the top of the filler hatch could not open so that it could be filled from the top?
MS. BAUGHMAN: Objection, form.
THE WITNESS: Say again.
Q (BY MS. HORAN) Sure.

The -- the filler hatch for the M 106.

A Yes.

Q Do you agree that you could open the filler hatch and fill the water buffalo through that hatch?

A As opposed to through the pump?

Q Yes.

A Certainly possible. I mean, it seems to be possible.

Q Turning to Page 7, you see Figure 5 is the M106 filling instructions from October of 1951?

A On Page 7. The --

Q Yeah. So what you're pointing to, but if you look at the bottom, it says Figure 5.

A Okay.

Q And it's the M 106 filling instructions --

A Okay.

Q -- for 1951.

Okay. And the section that you have highlighted in your report says operation of regular equipment of water tank trailer M 106.

Do you see that?

A Say again.

Q The top --
A Top. Yeah.
Q -- of Figure 5 says operation of regular equipment of water tank trailer M 106; correct?
A Yes.
Q And right below that 32, it says 32, loading and unloading water tank.
Do you see that?
A Yes.
Q And you would agree that these are essentially instructions on how to fill a M 106 water buffalo?
A Yes.
Q Okay. And B says loading tank from overhead free-flowing source.
Do you see that?
A Yes.
Q And C says loading tank from source from which water must be pumped.
A Yes.
Q Agree that for C, the M 106 water pump is attached to the filler hatch?
A Say again.
Q Yeah.
For instructions C.

A C.
Q Yes.
A Yeah. Okay.
Q You agree that that's instructions for the water pump which is attached to the filler hatch?
A Yes.
Q Okay. On Page 7 right below that image, the second sentence, you say the fill point moved from the manhole cover to the filler hatch with the introduction of this model when using an overhead free-flowing source.
Do you see that?
A Yes.
Q Okay. Could you turn to Page 15 of your report?
A 16?
Q 15.
A 15.
Q Okay. The first sentence of the first full paragraph says, the phrase of interest in the filling instructions which was used in several earlier water buffalo technical manuals is free-flowing source. A free-flowing source implies gravity fed which suggests the fill hatch

was never intended to be filled with a high pressure, high flow hose that was tapped into the base's water distribution system.

Did I read that correctly?

A Yes.

Q Okay. So a free-flowing source implies gravity fed. That's your understanding?

A That would be one understanding of that. Yes.

Q So if you turn back to Page 7.

A Yes.

Q And input that analysis into Figure 5, phrase B would read loading tank from overhead gravity fed source.

Fair?

A I'm sorry. Say that again.

Q Sure.

So I believe on Page 15, you come to the conclusion that free-flowing source means that it was gravity fed.

Is that fair?

A That's -- that's one interpretation of that term. Yes.

Q So if you turn back to the instructions you've identified in Figure 5.

A Uh-huh.
Q And you see Section B says loading tank from --
A Okay.
Q -- overhead free-flowing source.
A Yes.
Q So if you input your analysis into that, it would read loading tank from overhead gravity fed source.
A That would be one interpretation. Yes.
Q So what type of source is an overhead gravity fed source?
A Well, if you had a water tank, an elevated water tank, that would provide pressure to have overhead flow.
Q So if you were essentially dumping one tank into the fill hatch?
A If you were near the water treatment plant or near one of the water towers associated with water treatment plant, then that elevated water tank would provide free-flowing water without requiring a separate pump.
Q Anything else you can think of that would qualify as an overhead gravity fed source?
A That would be the one that would come to

mind. An elevated storage tank.

Q Have you ever seen any indication through your research that water buffaloes were filled through an overhead storage tank?

A Well, that's part of any distribution system. And we talked before about the water treatment plants and the different elevated water tanks. So those provide pressure to the water distribution system. And so that would be gravity fed. You pump water up into the elevated storage tank like every city has and then the water from the elevated storage tank flows by gravity through the distribution system.

Q So where would the hose that goes to the filler hatch be located?

A So you would have a water distribution line buried in the ground and the elevated storage tank would be pressurizing the water in that water distribution line. Then you would have the stand pipe tapping into that buried water distribution line coming up.

Q Got it.

So an overhead free-flowing source could be the fill pipe --

A Yep.

Q -- could be the stand pipe.
A Yep.
Q Okay. So for Figure 5, Section B, that could be how you fill it via a stand pipe.
A Correct.
Q Okay. You would agree that the M 106 water loading instructions do not direct a marine to fill the water buffalo through a manhole.
A Correct. Do not. Correct.
Q Yeah.
Okay. On Page 7, the last paragraph, the next iteration after the M 106 was the M 107, and you agree that that had a filler hatch and strainer; correct?
A Correct.
Q And you agree that --
A And a manhole cover.
Q And a manhole cover. Fair enough.
You agree that the M107 could be filled via the filler hatch and strainer; correct?
A Could be. Yes.
Q If you turn to Page 14 of your report.
A (Witness complies.)
Q You see Figure 17 says August 1972 M107 fill process?

A Yes.

Q And that above that, the text that you've written says in the August 1972 edition, which supersedes the October 1964 edition shown above, the fill process switches from being done through the filler hatch to the manhole cover as described in the text below.

Do you see that sentence?

A Yes.

Q So it wasn't until 1972 that there was any reference to filling the water buffalo through the manhole cover, the M 107; correct?

A Not -- not in terms of the manholes. No.

Q If you turn to Page 15.

A 1-5?

Q Yes.

The last sentence says, in the 1972 edition, the text specifically calls out that when filling through the manhole cover, a pressure pump can be used which is equivalent to water flow pressure like that's supplied by the water distribution system.

Fair?

A Yes.

Q And you agree that prior to 1972, the water buffalo could have been filled through the filler hatch using the stand pipe.

A Could have been, yes.

For convenience, I imagine they might have preferred filling it through the manhole, but certainly the filler hatch was what was in the manual.

Q You said for convenience, you might imagine that they would fill them through the manhole.

What is that based off of?

A Ease of opening the manhole, the -- if you look at that strainer, the -- would be easier to put the pipe over a big manhole than over that small filler hatch. The ability of the filler hatch to accommodate the high flows. A number of things. I could imagine.

Q But you agree that the filler hatch could accommodate the pressure from the stand pipe?

MS. BAUGHMAN: Objection, form.

THE WITNESS: I agree that you could certainly use the stand pipe to fill through the filler hatch. I question whether that strainer

would allow that volume of water to come through un-- unhindered.

Q (BY MS. HORAN) Um.

A That there might be backsplashing.

Q Do you have any documents that suggest that prior to 1972, marines, as a matter of course -- strike that.

Turning to Page 21 of your report. And I think this is what you were getting at. You state at the top of it, for those M 107s earlier than 1972, it is my position that these units more likely than not would -- would have also been filled through the manhole cover.

Correct?

A That's correct. That's stated.

Q And that's what you were just alluding to; correct?

A Correct.

Q Okay. And your basis for that is Mr. Hunt's affidavit. The filler hatch being able -- well, strike that.

Number 2 says the filler hatch, as outlined in several of the manuals, is designated for free-flowing water supplies and earlier versions fed by a hand pump; correct?

A Correct.

Q And so we've established that the filler hatch, when it said overhead free-flowing source, meant it could be a stand pipe; correct?

A Could be. Correct.

Q Okay. And then the third point you list is that from 1968 to 1972, there were water buffaloes that could only be filled through the manhole cover.

Fair?

A Correct.

Q Other than these three data points, is there anything else that you've relied upon in determining that marines would only have ever filled water buffaloes through the manhole cover?

MS. BAUGHMAN: Objection to the form.

THE WITNESS: It impressed me why would you fill highly treated drinking water through a strainer. So that's what got me puzzled about that and wanted to pursue this further to see what the documentation said and see what some of the experience was.

It impressed me that as in the early versions there was a hand pump. That that was more likely used for filling from a lake or some

source that had debris.

Q (BY MS. HORAN) And you agree that the earlier versions or the versions pre 1972 do not mention filling the water buffalo through the manhole cover.

A That's correct.

Q But they do reference filling the manhole through the filler hatch.

Fair?

MS. BAUGHMAN: Objection, form.

THE WITNESS: Say that again.

Q (BY MS. HORAN) The manuals pre 1972 reference filling the water buffalo through the filler hatch.

Fair?

A Correct.

Q Okay. In Number 1 of this, you state, on a regular basis, he, meaning Mr. Hunt, observed the filling of M107 water buffaloes and all of those he observed were filled through the manhole cover.

Do you see that?

A Yes.

Q Have you read Mr. Hunt's deposition?

A Yes.

Q Are you aware that he said he saw it filled less than ten times?

A I'd have to look back at my notes.

(Government Exhibit 13 marked for identification)

Q (BY MS. HORAN) I'm marking as Exhibit 13 this is the deposition of Ernest David Hunt from March 11, 2025.

Could you turn to Page 33?

A Whoops. Guess I got two of them. Sorry.

Q No, it's okay. Could you actually keep this one? Because it's the one with the sticker.

A 30 -- 33 again?

Q Yes.

So there's four pages on one. So I guess it's --

A Yeah. I've got it.

Q Okay. So beginning on line 23, it says:

"QUESTION: Do you recall roughly how many times you witnessed a water buffalo being filled at Camp Lejeune?"

If you turn to the next page,

"ANSWER: Just a few times. I don't really -- I don't recall

the number.
"QUESTION: Would you say less than 10? Less than 20? Less than 100? Do you have any --
"ANSWER: Less than -- less than 10."

A Uh-huh.

Q Does the fact that Mr. Hunt observed a water buffalo being filled less than ten times impact your opinion in any way that water buffaloes prior to 1972 were likely filled only through the manhole?

A No.

Q Could you turn to page 29 of the --

A Whoops.

Q Yeah. Sorry.

A I jumped the gun.

Q Page 29.

A 29?

Q Uh-huh.

A (Witness complies.)

Q So beginning on line 18, it reads:

"QUESTION: Okay. So this record has you starting at Camp Lejeune on March 17 of

'65. And if you turn the page around, you will see that it has you leaving on October 7th of '66.

"ANSWER: Correct.

"QUESTION: Does this sound about right to you?

"ANSWER: Yes."

And then -- Okay.

And you were aware that Mr. Hunt saw water buffaloes being filled less than ten times between March of 1965 and October of 1966.

Fair?

A Yes.

Q Does that change your conclusion in any way, that water buffaloes prior to 1972 were likely filled only through the manhole?

A No.

Q Could you turn to Page 8 of your report?

A 8?

Q Uh-huh.

A (Witness complies.)

Q The middle of the page reads filling the M107 A1 is still directed to be done through the filler hatch as described in Figure 7 below.

Do you see that?
A Yes.
Q You agree that nothing in the loading the water tank instructions for the M 107 A1 directs filling the water buffalo through a manhole cover; correct?
MS. BAUGHMAN: Objection, form.
THE WITNESS: In these guidelines, correct.
Q (BY MS. HORAN) You've identified Figure 7 as the M 107 A1 filling instructions.
A Correct.
Q And you agree that nothing in Figure 7 directs you to fill the tank through the manhole cover; correct?
A Correct.
Q Turning to Page 9, you agree that the M 149 had a filler hatch and strainer; correct?
A Yes.
Q And you agree that the M 149 could be filled through the hatch and strainer?
A Could be. Yes.
Q If you turn to Page 12 of your report.
A (Witness complies.)
Q Are you there?

A Yes.

Q Okay. The text in the middle of the report says, the significance of this note is that as early as December of 1968, the Army is acknowledging that the M 149 A1 was not equipped with a strainer and the use of a strainer became optional for the M 149 in cases where the strainer was damaged or found defective.

Did I read that correctly?

A Yes.

Q Have you found any documentation that prior to December of 1968 the use of strainers in water buffaloes was optional if they were damaged or defective?

A Say that again.

Q Have you found any documentation that prior to December of 1968, the use of strainers in water buffaloes was optional if they were found damaged or defective?

A No. Not to my knowledge. No.

Q So at least from 1953 to December of 1968, the manuals instructing how to load water into a water buffalo instructed filling through the filler hatch.

Fair?

A Fair.
Q And from 1953 to December of 1968, the manuals instructing how to load water into a water buffalo did not mention filling a water buffalo through the manhole; correct?
A Correct.
Q On Page 9, the first -- and you can correct me if I'm wrong -- manual that I was able to identify from your report for the M1 --
A I'm sorry. Where? On Page 9?
Q Yeah. Page 9.
A Okay.
Q Just generally.
A Okay. I thought you were pointing to something.
Q Do you know when the first M149 A1 became available?
A I would have to look back through. Off the top of my head, no, but I'd have to look back through.
Q So in -- on Page 9, you have Figure 10 which shows both the M149 and the M149 A1, and that's attributed to June of 1971.
Do you agree?
A I'm not tracking. Trying to track what

you said here on the page here.
Q Sorry.
A You said on Page 9.
Q Yeah. So on Page 9, it says the illustration below, Figure 10.
A Okay.
Q Is from a manual from June of 1971.
A Uh-huh.
Q Fair?
A Fair.
Q Okay.
A With and without the filler hatch.
Q On Page 12, the text in the middle, the first sentence of the second paragraph says, "In 1970, the M149 A1 underwent a tank design change."
How did you determine that happened in 1970?
A I'd have to look back at my -- have to look back at my sources. I don't recall right now.
Q Okay. Turning to Pages 19 and 20. You identified via inventory that Camp Lejeune had M149 and M107 water buffaloes; correct?
A Say again. M --

Q M107 A2, M107, and then M149 water buffaloes.

Fair?

A M129.

Q 129?

A Is that what you said?

Q No. Sorry.

Okay. Figure 22 of your report identifies as part of the 1968 equipment that there were M107 and M107 A2 water buffaloes.

A Yes.

Q Fair?

A Okay. Yes. I misunder -- misheard you.

Q And then if you turn to Figure 23, you've identified that the 1999 inventory had M149 water buffaloes.

A Yes.

Q You state in -- you state in Page 20 -- the second to last sentence of the first paragraph says, "This supports that the base was transitioning from M107 to the M149 A1s during the 1970s."

Did I read that correctly?

A Yes.

Q Did you find any documentation

supporting that the M149 A1 was in inventory at Camp Lejeune beyond Mr. Cagiano's affidavit?

A Beyond...

Q Sure.

So was there anything other than Mr. Cagiano's deposition -- excuse me, affidavit, any other documents you found supporting that Camp Lejeune transitioned from M107s to M149 A1s during the 1970s?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Shows up on this inventory. What's the date on this inventory? '99. Not that I recall.

Q (BY MS. HORAN) In 19 -- the Figure 23, you say 19 -- from 1999. Do you see that?

A That's the indication.

Q You agree that that says M149, but does not indicate M149 A1.

Fair?

A That's correct.

Q For determining the fill time, you determined that it likely took between two or three minutes to fill a water buffalo.

Fair?

A Fair.

Q And is that -- or that's through the manhole; correct?
A Correct.
Q Did you determine the fill time through the strainer?
A No.
(Government Exhibit 14 marked for identification)
Q (BY MS. HORAN) I'm marking as Exhibit 14 -- this is Camp Lejeune Justice Act Litigation Rebuttal Report of Kyle Longley.
And Dr. Sabatini, could you please turn to Page 23.
A 27?
Q 23.
A 23. I was going to say 27 is this.
(Witness complies.)
Q Three lines up from the bottom of that paragraph, the sentence reads, "The marines could fill the water buffaloes at Hadnot Point in 10 to 20 minutes."
Do you see that?
A Yes.
Q Do you know what source Mr. Longley was using for that position, or that statement?
A Well, he -- no. He has a reference

there, but that seems to be for the next sentence.

Q And that reference is to the Ensminger oral history?

A Yeah. Seems to be for the following sentence.

Q But you disagree with Dr. Longley that it wouldn't take 10 to 20 minutes to fill a water buffalo at Hadnot Point?

A Through the manhole. Now, through the strainer -- yeah, I would envision it would take longer through the strainer because it would accept -- I imagine my professional judgment is it could not handle as fast a flow.

Q So does this indicate to you that some marines filled the water buffaloes through the fill hatch?

MS. BAUGHMAN: Object to the form.

THE WITNESS: I couldn't speculate.

Q (BY MS. HORAN) You can put that aside, Dr. Sabatini.

MS. HORAN: We've been going for about an hour and a half. Would you mind taking just a 10-minute break?

THE WITNESS: Sure. Sure.

THE VIDEOGRAPHER: We are off the record at 5:02 p.m.

(Short break from 5:02 p.m. to 5:12 p.m.)

THE VIDEOGRAPHER: We're back on the record at 5:12 p.m.

Q (BY MS. HORAN) Turning to your report, not the Appendix A, on Page 19, you show calculations for water buffaloes in Table 5.6.

Is that fair?

A Fair.

Q And you use the same study as Dr. Hennet to do your calculations in Table 5.6; correct?

A Correct.

Q And that's the McKone and Knezovich 1991 study?

A Correct.

Q One of the edits you make to the McKone and Knezovich study is that the fall height in your opinion should be .4 meters instead of 1.6 meters used in the study.

Is that fair?

A Restate that.

Q Sure.

One of the edits you make to the McKone and Knezovich study is that the fall height in

your opinion should be .4 meters instead of 1.6 meters that they used in the study.

A In applying it to the water buffaloes. Correct. Not that McKone should have used .4 meters.

Q Ah.

A Adjusting his results to this situation.

Q Sure.

And your proposed 75 percent reduction due to differences in fall height relies on the assumption that the fall height is directly proportional to volatile loss; correct?

A Correct.

Q And what's your basis for that assumption?

A Time of volatilization.

Q So the fall height would be directly related to the time. Fair?

A Correct.

Q Turning back to your Appendix A on Page 21. Do you see Figure 24 is showing that the water buffalo is being filled from just outside the manhole cover?

A Meaning that the pipe -- yes.

Q And if you look at Figure 25, the water

buffalo is being filled about half a person size over the manhole.

Fair?

A Correct.

Q Okay. Are Figure 24 and Figure 25, in your opinion, representative of filling operations of water buffaloes at Camp Lejeune?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Represented from other sites but could well be examples of what it might look like. I might also add Figure 27 to the discussion.

Q (BY MS. HORAN) Sure.

And Figure 27 shows a water buffalo being filled via fire hydrant with the fire hydrant hose just on the lip of the manhole cover.

Is that fair?

A It's hard to tell. The pipe may not be inserted. Either way.

Q Would -- if you turn to Figure 25, the fact that the stand pipe fill hose is at least two feet above the manhole cover, impact your calculations for fall height as done in your expert report?

A Potentially.

Q And how potentially would they impact your calculations?

A Would be additional time for volatilization in the travel distance. I might add as another data point, Hennet's deposition, he mentioned that the filling of the water buffalo, he observed the water -- the fill pipe was near the entrance to the manhole.

Q And you saw the photos from Dr. Hennet's February visit where he observed the water buffalo being filled?

A I saw photos. I'm not sure -- I don't recall exactly all the -- the specifics. But yes, I saw photos.

Q And you read the testimony or listened to the testimony of Dr. Hennet about his viewing of water buffaloes in the February 2025 visit.

Fair?

A In the February visit. Yes.

Q And having seen those photos and read that testimony, does it have any impact on any of your opinions in your report?

MS. BAUGHMAN: Object to the form.

THE WITNESS: No.

Q (BY MS. HORAN) Turning back to your report on Page 19. Row 3 says assuming downward velocities are the same.

Do you see that?

A Yes.

Q What did you mean by that?

A I assume that the -- I assume that the shower experiments translated to the water buffalo filling except the only -- the only adjustment that was necessary was the, I'll say fall height distance. I don't want to confuse fall height with fall height from the spiractor.

Q A lot of fall heights today.

Does a vertical strainer spread the water more efficiently compared to a showerhead?

A Oh, that's -- it could go either way.

Q And why could it go either way?

A I mean, it's -- that's speculation. Showerhead has tiny nozzles that direct the water intentionally out. Where as a strainer is just there to remove debris. The openings in the strainer grid coarser than the fine orifices in the showerhead.

Q Have you seen a strainer from a water buffalo in person?

A No.
Q Have you seen a water buffalo in person?
MS. BAUGHMAN: Objection. Asked and answered.
THE WITNESS: Yeah, no.
MS. HORAN: Okay.
A I've answered that before, but no.
Q (BY MS. HORAN) Could you turn to Page 6 of your Appendix?
A (Witness complies.)
Q Do you see Figure 4? And you've highlighted Number 22.
A Yes.
Q Which is the strainer element.
A Yes.
Q And you would say that that strainer element has holes, more or less than a showerhead?
A I'm sorry. Would --
Q Does the strainer in Figure 2 - identified as 22 in Figure 4 have more or less holes --
A Holes.
Q -- than a showerhead.
A I would say more.

Q Would you agree that the strainer would have a larger spray pattern than a showerhead?

MS. BAUGHMAN: Object to the form.

THE WITNESS: No.

Q (BY MS. HORAN) Why not?

A No.

Q Yeah. Why -- why not?

A Why not? The -- well, it even says here this is to remove sediment. So I -- just my professional judgment would be that it would not.

Q So if you attach a fill hose to the strainer on 22, wouldn't water come out of the strainer holes throughout the entire strainer, as long as it's not submerged?

A Yes.

Q And so the strainer holes at the top, the water will come out and go all the way to the bottom or wherever the filling process is in the water buffalo.

Fair?

A Fair.

Q And so it would be more efficient at volatilization of TCE than assumed in your calculations, so long as the strainer was not submerged.

Fair?

MS. BAUGHMAN: Objection to the form. Foundation.

THE WITNESS: It's an interesting argument. I just followed Hennet's approach. I didn't adjust -- I didn't adjust the spray diameter from what Hennet used.

Q (BY MS. HORAN) But you --

A For filling through the strainer.

MS. HORAN: Could you repeat my question?

THE REPORTER: "And so it would be more efficient at volatilization of TCE than assumed in your calculations, so long as the strainer was not submerged."

MS. BAUGHMAN: Objection to form.

THE WITNESS: I didn't do calculations. The only adjustment I made was for the time not for spray or -- I assumed the same spray pattern that Hennet did in the filler hatch calculation.

Q (BY MS. HORAN) So sitting here today, you don't have any opinion on whether the strainer in a water buffalo would be more efficient at volatilization of TCE than assumed in your report?

MS. BAUGHMAN: Object to the form.

THE WITNESS: I would say that I followed the same approach that Hennet followed.

Q (BY MS. HORAN) Did you do any analysis to determine whether the -- strike that.

Assuming that the water strainer would have a larger spray pattern than a showerhead, it would have a higher -- greater volatilization because of a greater surface air between -- greater surface area between the air and the water.

MS. BAUGHMAN: Object to the form.

THE WITNESS: That's speculative. I wouldn't care to comment on not seeing data or evidence. And again, I'll just refer back to, I followed the same approach that Hennet did relative to the strainer. Just adjusting for time.

Q (BY MS. HORAN) In your report, you then switch to talking about filling through the manhole cover, which begins on Page 20 of your report. Prior to issuing your opinion, you had watched a YouTube video where water buffaloes were filled correct?

A Say that again.

Q Prior to issuing your rebuttal report, you had watched a YouTube video where water buffaloes were being filled; correct?

A Yes.

Q And the video showed splashing and aeration while the water buffalo was being filled.

Fair?

A Yes.

Q And volatilization losses happen relatively more in the presence of splashing and aeration.

Fair?

MS. BAUGHMAN: Object to the form.

THE WITNESS: Depends upon the degree of splashing. It's surface area again. So if the splashing creates some additional surface area, there's additional possibility for volatilization.

Q (BY MS. HORAN) An increase in surface area between the air and water will increase volatilization; correct?

A Correct.

Q After you determine --

A Maybe just add one point to that. The

shower hitting the floor would cause splashing. And so there's a degree of the splashing that you're describing that was inherent in the shower experiment that I was working from.

Q And did you take that into consideration in your analysis in any way other than following McKone?

A That, to me, helped account for splashing that might have occurred filling through the manhole.

Q Was there any analysis that you did to compare the splashing in a manhole with the splashing accounted for in the shower experiment?

A No.

Q Do you know if there's more or less splashing in filling a water buffalo through the manhole than in a shower?

A I would have to assess that. But I would -- you have certain amount of water hitting the floor and agitating. So I couldn't comment on the relative amount, but I would consider them in the same category.

Q But you haven't done an assessment of that yet?

A No. No.

Q When you determined that a water buffalo was filled through the manhole, did you do any analysis to determine if the shower is still the most apt analogy?

A Whether the shower was --

Q Still the most appropriate analogy.

A I did look for other approaches. But I found that -- in my searching, I found that Hennet's approach was -- I could adjust that approach.

Q What other approaches did you look into?

A I looked for -- from a faucet. And then the kitchen is one example that I looked at.

Q Can you remember any other things you looked at, sitting here today?

A Well, I mean, I searched. I searched -- so anything that I could have found that would have been similar to a faucet, a bath tub or something of that nature.

Q Would you agree that filling a water buffalo through the manhole cover is more similar to a bath tub?

MS. BAUGHMAN: Object to the form.

THE WITNESS: I think the -- I mean what I had to work on, I was responding to Hennet's

report. And so I adapted his approach for the situation at hand.

Q (BY MS. HORAN) Sure.

And you determined -- you introduced some new facts. And I'm wondering if when you introduced those new facts, that changed any analysis in where you determined that a -- filling a water buffalo is more similar -- through the manhole -- is more similar to filling a bath tub than a shower.

MS. BAUGHMAN: Object to the form.

THE WITNESS: That would be speculation.

Q (BY MS. HORAN) Well, no. I'm asking if you considered it.

A Well, yeah, I mean I'd just have to speculate. There's -- you could see similarities and differences. But in the absence of being able to find such an approach, I went with the -- I -- I adapted to Hennet's approach.

Q Do you know whether the EPA has ever studied VOC losses through filling a bath tub?

MS. BAUGHMAN: Object to the form. Foundation.

THE WITNESS: Not to my knowledge. I wasn't -- I did a search and wasn't able to find

such information.

Q (BY MS. HORAN) What in your model accounts for the splashing of the water and the general movement of the water --

A Agitation.

Q Agitation.

-- when you fill through the manhole?

A I'll refer back to the shower -- two things. The shower water hitting the floor and -- that agitation. I also included a -- in my Table 20 -- on Page 22.

Q Uh-huh.

A I introduced a line 4 which Hennet did not include in his analysis. Losses doing daily use of the water buffaloes. And so that was an attempt to account for additional losses. In an attempt to be conservative.

Q Anything else? Any other way you accounted for splashing and agitation?

A Just those two factors.

Q I believe you said earlier that you thought that the fact that a strainer on a water buffalo intended to remove sediment would be consistent with the strainer holes being smaller than a shower.

A Say again.
Q I -- earlier, you testified that it was your understanding that the strainer in a water buffalo would be used to remove sediment.
Do you recall that?
A I was -- actually referring to that in that one caption. It says sediment removal.
Q And what impact would that have on the size of the holes compared to a shower? Would they be larger or smaller?
A Size of a hose compared to a shower. I'm not sure I understand the relationship.
Q Sure.
So if you have a strainer that's designed to filter out sediment, would you expect the holes in the strainer to be larger or smaller than those in a showerhead?
A It would depend upon what size of sediment was being removed. I could see it going either way. I'd have to -- I'd have to see a -- a strainer.
Q Do you know what sediment would have been removed from the water buffaloes strainer?
A I could imagine that it was -- no, I don't. But I could imagine, if you're filling

from a lake or a pond, you're trying to remove sediment from that water source would be my impression.

Q And if you're removing sediment from a lake or a pond, would the strainer holes be larger or smaller than those in a showerhead?

A I could see that going either way. I could see a case where it might be smaller and I could see a case where it might be larger. The smaller it is, the harder it would be for the water to get through the strainer. So as the holes get -- the holes, or I would say grid, in the strainer get smaller and smaller, create more and more resistance of water flow and would be harder to fill through that strainer.

Q And the smaller the holes, the larger the surface area of the water going through it?

A Could be.

Q You state that the higher velocity during filling via the manhole leads to 33 percent less volatilization due to less time falling from the pipe.

Fair?

A You're referring to my calculations?

Q Yes.

A That -- that adds to the fall height and the -- yes. Can you restate the question?

Q Sure.

You state that a higher velocity during filling via the manhole will lead to a 33 percent less volatilization due to less time falling from the pipe.

A We're talking through the manhole now?

Q Uh-huh.

A And you're referring to my calculations?

Q Correct.

A I think the 33 -- it's a combination of the spray diameter and the time the fall -- the time for volatilization.

Q A higher velocity would also create more aeration upon impact.

Fair?

A And that comes back to the analogy of the shower experiment where the water hitting the floor of the shower would cause splashing.

Q If a water buffalo was used for more than one day in the field, would the loss of TCE be higher than you estimated for half a day or one day?

MS. BAUGHMAN: Object to the form.

THE WITNESS: That's speculative. So again, if it was used for...

Q (BY MS. HORAN) More than one day.

A That could increase volatilization.

Q Did you account for temperature changes of the water and air in the water buffaloes?

A I assume that could go both ways. Lower temperatures would have one effect; higher temperatures would have another effect.

Q So did you account for it in your model?

A I assumed that that evened out because it could go both ways.

Q Earlier, you recall we were talking about calibration and validation of the model with your Opinion 2. Is it your understanding that calibration and validation are synonymous?

MS. BAUGHMAN: Object to the form.

THE WITNESS: I'd have to defer to the -- I'd have to defer to the experts in that area. The people that were doing that part of the work. That was not my focus.

Q (BY MS. HORAN) You've read Dr. Konikow's expert report and his deposition?

A Yes.

Q Do you agree with Dr. Konikow that a

model cannot be validated?

MS. BAUGHMAN: Object to the form. Foundation.

THE WITNESS: I'd have to review the context of his report and -- to see what you're referring to.

Q (BY MS. HORAN) Isn't it the case that calibration validation of a model are distinct processes?

MS. BAUGHMAN: Object to the form. Lack of foundation.

THE WITNESS: Again, I'd have to defer to those that focused on that aspect of the project.

Q (BY MS. HORAN) Have you ever calibrated or validated a model?

A Define model. Yes, I have. But -- in my experimental work, we develop models and we validate them.

Q If you defer to the experts such as Mr. Maslia, then you would agree that Tarawa Terrace wasn't calibrated with treated water samples.

Fair?

MS. BAUGHMAN: Object to the form. Foundation.

THE WITNESS: I'm sorry. I keep asking you to repeat questions. Please, one more time.

Q (BY MS. HORAN) Sure.

If you defer to the experts, as you've stated, then you would agree that Tarawa Terrace wasn't calibrated with treated water samples.

A No, I would not agree with that statement.

Q Do you recall looking at Mr. Maslia's report earlier today? We looked at Mr. Maslia's report earlier today in regards to Tarawa Terrace. It stated that the model was not calibrated using the treated water samples; correct?

A I'm not in a position to comment on calibration validation. I defer to those that were focused on that aspect of the project.

Q Sure.

And if you were incorrect and the Tarawa Terrace model by ATSDR was not calibrated using treated water samples, then the ATSDR model for Tarawa Terrace would not indirectly account for VOC losses at the water treatment plant.

MS. BAUGHMAN: Object to the form. Foundation and asked and answered.

THE WITNESS: Yes. I agree.

Q (BY MS. HORAN) Earlier in this deposition, you stated that you had seen the photos from Dr. Hennet's visit and read deposition testimony about his February 2025 visit.

Do you recall that?

A I read his deposition. That included discussion about that visit.

Q And part of that was Dr. Hennet's measurement of the Hadnot Point spiractor.

Fair?

A Correct.

Q And you understood Dr. Hennet's measurements of the spiractor that he conducted in February 2025?

MS. BAUGHMAN: Objection to form and foundation.

THE WITNESS: Yeah, it's -- there wasn't documentation to his pictures. So I can't say that I fully under -- that I understood what exactly was done.

Q (BY MS. HORAN) So through his photos and testimony, you were not able to fully understand how Dr. Hennet measured the spiractor

at Hadnot Point?

A No. I will comment that it was an empty, non-operating -- no chance to see the constricted water reducing the fall height. So to me, the AH photos that incorporate those are -- are valuable.

Q And sitting here today, do you have any methodology that you could use to measure a spiractor fall height while the spiractor is in use?

MS. BAUGHMAN: Object to the form.

THE WITNESS: I have no question that it could be done.

Q (BY MS. HORAN) Do you know how to do it?

A I can't say -- I can't say how exactly I would do it, but given time and resources, it could be done.

Q During the breaks today, have you spoken with counsel about any substance related to your testimony?

A Just a reminder to let you finish a question, to pause. So we had discussions in that nature.

Q Anything else related to the substance

of your testimony?

A Nothing substantive. Just the procedural-type issues.

Q Okay. Dr. Sabatini, thank you very much for your time today.

A Thank you.

MS. HORAN: I will pass the witness.

MS. BAUGHMAN: And how much time's left?

THE VIDEOGRAPHER: We are at six hours and 58 minutes.

EXAMINATION

BY MS. BAUGHMAN:

Q Dr. Sabatini, I have some questions for you. Okay. First, let's -- let's talk about Exhibit 3. If you can pull that up. Pull that from your materials.

A Say again.

Q Exhibit 3. That's the supplemental and amended materials considered list.

A One. Got them mixed up. This one.

Q Okay. All right. Did you prepare the supplemental/amended materials considered list dated April 9, 2025?

A Legal staff prepared this for me.

Q Okay. I want to -- turn, please, to

Page 9 where it says, additional materials considered.

A (Witness complies.)

Q Okay. Now, turn -- well, first of all, I just want you to look at the volume, or the number of documents, from Page 9 to Page 30. Just flip through.

A Okay.

Q Did you review this volume or this number of new documents between the time that you signed your report on January 14, 2025 and to April 9, 2025?

A No.

Q Okay. In that timeframe, from after you signed your report January 4 -- 14, 2025 until today, can you identify new documents that you reviewed that you had not reviewed prior to finalizing and signing your report?

A I think there was just the CLW mentioned. Other than -- other than maybe a CLW, no.

Q Okay. Well, you -- to be fair, there are depositions that didn't exist before.

A I'm sorry. I'm sorry.

Q And you reviewed those depositions;

right?

A Yes. Yes. I'm sorry. Yes. Yes.

Q So other than the depositions that didn't exist before January 14, 2025 and a CLW document that you've referenced, can you think of any other document you reviewed after signing your report that's new?

A No. Not to my recollection. No.

Q Okay. Do you know why there's this -- and especially, the number of Bates-stamped documents -- do you know why there's so many documents from Page 9 to Page 30 of Exhibit 3?

MS. HORAN: Objection. Foundation.

THE WITNESS: Background information that did not play into my rebuttal report. Much -- much of it.

Q (BY MS. BAUGHMAN) Okay. So to the best of your knowledge, other than the one CLW document and the depositions that have been taken after January 14, 2025, are there any new documents that you're relying on for your rebuttal report that you reviewed after signing your report?

A No.

Q Okay. Just to refresh your

recollection. December 9, 2024. That's the date of Dr. Hennet's report. And the date of your report is January 14, 2025. In that timeframe, is there a reason why you did not request to go to Camp Lejeune for a site visit?

A I felt we -- with the AH report and Hennet's report, I had the data, the information I needed to make my assessment, my calculations. And I actually -- the AH values from 2004 were meaningful to me. Felt they were more relevant than anything I might see in 2025.

Q Why is that?

A Just more representative of what was there in -- decades ago. They also operating -- show the spiractor in operation which is important in terms of the fall height.

Q Being AH did that?

A Yes.

Q Okay. All right. We'll get to that in a few minutes.

Can you pull out -- can you pull out Exhibit 7 for me?

A 7?

Q Yes.

A Okay.

Q So if you remember, defense counsel asked you a question about a vent --
A Yes.
Q -- on the -- the water buffalo --
A Correct.
Q -- using that document.
Does this vent that's on the water buffalo change your calculations and opinions regarding volatilization from the water buffaloes?
A No.
Q Why not?
A This is similar to the -- if you will, this is similar to the vents on the reservoirs at the water treatment plant. Allows water to escape as water is filled up -- air to escape as water is filled up to the valves. Air to -- prevents pressurization in the vessel.
Q What affect would it have to volatilization?
A It would -- it's not -- there's not -- causing air to flow over the water in a way that would increase volatilization.
Q Okay. You made a statement earlier today in response to defense counsel's questions.

You said something like, given an ultimate amount of time, VOCs leave water.

Do you recall saying that?

A Yes.

MS. HORAN: Objection to form.

Q (BY MS. BAUGHMAN) What do you mean by "ultimate amount of time"?

A An extreme amount of time much, much greater than what's practical in a water treatment plant reservoir.

Q So both you and Dr. Hennet used -- what's the name of the -- the calculation that you used? Here.

A For the -- the fall height or --

Q No, no. Here. The volatilization from water. It's in Thomas.

A Thomas.

Q Okay. If VOCs leave water just from having -- from being exposed to air, why is the Thomas method necessary?

A Henry's law calculates -- tells us where it would happen at equilibrium, but we're often far from equilibrium in practice. And so the whole reason that AH and Hennet used the Thomas method is to recognize that in practical

applications, we're often far from equilibrium and so we have to use a kinetic-based model to account for volatilization.

Q Okay. So if you look at Exhibit 9, if you could turn to Table 15-3.

MS. HORAN: What page is that?

THE WITNESS: Say again.

Q (BY MS. BAUGHMAN) Table 15-3.

A Okay.

Q It's the same table defense counsel asked you about in her questions.

A Okay.

MS. HORAN: Think it's on Page 15-20.

THE WITNESS: Page 15-20.

Q (BY MS. BAUGHMAN) And do you recall that you were asked a number of questions about the fact that Dr. Hennet used .008 --

A Yes.

Q -- for the oxygen reaeration coefficient? Correct?

A Correct.

Q Look at -- under river. What's the first literature value reported for an oxygen aeration coefficient for river?

A 0.008.

Q The same one that -- used by Dr. Hennet?
A Yeah.
Q Okay. I want to ask you a few questions about recarbonation basins. There's a recarbonation basin at Hadnot Point; is that correct?
A Yes.
Q Actually, let's look at the schematic that you have in your report. Make sure we're talking about the same thing. Okay.
MS. HORAN: What page?
Q (BY MS. BAUGHMAN) If you could turn to Page 3, Figure 3-1.
A (Witness complies.) Yes.
Q Okay. So Figure 3-1, Hadnot Point water treatment plant in your report, you took that from AH Environmental report; is that right?
A Correct.
Q Okay. And it shows the recarbonation basin after the spiractors; correct?
A Correct.
MS. HORAN: Objection to the form.
Q (BY MS. BAUGHMAN) Okay. Was the recarbonation basin operating in 2025?
MS. HORAN: Objection to form.

Foundation.

THE WITNESS: No.

Q (BY MS. BAUGHMAN) How do you know that?

A Not to my knowledge. No.

Q How do you know that?

A That's the indication -- I'm sorry. In 20- --

Q '25.

A Yeah. To my knowledge, no.

Q Okay. What about in 2004, when AH Environmental was out investigating and seeing -- making site visits to the Hadnot Point water treatment plant? Was the recarbonation basin operating?

A According to the report --

MS. HORAN: Objection to the form; foundation.

THE WITNESS: According to the report, no.

Q (BY MS. BAUGHMAN) Okay. Since we got the objection, let's turn to the AH Environmental report. It's attached to your report. And if you could turn to Page 2-8.

A 2-8. (Witness complies.)

Q Read the first sentence on 2-8, please.

A "At some unknown time in the past decades, the plant operators discontinued recarbonation."

Q Okay. And that's stated in the --

A 2004.

Q -- in the 2004 report of AH?

A Yes.

Q Okay. And have you -- in all of your work that you've done in this case, have you seen any indication in any document, including Dr. Hennet's report, that indicates that the recarbonation basin was used at any time from the decades prior to 2004 until 2025?

A No.

Q Okay. So while we're talking about the recarbonation basin -- we're on Page 4-2 -- I want to -- well, turn to Page 4-2 of AH 2004 report that's attached to your report.

A (Witness complies.)

Q And this is what I want to ask you. Even though the recarbonation basin wasn't running, what role did it play in terms of your calculations regarding volatilization at the Hadnot Point water treatment plant?

A The AH indicates that the recarbonation

basin created a constriction that caused water to back up in the effluent pipe of the spiractor and reduced the fall height. And so even though it was no longer operating as a recarbonation basin, water was still flowing through it to get from the spiractors to the filters.

Q This statement on Page 4-2 of AH. Can you read the sentence that starts "because of the downstream recarbonation basin"? Can you read that?

A Because of the downstream recarbonation basin at the plant, the available head loss --

Q The available --

A -- the available head does not appear to allow fall height of greater than approximately 1 foot.

Q And?

A And the effluent pipe is likely to be flowing full.

Q Okay. What does that mean, the available head? What's the available head that does not appear to allow fall height of greater than 1 foot? What's that available head mean?

A That's just the energy of being able to -- the fall height that the water can go.

Q Okay. And so what is it about the Hadnot Point water treatment plant that's not allowing the fall height to be greater than 1 foot?

A The recarbonation basin creating a blockage, if you will, to the water flowing.

Q And if -- if the water treatment plant is not running and the spiractor is empty, would one be able to see the fact that the fall height can't be greater than 1 foot?

MS. HORAN: Objection to form.

THE WITNESS: No. You couldn't -- you can only determine that under hydraulic flowing conditions.

Q (BY MS. BAUGHMAN) Okay.

A Then as we said before, Figure 4-3 shows a nice demonstration of what it looks like without the back. Holcomb Boulevard that didn't have the restriction has a much cleaner, deeper fall height.

Q Okay. So just for the record, did Holcomb Boulevard have a recarbonation basin?

A No.

Q Okay. And so you're saying Figure 4-3 shows what -- what -- the fall would look like --

or what the flow would look like at the spiractor without a recarbonation basin.

A With a 2-foot fall height.

Q Okay.

A And AH points that out in their document.

Q Okay.

A They say, on Page 4-2, if I might, "However, Holcomb Boulevard water treatment plant, because of the absence of recarbonation, water falls approximately 2 feet to the bottom of the pipe section."

MS. BAUGHMAN: Can I -- do you have any stickers over there?

THE REPORTER: (Hands exhibit stickers to Ms. Baughman.)

MS. BAUGHMAN: Thank you.

What's our next one? Next exhibit?

MS. O'LEARY: We're at 14.

MS. BAUGHMAN: 14 is next?

MS. O'LEARY: No. 15.

MS. BAUGHMAN: 15. Thank you.

MS. HORAN: Do you want to just do Plaintiffs' Exhibit 1?

MS. BAUGHMAN: It does say Plaintiffs'

Exhibit. You want me to start with 1, then?

MS. HORAN: Yeah, I think that would probably be cleaner.

MS. BAUGHMAN: Okay. All right.

(Plaintiffs' Exhibit 1 marked for identification)

MS. HORAN: Do you have a copy of it for me?

MS. BAUGHMAN: Yes. But I'm just not quite ready yet.

MS. HORAN: Oh, Sorry.

MS. BAUGHMAN: Give me a second.

Q (BY MS. BAUGHMAN) If you could turn to Page 16 of your report which is Exhibit 2.

A (Witness complies.)

Q Okay. I'm going to turn your attention to the second full paragraph where you refer to Maslia's table -- and this is in the context -- this is discussing your Opinion Number 2; correct?

A Say again. This is...

Q Okay. So just for context, we're talking about Opinion Number 2 here.

A 2. Correct.

Q Okay. And in this Page 16, the second full paragraph, you reference a document CLW606

regarding the July 28, 1982 samples.

Do you see that?

MS. HORAN: Objection to form.

THE WITNESS: Yes.

Q (BY MS. BAUGHMAN) Okay. So I'm going to hand you what I've marked Plaintiffs' Exhibit 1. And is Plaintiffs' Exhibit 1 CLW606 that you referenced in your report at Page 16?

A Yes.

Q It is? Okay.

So in your report, you're referring to samples of the Hadnot Point water treatment plant taken on July 28, 1982; correct?

MS. HORAN: Objection to form.

I think you meant Tarawa Terrace.

MS. BAUGHMAN: Thank you. Let me -- let me -- let me try that again.

Q (BY MS. BAUGHMAN) On your report on Page 16, when you're referring to CLW606, you're referring to July 28, 1982 samples taken at Tarawa Terrace.

A Yes. Tarawa Terrace. Yes.

Q And they're both raw water and treat water; correct?

A Yes. Correct.

Q And what were the findings?
A The raw water was 76 and the treated water was 82.
Q Okay. Samples taken on the same day?
A Yes. That's --
Q Okay. And you cited Exhibit 1, CLW606, in support of that proposition; correct?
A Correct.
MS. HORAN: Objection to form.
Q (BY MS. BAUGHMAN) Okay. I want to turn your attention to -- well, first of all, the first page of 606. This tells -- who wrote this document? Who's the author?
MS. HORAN: Objection to form; foundation.
MS. BAUGHMAN: What's the objection to asking who the author is so I can -- so I can rephrase the question, what's the objection?
MS. HORAN: So I mean, we can all read what this document says, but I don't know if what he's --
MS. BAUGHMAN: So what's wrong with the form?
MS. HORAN: -- his understanding of this is.

MS. BAUGHMAN: Okay. Okay.

Q (BY MS. BAUGHMAN) Dr. Sabatini, who is the author of Exhibit 1, CLW606?

MS. HORAN: Same objection.

THE WITNESS: Ms. Betz.

THE REPORTER: I'm sorry. What was the answer?

THE WITNESS: B-e-t-z.

Q (BY MS. BAUGHMAN) Okay. And what was Ms. Betz's job title, according to the document?

A Quality control lab.

Q Okay. So if you turn to the second page on Paragraph Number 8, does Ms. Betz provide any opinion regarding the significance of the raw and treated samples that you cite in your report in terms of what she thought about what that told her?

MS. HORAN: Objection to form; foundation.

THE WITNESS: Point 8, she comments on the tetrachloroethylene from Tarawa -- well, yes, she does.

Q (BY MS. BAUGHMAN) And what does she say?

A Level of tetrachloroethylene from Tarawa

Terrace system averaged --

Q Let me withdraw that.

A Okay.

Q Let me ask you this.

Do you see where she starts with "therefore"?

A Therefore. Therefore. Yes. Okay.

Q Okay. What does Ms. Betz tell us in terms of what she thought the difference was between the raw and treated samples at Tarawa Terrace?

A "Therefore, with no significant difference between raw and treated samples."

Q Okay. So what -- so Ms. Betz -- you see at the bottom, she signed this document?

A Supervisor chemist.

Q With a signature; correct?

A Correct.

Q So do you agree with Ms. Betz that there was no significant difference between the raw and treated samples at Tarawa Terrace on July 28th of 1982?

MS. HORAN: Objection to form.

THE WITNESS: Correct.

Q (BY MS. BAUGHMAN) What was your answer?

A Yes. Correct.
Q Okay. And let me ask you this. You also looked at some comparisons between raw and treated samples for Hadnot Point; correct?
A Yes. On -- yes.
Q Okay. And you discuss that on Page 15 of your report.
A Correct.
Q Okay. And defense counsel asked you some questions about the December 4, 1984 samples. But can you tell me what the results were for July 27, 1982, in terms of the difference between the raw and treated samples at Hadnot Point?
A July 27th. Nineteen and 21.
Q '82.
A Yeah. 19 micrograms per liter and 21 micrograms per liter.
Q Okay. Now, you've referenced that and several other pairs of samples taken for raw and treated on the same day for Hadnot Point; correct?
A Correct.
Q Okay. So what significance if any to your opinions is there comparing these raw

untreated samples at Hadnot Point and Tarawa Terrace with regard to your Opinion Number 1?

A They were reinforced -- they validate -- they support the lack of volatilization minimal to -- minimal to negligible volatilization. They help support my calculations that the losses would be minor.

Q Okay.

A They help support my opinion which was minor losses.

Q Now, I want to go back to the AH 2004 report for a moment. Do you know what AH based its opinions and conclusions on in that report?

MS. HORAN: Object to the form.

THE WITNESS: Well, they state it upfront. So Page 1-1. Bottom paragraph. They're retained by Camp Lejeune. Scope of work included developing estimates. As part of this effort, AH conducted a literature review, a search of appropriate archives to assist in the development referenced estimates of VOC losses, removal rates.

And also in their 2005 expert panel, they discuss further the -- all that they did. Evaluating all the basins, looking for any

disruptions in the basins, et cetera.

Q (BY MS. BAUGHMAN) Okay. Give me just a moment.

Okay. If you could turn to Page 2-5. Section 2.3 under water plant descriptions.

A Uh-huh.

Q What did AH base its description of the water plant on?

A Based on interviews with base personnel, site visits, examinations of design, and as-built drawings pertain to part of this project.

Q Okay. Do you know whether AH, in coming up with its opinions and conclusions regarding the extent of volatilization at the water treatment plants at Camp Lejeune, whether they took into account any kind of agitation or splashing in the tanks or the air -- or the water towers or the water reservoirs?

A In their expert report, they comment that they looked for any evidence of agitation and they narrowed it down to the things that they based their calculations on.

Q So when you say expert report --

A I'm sorry. Panel. Expert panel.

Q Okay. And when you expert panel, are

you referring to the comments by Dr. Pommerenk?
A Yes.
Q From what year?
A 2005.
Q Okay. And so what did Dr. Pommerenk say in 2005 rather about whether they took agitation into account in reaching their conclusions on volatilization?
A Said that they took all those factors into consideration in identifying where they needed to focus their calculations and their estimations.
Q Okay.
MS. BAUGHMAN: Okay. I'll pass the witness.

FURTHER EXAMINATION

BY MS. HORAN:
Q Do you know what percentage of water in any of the paired treated and untreated samples that you cited in your report -- do you know if -- what wells any of those samples came from?
A What any of those...
Q Samples came -- what wells were on when those pairs were taken. Do you know what wells were on?

A Not off the top of my head. No.
Q Do you know whether the wells or pump rates of the wells consistent at the time of any of the paired treated and untreated samples?
MS. BAUGHMAN: Object to the form.
THE WITNESS: I'd have to look in the documentation.
Q (BY MS. HORAN) So sitting here today, you don't know the answer?
A No.
Q At one point in your questioning with your counsel about the amended materials considered list, you said in reference to new documents that were added that you've reviewed since filing your rebuttal report.
The CLW you mentioned. What document were you referencing when you said that?
A I don't remember the number. It was one that -- right now, I don't recall.
MS. BAUGHMAN: I handed you what I thought it was earlier today. You can ask him if that's it.
THE WITNESS: Yeah, that's --
MS. BAUGHMAN: And to tell you the truth, that document that I handed you, the

important part, is 606 which he already had.

THE WITNESS: Okay. That's it then.

Q (BY MS. HORAN) It's the 606 document that you were thinking of?

A Yes.

Q It doesn't look like that was included.

MS. HORAN: This is not intended to be a memory test. Could you just identify?

MS. BAUGHMAN: Can I see that one?

MS. HORAN: (Hands document to Ms. Baughman.)

MS. BAUGHMAN: Yeah. Thank you.

Can we go off the record for a second.

THE VIDEOGRAPHER: We're off the record at 6:13 p.m.

(Off the record from 6:13 p.m. to 6:14 p.m.)

THE VIDEOGRAPHER: We're back on the record at 6:14 p.m.

Q (BY MS. HORAN) Would you agree that if pump rate or fractive pumping of wells that were the source of contamination varied such that the system was not always at a steady state for contaminant concentration entering the water treatment plants --

MS. BAUGHMAN: Objection to the form.

Q (BY MS. HORAN) -- then the samples would not show a quantity of treatment losses?

MS. BAUGHMAN: Object.

Q (BY MS. HORAN) When I say the samples, I mean the paired samples.

A That's speculative. There's certainly that possibility.

MS. HORAN: I don't know that we need to --

Q (BY MS. HORAN) I believe you testified earlier that you had reviewed Dr. Longley's expert report. He's the historian.

A Dr...

Q Longley. He's a historian.

A Yes. Yes.

MS. HORAN: We don't -- we don't see this on the materials considered list.

MS. BAUGHMAN: I think he's confused. I think he reviewed Brigham, and he's thinking Longley. I -- I don't know that he's reviewed Longley. I don't think he has.

MS. HORAN: Well, could you follow up and follow up with us?

THE WITNESS: Longley's --

Q (BY MS. HORAN) The historian.

A Right.
Q Yeah.
MS. HORAN: Can we just -- can you just follow up with us, Laura? We'll just find out.
MS. BAUGHMAN: Hold on. Okay. Are you done?
MS. HORAN: Yeah. Nothing further.
MS. BAUGHMAN: Okay. I'll tell you, for the record -- I've confirmed it -- he's never been provided Longley. He's confused because you're saying "historian".
THE REPORTER: We're still on?
MS. BAUGHMAN: Yes. We're still on.
He's confused because you're saying historian, so he's assuming that's the historian that he had reviewed. Okay? He reviewed Brigham, and that's on the list.
MS. HORAN: We just wanted to understand the --
MS. BAUGHMAN: So I'm not going to supplement because --
MS. HORAN: That's fine.

FURTHER EXAMINATION

BY MS. BAUGHMAN:
Q How many -- let me -- I'm going to ask

you a few follow-ups.

How many different historian expert reports did you review?

A One that I recall.

Q Okay. Was that Dr. Brigham?

A Yes.

Q Okay. So did you review Dr. Longley's report?

A Not to my recollection.

Q Okay. Were you confused because she used the word historian?

A Yeah. Historian. I mean....

Q Okay. Let me just ask you a couple of other things.

So you have these paired samples that you're relying on for your Opinion Number 2 which also relate to your Opinion Number 1 which you talked about earlier; right? Correct?

A Correct.

Q Okay. And you've been asked by defense counsel some questions about, well, do you know which wells were pumping and what if they changed.

What's the likelihood that that wells would be pumping differently on the same day such

that it would change the results?
MS. HORAN: Objection to form.
Q (BY MS. BAUGHMAN) What's your opinion on that based on all the work --
A That seems --
Q -- based on all of the work you've done and the documents you've reviewed?
MS. HORAN: Objection; foundation.
THE WITNESS: That would seem very unlikely. Very unlikely.
Q (BY MS. BAUGHMAN) Does the concept that the different wells could have been pumping at different times on the same day change your confidence in your reliance on the paired samples to support your Opinions 1 and 2?
MS. HORAN: Objection to form.
THE WITNESS: No.
Q (BY MS. BAUGHMAN) And why is that?
A Just the unlikely nature in that it would happen on each of those episodes and each of those times.
Q (BY MS. BAUGHMAN) Okay.
MS. BAUGHMAN: I'll pass the witness.
MS. HORAN: Nothing.
MS. BAUGHMAN: Go ahead.

MS. HORAN: Nothing further.

Thank you, Dr. Sabatini, for your time today.

THE WITNESS: Thank you.

THE VIDEOGRAPHER: We're off the record at 6:19 p.m.

THE REPORTER: Can both of you right here state just for the record, your order for the transcript? Are you ordering the transcript?

MS. BAUGHMAN: Yes. But that's all with Golkow, and there's a whole leadership committee. So I want whatever we normally do. Okay.

MS. HORAN: Can we have a three-day turnaround, please?

(Deposition concluded at 6:19 p.m.)

J U R A T

STATE OF OKLAHOMA)
) SS:
COUNTY OF _____)

I, DAVID ALLEN SABATINI, PH.D, PE, BCEE, do hereby state under oath that I have read the above and foregoing deposition in its entirety, and that the same is a full, true, and correct transcription of my testimony so given at said time and place, except for the corrections noted.

_____
DAVID ALLEN SABATINI, PH.D, PE, BCEE

Subscribed and sworn to before me, a Notary Public in and for the State of Oklahoma by said witness, DAVID ALLEN SABATINI, PH.D, PE, BCEE, on the _____ day of _____ 2025.

_____
Notary Public in and for the
State of Oklahoma

My Commission Expires:_____

My Commission Number:_____

C O R R E C T I O N S H E E T

NAME: DAVID ALLEN SABATINI, PH.D., PE, BCEE
CASE: IN RE: CAMP LEJEUNE WATER LITIGATION
DATE: APRIL 11, 2025
REPORTER: LANA L. LEDFORD, CSR

PG/LN	CORRECTION	REASON FOR CORRECTION
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C E R T I F I C A T E

STATE OF OKLAHOMA)
) SS:
COUNTY OF OKLAHOMA)

I, Lana L. Ledford, a Certified Shorthand Reporter within and for the State of Oklahoma, certify that DAVID ALLEN SABATINI, PH.D, PE, BCEE was sworn to testify the truth; that the deposition was taken by me in stenotype and thereafter transcribed by computer, and is a true and correct transcript of the testimony of the witness; that the deposition was taken on APRIL 11, 2025, AT 120 NORTH ROBINSON AVENUE, 4TH FLOOR, OKLAHOMA CITY, OKLAHOMA 73102; that I am not an attorney for nor relative of either party, or otherwise interested in this action.

Witness my hand and seal of office on the 16TH day of APRIL 2025.

<%824,Signature%>

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LANA L. LEDFORD, CSR
for the State of Oklahoma
CSR #01776

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

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VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

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