BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 010503-WU

In the Matter of:

APPLICATION FOR INCREASE IN WATER RATES FOR SEVEN SPRINGS SYSTEM IN PASCO COUNTY BY ALOHA UTILITIES, INC.
_____/

ELECTRONIC VERSIONS OF THIS TRANSCRIPT ARE A CONVENIENCE COPY ONLY AND ARE NOT THE OFFICIAL TRANSCRIPT OF THE HEARING, THE .PDF VERSION INCLUDES PREFILED TESTIMONY.

VOLUME 3

Pages 240 through 369

PROCEEDINGS:	HEARING
BEFORE:	CHAIRMAN BRAULIO L. BAEZ COMMISSIONER J. TERRY DEASON COMMISSIONER RUDOLPH "RUDY" BRADLEY COMMISSIONER CHARLES M. DAVIDSON COMMISSIONER LISA P. EDGAR
DATE:	Tuesday, March 8, 2005
TIME:	Commenced at 9:30 a.m. Concluded at 6:25 p.m.
PLACE:	Betty Easley Conference Center Hearing Room 148 4075 Esplanade Way Tallahassee, Florida
REPORTED BY:	JANE FAUROT, RPR Official FPSC Reporter (850) 413-6732
APPEARANCES:	(As heretofore noted.)

I N D E X

WITNESSES

EXHIBITS

PROCEEDINGS

(Transcript follows in sequence from Volume 2.)

CHAIRMAN BAEZ: We'll go back on the record. We have Witness Sowerby.

Mr. Sowerby, will you stand up and raise your right hand.

(Witness sworn.)

CHAIRMAN BAEZ: Mr. Jaeger.

JOHN R. SOWERBY, P.E.

was called as a witness on behalf of the Commission Staff, and having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. JAEGER:

Q Mr. Sowerby, please state your name and business address for the record.

A John Sowerby, Florida Department of Environmental Protection, 2600 Blair Stone Road, Tallahassee, Florida.

Q And in what capacity are you employed by DEP?

A I'm a professional engineer in the drinking water program.

Q Have you prefiled direct testimony in this docket consisting of six pages?

A Yes, I have.

Q Do you have any changes or corrections to your testimony?

A No.

Q No?

A No.

Q If I asked the same questions today, would your answers remain the same?

A Yes.

MR. JAEGER: Chairman, may we have Mr. Sowerby's testimony inserted into the record as though read.

CHAIRMAN BAEZ: Without objection show the testimony, that will be the direct testimony of John Sowerby, entered into the record as though read.

MR. JAEGER: And there were no exhibits.

DIRECT TESTIMONY OF JOHN R. SOWERBY

Q. Please state your name and business address.

A. John R. Sowerby, Florida Department of Environmental Protection, 2600 Blair Stone Road, Tallahassee, FL 32399-2400.

Q. Please state a brief description of your educational background and experience.

A. I hold a Bachelor of Civil Engineering Degree from the University of Delaware and a Master of Science Degree in environmental engineering from the Johns Hopkins University. I have over 27 years of experience in the design review, permitting, construction inspection, and regulation of public drinking water facilities and public wastewater facilities. During that time, I have been employed as a public health engineer with the Maryland Department of Health and as a professional engineer with the Florida Department of Environmental Protection. I am a licensed professional engineer in the States of Florida, Maryland, and Virginia.

Q. By whom are you presently employed?

A. The Florida Department of Environmental Protection.

Q. How long have you been employed with the Department of Environmental Protection and in what capacity?

A. I have been employed by the Florida Department of Environmental Protection for approximately 20 years. For the first 7.33 years, I was employed as a professional engineer in the Department's Bureau of Local Government Wastewater Financial Assistance. For the past 12.67 years, I have been employed as a professional engineer in the Department's Drinking Water Program.

Q. What are your general responsibilities at the Department of Environmental Protection?

A. I develop and write State rules regulating the design, permitting, construction, operation, and staffing of public drinking water systems, and I provide guidance on the

implementation of these rules. Additionally, I have developed and written State primary drinking water standards for disinfectants and disinfection byproducts, and I provide guidance on the implementation of these standards.

Q. Are you familiar with the Aloha Utilities water systems in Pasco County, particularly the Seven Springs system?

A. No, I am not familiar with any details of the Aloha Seven Springs System, but I understand that the system is a community water system, and I can address questions concerning application of our rules to the system and questions concerning whether the system is complying with our rules.

Q. Does the finished water produced by the utility meet the State and Federal maximum contaminant levels for primary and secondary water quality standards?

A. Yes, based upon information provided to me by the Department's Southwest District Office, Aloha currently meets all applicable primary or secondary drinking water standards.

Q. Does this include the lead and copper rule?

A. Yes, the lead and copper rule is considered a primary drinking water standard, and based upon information provided to me by the Department's Southwest District Office, Aloha currently complies with the lead and copper rule.

Q. Has the utility's compliance with the lead and copper rule resulted in a lessening of the monitoring requirements?

A. Yes, based upon information provided to me by the Department's Southwest District Office, Aloha has optimized its treatment for lead and copper and qualifies for reduced monitoring.

Q. Does the utility maintain the required chlorine residual or its equivalent throughout the distribution system?

A. Yes, based upon information provided to me by the Department's Southwest District

Office, Aloha consistently maintains throughout its distribution system a free chlorine residual equal to, or greater than, the minimum 0.2 mg/L required by the Department.

Q. **Has the utility been the subject of any** Department of Environmental Protection enforcement action within the past two years?

A. No, based upon information provided to me by the Department's Southwest District Office, Aloha has not been the subject of any Department enforcement action within the past two years.

Q. **Concerning hydrogen sulfide in drinking** water, what rules does the DEP have in place that addresses hydrogen sulfide concentrations?

A. The Department has a secondary standard, or secondary maximum contaminant level, for odor of 3 as a threshold odor number and a secondary standard, or secondary maximum contaminant level, for color of 15 color units. Additionally, the Department has a fairly new rule, Rule 62-555.315(5), requiring that applicants for a construction permit to connect a new or altered well to a community water system provide appropriate treatment as necessary to reduce total sulfide in the water from the new or altered well to less than 0.3 mg/L.

Q. **What was the reasoning behind the implementation of the DEP's rule for total sulfides** in a new or altered well?

A. The rule was recommended in the final report for the Interagency Copper Pipe Corrosion Project, which was completed several years ago and involved the Florida Public Service Commission, the Florida Department of Environmental Protection, and the Florida Department of Community Affairs. I was not directly involved in the project.

Q. **How would those rules addressing odor, color, and total sulfides apply** to Aloha Utilities?

A. The secondary standards for odor and color apply to Aloha, and based upon information provided to me by the Department's Southwest District Office, Aloha currently

meets the standards. The rule requiring appropriate treatment as necessary to reduce total sulfides in water from new or altered wells would apply to Aloha only if Aloha were to request a construction permit to connect a new or altered well to its system, and even then, the rule would apply only to water from the new or altered well and not to water from existing wells.

Q. What is the point in Aloha's system where the utility would draw a sample for testing to comply with DEP requirements, such as odor or color?

A. Samples for odor and color must be taken at each entry point to a water system's distribution system.

Q. As related to testing, is it true that for the most part, samples are collected at the water plant, at its introductory point to the distribution system?

A. Yes, samples for most contaminants, including inorganic contaminants other than asbestos, organic contaminants, radionuclides, and secondary contaminants, must be taken at each entry point to a water system's distribution system. However, samples for asbestos, disinfectant residuals, disinfection byproducts, or coliform bacteria must be taken in the distribution system, and samples for lead or copper must be taken at customers' taps.

Q. Would the DEP have a problem with any utility testing at additional points in the distribution system, other than the entry point at the treatment plant?

A. No, the Department would have no problem as long as the utility tested at the locations required by our rule as well as at such additional points.

Q. What about frequency of testing? Would the DEP have a problem if the utility conducted tests more frequently than the DEP's rules require?

A. No, the Department would have no problem if a utility were to conduct tests more frequently than required by our rules.

Q. Are you familiar with the hydrogen peroxide pilot project now being conducted at

Aloha's Seven Springs water system?

A. No.

Q. The parameter set by the Copper Corrosion and Black Water rule for total sulfides states that total sulfides should not exceed 0.3 mg/l in the finished water. Is this a goal or an action level, and does it apply only to new or altered wells?

A. Rule 62-555.315(5), Control of Copper Pipe Corrosion and Black Water, requires that appropriate treatment be provided to reduce total sulfide in the water from a new or altered well if total sulfide in the raw water from the well equals or exceeds 0.3 mg/L. I would call this 0.3 mg/L total sulfide level an action level because it is the level at which a construction permit applicant must act to provide appropriate treatment. This action level applies only to water from new or altered wells being connected to a community water system.

Q. Is it your testimony that the amount of sulfides in Aloha's drinking water is acceptable under the DEP's rules?

A. Yes. The Department has no standard or requirements, other than the requirements under Rule 62-555.315(5), regarding sulfide in drinking water.

Q. Would the DEP allow Aloha to treat its water for total sulfides removal to enhance the water quality?

A. Yes, but if this were to involve the construction of new water system facilities or the alteration of existing water system facilities, Aloha would first have to obtain a construction permit from the Southwest District Office of the Department.

Q. Do you know if a permit has been applied for by Aloha to modify its treatment process?

A. I understand, based upon information provided to me by the Southwest District Office of the Department, that Aloha applied for a construction permit to convert from chlorination to chloramination and that the Southwest District Office issued the permit on December 30,

2004, allowing for this conversion.

Q. Do you have anything further to add?

A. No.

MR. JAEGER: I tender Mr. Sowerby for cross.

CHAIRMAN BAEZ: Thank you, Mr. Jaeger.

And I'm not quite sure how to do this one, but we can start with Mr. Beck.

MR. BECK: Thank you, Mr. Chairman.

CROSS EXAMINATION

BY MR. BECK:

Q Good afternoon, Mr. Sowerby.

A Good afternoon.

Q I would like to ask you a few questions to begin with on Rule 62-555.315(5) that you refer to in your testimony. At Page 3 of your testimony between Lines 12 and 15 you state that the Department has a fairly new rule, and give the rule number, requiring that applicants for a construction permit to connect a new or altered well to a community water system provide appropriate treatment as necessary to reduce total sulfide in the water from the new or altered well to less than .3 milligrams per liter, is that right?

A That's right.

Q You also at Page 5 of your testimony, Lines 6 through 8, you state that the rule requires that appropriate treatment be provided to reduce total sulfide in the water from a new or altered well if the total sulfide in the raw water from the well equals or exceeds .3 milligrams per liter, is that right?

A That's right.

Q I passed out an exhibit, a cross-examination exhibit that is a copy of the rule. Do you have that there?

A Yes, I do.

Q Could you turn to Subpart 5 of the rule?

A All right.

Q First of all, this rule only applies to new wells after August 28th, 2003, is that right?

A New or altered wells, yes, sir.

Q So it doesn't apply to the wells that Aloha is currently using, is that right?

A Assuming that they existed prior to that date no, it would not apply.

COMMISSIONER BRADLEY: Excuse me.

CHAIRMAN BAEZ: Hold on, Mr. Sowerby. I want to clear up something in my mind. Would you define what an altered well is? Mr. Beck, I'm sorry, I want to --

THE WITNESS: We would consider an altered well as one that is changing the depth, changing the location where the water was being withdrawn which could, therefore, change the quality of the water.

COMMISSIONER BRADLEY: Okay. Thank you.

CHAIRMAN BAEZ: Go ahead, Mr. Beck.

BY MR. BECK:

Q And the rule requires them to measure, among other things, sulfide, or take a sample in the new or altered well,

does it not?

A Yes, sir.

Q And if the total sulfide equals or exceeds .3 milligrams per liter in the raw water, it requires certain items, does it not?

A That's correct.

Q And what it does, it requires the removal of the total sulfide as necessary, is that right?

A That's correct.

Q And it also says that direct chlorination shall not be used to remove, i.e., oxidize .3 milligrams per liter or more of total sulfide unless the elemental sulfur formed during chlorination is removed, is that right?

A That's correct.

Q What is the concern of the rule that requires removal of the sulfur?

A Let me start by mentioning this. This rule is a product of an interagency copper pipe corrosion project which I was not a direct part of. So I cannot say for certainty what all the thought process was in that project. But elemental sulfur, the concern is that that can be converted back to hydrogen sulfide, or reduced back to hydrogen sulfide leading to potential problems in black water.

Q So the rule doesn't require or doesn't prohibit chlorination, it just requires removal of the sulfur if it

exceeds certain levels in the raw water, is that right?

A That's correct.

Q With respect to Aloha, have you read the transcripts from this case, for example, the customer proceedings in this case?

A No, I have not.

Q Have you reviewed customer complaints about Aloha to the Public Service Commission?

A No, I have not.

Q Have you seen any of the black water that customers have reported?

A No, I have not.

Q Do you have any specific knowledge related to Aloha Utilities as opposed to just general knowledge about the rules?

A No, I do not.

Q With respect to Aloha's compliance with DEP rules, did you look at any of the source materials regarding their compliance with DEP rules?

A No, I did not look directly at the data. I asked our district office about the compliance status and was given information from that office.

Q You simply asked them are they in compliance, and they told you that they were?

A That's correct.

MR. BECK: That's all I have. Thank you.

CHAIRMAN BAEZ: Mr. Wharton, do you have questions?

CROSS EXAMINATION

BY MR. WHARTON:

Q Good afternoon, Mr. Sowerby.

A Good afternoon.

Q With regard to the questions that Mr. Beck was just asking you about determining that Aloha is in compliance with DEP's rules, is that what you would normally do if you were trying to learn that kind of information, contact your people in the field?

A Yes, it is.

Q Or the field offices?

A Yes, it is, Tallahassee district -- well, our day-to-day compliance, enforcement, data-keeping, data-entry is all done at our district offices, or in the case of ten counties, it is the county health department.

Q Sir, you say in your testimony that DEP does not have a rule on hydrogen sulfide, other than the one you have been describing for new or altered wells, correct?

A That's correct.

Q Are you aware that one of the issues in this case is whether the Commission should establish an MCL for Aloha on hydrogen sulfide?

A I'm vaguely aware from just having been sitting in here this afternoon.

Q Isn't it true that you have been intimately involved over the course of your career with the implementation of new rules at DEP or the changing of existing rules?

A Yes, I have.

Q Now, you have been with the department 12 years and in your time DEP has never chosen to establish an MCL without it coming from EPA first, correct?

A I have been with the department for about 20 years. I have been with the drinking water program for over 12. And while with the drinking water program, that is correct, we have not ever attempted to promulgate an MCL that did not originate from EPA.

Q EPA goes through a very involved process before it determines that a particular MCL should be established, doesn't it?

A Yes, it does.

Q Isn't it true that they look at the contaminants on the unregulated list, and they move it to their monitoring list, they do health studies, they look at laboratory tests, and that they also consider cost/benefits?

A Yes, sir, particularly with regard to the primary drinking water standards, yes, sir.

Q Can it take years from its initiation at EPA until a particular MCL is put into place?

A Yes, it can.

Q Just so the record is clear, Mr. Sowerby, do you agree that there is no DEP rule which would require Aloha in any way, shape, or form to meet a goal, action level, MCL, or anything else of 0.1 mg/L of hydrogen sulfide in their water?

A That's correct.

Q There is no DEP rule which requires Aloha to meet any particular level of hydrogen sulfide at any point in their system, correct?

A That is correct.

Q Do you have any idea how many water wells in the State of Florida were grandfathered under the rule that Mr. Beck talked to you about?

A No, I do not.

Q Do you think it is over 10,000?

A I couldn't say.

Q Do you think thousands would be a safe bet?

A I couldn't say. I have no idea what that number is.

Q Let's try this. Do you have any idea how many drinking water wells are in the State of Florida?

A I believe it's -- public water system wells, I believe it is somewhere in the neighborhood of 10,000.

Q And all of those wells that either existed before the date you talked about in 2003 or have not been altered since that date are not covered under that rule, correct?

A That's correct. The rule applies only to community

water system wells. And the number I gave you is total public water system wells. So there is about 10,000 public water system wells out there. As far as how many are community water system wells, I really don't even have a guess.

Q What is the difference between those two?

A A public water system is a water system that serves water to the public, 25 or more people 60 days or more out of the year. Public water systems are then divided up into three subsets. There is community water systems which serves 25 or more year-round residents, or 15 or more service connections to year-round residents. And those are the typical water systems that most people think of when they hear the word utility. There are also, though, noncommunity water systems which then are divided into two categories, nontransient noncommunity and transient noncommunity water systems. I don't know if you want me to go into an explanation of those here.

Q No.

A Thank you.

Q Sir, you agree, don't you, that the primary drinking water standards are designed to protect public health?

A Yes, sir.

Q And the secondary drinking water standards are geared toward aesthetic qualities in providing water that is aesthetically acceptable?

A Yes, sir.

Q Isn't it true that it is your opinion that the primary and secondary drinking water standards that apply to utilities in Florida are adequate to safeguard the health of water consumers?

A Yes.

Q And it is also your opinion, isn't it, that if DEP felt there was some inadequacy in a current primary or secondary drinking water standard, they would be trying to do something about that?

A That's correct.

Q And you are not aware, are you, of DEP currently contemplating imposing or establishing any standard with regard to hydrogen sulfide?

A No, we are not.

Q And to your knowledge neither is EPA, correct?

A Not to my knowledge.

Q Sir, it is your testimony that Aloha does consistently maintain the chlorine residual to the level required by DEP, correct?

A Yes, based on information I've gotten from the district office.

Q Now, hydrogen sulfide cannot exist in the presence of free chlorine, can it?

A Not to my understanding, no.

Q So if free chlorine is present at any particular

point in the system, there cannot be hydrogen sulfide at that particular test point, correct?

A That would be my understanding, yes, sir.

Q And part of the testing for free chlorine that DEP requires is testing at remote points in the system, correct?

A We require that systems serving more than 3,300 test five days a week at a remote point in the system. It is a single point.

Q Do you know how many points Aloha tests at?

A No, I do not.

Q Aloha is also in compliance with DEP's secondary standards for odor, correct?

A Again, based on my information from the district office.

Q Isn't it true, sir, that the majority of sampling points for contaminants regulated by DEP are tested at the entry points to a water system's distribution system?

A The majority of them are tested at the entry point. There are some that are tested in the distribution system.

Q There were several questions in your prefiled testimony to the effect of would DEP have an objection if Aloha did a certain thing. Do you recall those lines of questions?

A I believe you're talking about the questions relating to sample frequency and so forth, and that's correct, DEP would have no objections to a utility sampling above and beyond the

minimum requirements in our rules.

Q Isn't it true, sir, so that so long as a given utility is meeting DEP's rules for the testing of contaminants, DEP would never be concerned if a utility was taking more tests than were required, or was taking those tests in a greater number of locations than was required, or was testing for contaminants that they weren't required to test for, DEP would have no objection in those cases?

A That is correct, we would have no objection.

Q In fact, DEP doesn't have any jurisdiction to tell a utility not to do those things, does it?

A That is correct.

Q Sir, isn't it true that you believe that the odor and color tests which are part of the secondary standards are used as an indirect measure of the level of hydrogen sulfide in the water?

A Yes. Especially the odor test, yes.

Q And those tests are required at the entry point from the water plant into the distribution system, correct?

A That's where all tests for secondary standards are taken, yes. The samples, yes.

Q To your knowledge, sir, isn't it true that DEP has performed chlorine residual tests in Aloha's water in the past, and all of those tests have shown Aloha to be in compliance?

A I'm sure that our inspectors have done testing of

chlorine residual in that system in the past. I cannot say with 100 percent certainty that they all showed compliance. I haven't reviewed that data.

Q But you are not aware of any that were out of compliance?

A No, I'm not.

Q And, isn't it true, sir, you have no knowledge that Aloha has failed to properly perform the tests that DEP requires Aloha to engage in?

A That is correct.

MR. WHARTON: That's all we have, Mr. Chairman.

CHAIRMAN BAEZ: Commissioners, do you have any questions at this point?

COMMISSIONER BRADLEY: I have one question.

CHAIRMAN BAEZ: Go ahead, Commissioner.

COMMISSIONER BRADLEY: What would the rationale be for DEP testing some water at the well and some within the transmission system, why is that? Why is it that you do some -- why is there a difference? Why do you have two methods?

THE WITNESS: I believe you are asking why do we sample sometimes at the entry point to the distribution system versus in the distribution system, is that correct?

COMMISSIONER BRADLEY: Exactly.

THE WITNESS: In general, we require testing for

chlorine residual, disinfection by-products, and coliform bacteria in the distribution system. Those things tend to or may change throughout a distribution system versus most of the other water quality parameters. There would be, in most cases, no reason to believe that they would change, so that's why they are sampled at the entry point only. Have I answered your question?

COMMISSIONER BRADLEY: Yes.

CHAIRMAN BAEZ: Mr. Jaeger, redirect.

MR. JAEGER: I just have one redirect question.

REDIRECT EXAMINATION

BY MR. JAEGER:

Q Aloha is going to chloramines and hydrogen peroxide possibly. Would that place them under this new rule?

A New rule meaning 62-555.315(5)?

Q Right. New wells or altered wells.

A No, it would not.

MR. JAEGER: Thank you. That's all I have.

MR. WOOD: Mr. Chairman, I have some questions.

CHAIRMAN BAEZ: Mr. Wood, I'm sorry if I skipped over you at the time. You go ahead and ask your questions, sir.

CROSS EXAMINATION

BY MR. WOOD:

Q Mr. Sowerby, on your testimony on Page 2, 12 through 22, you talk about Aloha being in compliance in the lead and

opper rule. If the water coming out of the taps of a goodly umber of consumers in the Aloha district is as black as the op of the coffee pot there in front of you, how can they be in ompliance with the copper rule?

MR. WHARTON: Objection, the question is leading.

MR. BECK: Leading questions are allowed.

MR. WHARTON: Well, maybe it is a hypothetical about :he water being as black as a --

MR. WOOD: If I can excused, Mr. Chairman, I will go)ut to the car --

CHAIRMAN BAEZ: I'm going to allow the question, Mr. Vharton. Do you want to restate it? Mr. Sowerby, do you need Mr. Wood to restate it?

MR. WOOD: If you want, I can go out to the car and I :an get a bottle of the black water and bring it in here.

CHAIRMAN BAEZ: That is not going to be necessary. I think if you allow Mr. Sowerby to have a crack at the question, we may get what we need.

THE WITNESS: Well, I'm not sure I have any way to answer that. To me it is a hypothetical question. Based on the samples that we are requiring, they meet the action level. I don't know how to answer that.

BY MR. WOOD:

Q In the testing for lead and copper, why are so many houses excluded?

A There are specific criteria that have to be met for sampling sites. The lead and copper rule is not my area of expertise, but there are a number of criteria that have to be met as far as when the house was constructed, whether or not it has point-of-entry point-of-use devices. Point-of-entry devices will exclude the site from being an acceptable site and so forth.

Q In what has brought this here, and we talked earlier about the exclusion of certain territories under Aloha, under another docket, based on what I look at there has never been a house in those areas that has been tested. Why would that be?

A You're asking me to guess about things that are not within my knowledge base. I have not looked at their sampling plans. I'm not familiar with the service area. I cannot answer that question.

Q But shouldn't the DEP rules take into consideration what is going on in current houses so that things like the lead and copper rule -- we say that there is no health problem, supposedly the copper is a lead problem or a health problem. Why aren't we doing something about it?

A Again, my understanding is they are meeting the lead and copper rule.

Q But if they are not testing, and that is where you have the copper, are they meeting the rule or is the rule so loose that anybody can skip through it?

A My understanding is they are testing at sampling locations that have been identified in a sampling plan prepared in accordance with our rules.

Q Well, up through 2001, and then they got a three-year extension, if you look at all the Xs that I have on this map, and you look at this area down here with no Xs, this area down here with no Xs is what has petitioned to be let go from Aloha.

MR. WHARTON: Mr. Chairman, I object. We are getting into testimony and evidence now.

CHAIRMAN BAEZ: Hang on. Mr. Wood, first of all I need to know what it is you are pointing at, first of all. Do you want to tell me?

MR. WOOD: Tell you, yes.

CHAIRMAN BAEZ: Well, let's tell everybody.

MR. WOOD: Okay, everybody. I have a map here of where the tests were conducted.

CHAIRMAN BAEZ: And where did you find that map?

MR. WOOD: I got this information from the Southwest Water District down in Tampa. I didn't get the map. I got all the information, and I made up the map from the information that was supplied from the Southwest Water District of the tests that were turned in by Aloha.

CHAIRMAN BAEZ: Oh, Mr. Wood.

MR. WHARTON: All I would ask, Mr. Chairman, is that if he is going to lay this as a hypothetical, maybe he can do

.t. He is assuming facts not in evidence.

CHAIRMAN BAEZ: Here is the problem. Here is the problem I have is that you are referring to something that hasn't been verified and it hasn't been admitted as evidence. I have my doubts as to whether it could be honestly, Mr. Wood. But if you want to try to pose your questions in a manner that doesn't involve whatever facts you believe you know about Aloha, then maybe you can get some answers that we can use.

BY MR. WOOD:

Q The big answer that I'm looking -- the big answer that I am looking for is if certain houses that have the problem are not being tested, why are the requirements of such that those houses are not being tested? And statistically, what is the relationship or the correlation between what is being tested and what is actually happening?

A I do not understand the question.

CHAIRMAN BAEZ: Can I try and --

MR. WOOD: Okay.

CHAIRMAN BAEZ: There seems to be a question as to whether the fact that you only sample -- I mean, your tests are not of all the houses, all the homes in a particular area. I mean, it couldn't be.

THE WITNESS: That's correct.

CHAIRMAN BAEZ: For so many reasons. I think Mr. Wood is trying to ascertain whether any of the houses that at

least purportedly have the problem don't seem to be in the sample that you test. I honestly don't know if there is an answer to that, frankly, but --

THE WITNESS: There may be, but I'm not privy to all of those details. I do not know the details of the system. I have not seen their sampling plan. I have not seen their results. So it is difficult. But the only thing I can tell you is there are certain criteria that you have to meet to be an eligible tier one sampling site. And perhaps none of these houses meet the criteria. I do not know.

CHAIRMAN BAEZ: And just for the record, you have referred a couple of times to sampling plans. The assumption is, or is it your knowledge that whatever sampling plans have been submitted to DEP have been approved, are in accordance with your rules?

THE WITNESS: That is correct.

CHAIRMAN BAEZ: Whatever the result of those are, but the sampling plans have to get approved beforehand?

THE WITNESS: Right. They have to submit a sampling plan. And, again, that is all reviewed and evaluated at our district level.

CHAIRMAN BAEZ: All right. Mr. Wood, do you have any other questions?

MR. WOOD: That's all.

CHAIRMAN BAEZ: Thank you, sir.

Mr. Jaeger, you had already had redirect.

MR. JAEGER: That's the only one I had. I had the one question.

CHAIRMAN BAEZ: All right. Then let's handle some exhibits if we have any.

MR. JAEGER: Mr. Beck, did you identify that Rule 32.555 as the next exhibit.

CHAIRMAN BAEZ: I don't know that we need that.

MR. BECK: I didn't ask that it be marked.

CHAIRMAN BAEZ: And I don't think that we need to.

Mr. Jaeger, I have Exhibit 19 that hasn't. I don't know if you ever moved that.

MR. JAEGER: No, I was right in the middle of starting Dr. Kurien, I was going to get him to identify it, to confirm it, and I got cut off in the middle of Dr. Kurien.

CHAIRMAN BAEZ: Mr. Sowerby doesn't have any exhibits, correct?

MR. JAEGER: No.

CHAIRMAN BAEZ: Mr. Sowerby, thank you for waiting. You are excused.

THE WITNESS: Thank you.

CHAIRMAN BAEZ: Are we ready for Dr. Kurien again? All right.

Doctor Kurien, you are still under oath, and I think we were at a point where Mr. Jaeger was going to cross.

MR. JAEGER: That's correct.

V. ABRAHAM KURIEN

resumed the stand as a witness on behalf of OPC/Customers, and, having been previously sworn, testified as follows:

CONTINUED CROSS EXAMINATION

BY MR. JAEGER:

Q Dr. Kurien, I think I started to ask you about that map I had provided. Have you had a chance to look at that?

A Yes.

Q The map of the Seven Springs Subdivision showing the wells and the water treatment plant at Mitchell Road?

A That is correct.

Q In your opinion, does that map accurately reflect Aloha's service territory?

A I don't know the location of all the wells. I know Wells 8 and 9 quite well. But, in general, the map is correct.

Q Dr. Kurien, it is my understanding that when hydrogen sulfide is oxidized that it can form either elemental sulfur or sulfate, is that correct?

A That's correct.

Q And it is your opinion that sulfate is not a real problem, is that also correct?

A No. Sulfate can be a problem if there is bacteria that can convert it back to hydrogen sulfide.

Q But sulfur is a bigger problem?

A Sulfur can cause problems for two reasons. One because being another sulfur compound it can be reduced to hydrogen sulfide, just like sulfate. Also, sulfur being colloid, that is it floats around in the solution, can act as what is called a nidus, a hiding place for bacteria. And this has been referred to by Mr. Porter and Doctor Levine in their writings.

Q Under what conditions will sulfate form when you are using chlorination as opposed to sulfur? Could you just explain that process real quickly.

A The oxidation of hydrogen sulfide occurs in two steps. Depending upon the amount of chlorination that is available, it can go to step number one, which is the production of elemental sulfur. And then if there is adequate amount of chlorination, it can go to sulfate. But in most underground water there are other substances that undergo oxidation when chlorine is added. So in reality, you can never reduce 100 percent sulfate. There will always be elemental sulfur when chlorination is used.

Q And what is this role of sulfur reducing bacteria? You say it can hide in the sulfur, or is that something else?

A Yes, it can hide in any floating matter within the liquid medium of water.

Q I believe in your testimony you talk about Well Number 9, and I'm referring to its chlorinator. You seem to

indicate that at high levels of hydrogen sulfide the chlorinator is somehow overwhelmed. And instead of reducing hydrogen sulfide to sulfate, that larger quantities are reduced only to sulfur, is that correct?

A That is correct. Doctor Levine showed in her audit report that the chlorinator at Well 9 can convert only 2.6 milligrams of hydrogen sulfide to sulfate. We had levels of up to 6.71 reported in that well. Therefore, when hydrogen sulfide levels in Well 9 are above 2.6, there will differently be elemental sulfur formed. And when it is as high as 6.71 milligrams, up to 3 milligrams of elemental sulfur can be formed.

Q Well, can't Aloha just pump up the amount of chlorine?

A Because if you put in a lot of chlorine, it still does not guarantee that it will go 100 percent to sulfate. Aloha could have done it better than the 25 milligrams that is available there. When the well was brought on line in 1995 or '96, it was known that the amount of hydrogen sulfide in that well was 4.3, and yet the chlorinator has the capacity of only 25 milligrams. So effectively that well is under-engineered. And I would have thought that Aloha would have detected that since they claim that they have experts working for them. Therefore, from the time that Well 9 was brought on, there was evidence to suggest that that well was capable of producing

elemental sulfur.

Q Is there also a top level on the chlorine due to trihalomethanes or haloacetic acid?

A No, the extent to which trihalomethanes and haloacetic acid is formed is proportional to the residual amount of chlorine. In fact, FDEP used to allow 5 milligrams of chlorine as the residual, now they have lowered it to 4 milligrams because of concern about increased production of trihalomethanes and haloacetic acid.

Q I think you also referred once to hydrogen peroxide as an untried or unproven method for oxidizing hydrogen sulfide, is that correct?

A Peroxide oxidizing hydrogen sulfide in drinking water. It has been used for wastewater treatment.

Q But you aren't aware of where it has been used for water oxidation?

A For drinking water it has not been used anywhere as a running project in the whole United States. Doctor Levine used it in Hillsborough County to remove sulfur. Because if you add small amounts of hydrogen peroxide to water it will immediately precipitate out all the sulfur, and you can filter that sulfur off. So when hydrogen peroxide is used, it is still possible to remove sulfur. We had a discussion earlier whether it was possible or not. It is still possible.

But the method that Doctor Levine has suggested for

Aloha does not include the use of filtration. So, there will always be elemental sulfur produced in that system also, just like it is being produced with chlorination alone. And that is the customers' concern. And that is why we have wanted a standard for elemental sulfur.

Customers have not objected to the use of hydrogen peroxide, and I think that is a false statement that has been made here. We have said that if Aloha is going to use its freedom to use whichever method it wants to, then it should also take into account the possibility of elemental sulfur being produced. And since there is a well-known association between elemental sulfur and black water, there should be a standard created for it.

All standards are created to prevent problems. And since Aloha has claimed that hydrogen sulfide formation in the plumbing of customers is responsible for the formation of copper sulfide, and we know from literature and from Doctor Levine's admission that elemental sulfur can also cause reduced disinfection capability, it is very important to have standards. If you choose a method, you must choose the standards appropriate to that method.

Q But does the hydrogen peroxide method have a greater capacity than chlorination? Is it better?

A It can do slightly better. Because chlorination produces only one atom of hydrogen per molecule of chlorine,

whereas hydrogen peroxide produces two atoms. **Therefore, there** will be a little bit more oxygen in hydrogen peroxide. But consider the fact that for hydrogen peroxide to work efficiently, you have to change the pH of water. And when it gets to the higher pHs, there is a risk that calcium will get precipitated out of water. And that is one of the concerns of other water experts who have indicated that they are not very comfortable with the use of hydrogen peroxide for treating drinking water. **That it is a very pH sensitive method. And if** the pH is not extremely well controlled, you will have what is called white water, because of the precipitation of calcium, rather than black water. And that is no solution.

Q Now, I believe it has been the testimony today, and I think it is also your testimony that there is no hydrogen sulfide in the presence of free chlorine residuals, is that correct?

A It is correct almost, or often enough, but it is not completely correct. Because as Doctor Levine said earlier, you are taking probably 30 CCs, 30 milliliters of water to do the test. You can have water that is outside that realm, especially water that is very close to the periphery of a tube which may not conform to that particular observation.

Q So you are saying that a chlorine test alone would not be sufficient to determine -- I'm sorry. Strike that.

That a chlorine test would not be sufficient, and a

test for hydrogen sulfide or sulfite would still be necessary?

A Yes. The reason for this is basically because the presence of residual chlorine neither excludes the possibility of hydrogen sulfide nor does it exclude the possibility of elemental sulfur. You can demonstrate both in this, even though it is not normally found. And that is because of where you test the sample.

Q Now, I believe you said Doctor Levine used a scanning electron micrograph to determine if sulfur was present in Aloha's water, is that correct?

A That's correct.

Q Is there any simple test other than scanning with an electron micrograph to determine if sulfur is there?

A Measurement of turbidity has been suggested as a method for detecting suspended material in water. It is not specific to elemental sulfur. But if you test the turbidity of water before it is processed and test it after it is processed, you can use the difference between the two turbidity measurements as an indicative measure of elemental sulfur.

Q Turn to Page 13, Line 17, I think that's where I have a question.

A Page 13?

Q Yes. Starting on Line 17. It is Page 13, Line 17, while I understand.

A Of my direct testimony?

Q This is of your testimony, direct. And you state, "While I understand that efforts will be made to convert all hydrogen sulfide to sulfate by pH adjustment more towards alkalinity, the likelihood that elemental sulfur will be formed in the presence of variable levels of hydrogen sulfide from the wells remains a real concern." Do you see that statement?

A Yes.

Q Where did you get that understanding?

A That understanding is based on the fact that there is -- if you inject or if you add a certain amount of hydrogen peroxide to water, then it can neutralize only so much of hydrogen sulfide. Because we know that the levels of hydrogen sulfide fluctuates, unless it is continuously monitored, it is difficult to dose the hydrogen peroxide correctly. Therefore, there is always that risk. And that is, again, one reason for trying to find a method, and I have suggested the use of turbidity differences between the raw water and the processed water as a way of indicating whether there is elemental sulfur.

Q Going on to the next page, Page 14, at the top, you use the word "stoichometrically"?

A Yes.

Q Can you tell me what that means, and specifically about the ratios of CL2 to H2S to get sulfate verse sulfur?

A Stoichometrically means the amount -- proportion of the amounts of two reacting substances. As far as chlorination

s concerned, when there is one molecule of chlorine for each molecule of hydrogen sulfide, you will still get hydrogen sulfide present as a gas or as an ion in water. If you raise the ratio to two-to-one, you can get rid of hydrogen sulfide, but still elemental sulfur will form. You have to get it up to 4-to-1 to reach the theoretical dose for chlorine. And in a lot of Aloha's wells. You never reach that 4-to-1 level, and that is why we come to the conclusion that elemental sulfur is being formed.

Q I want to make sure I understand your position on Issue 3, that is the number, frequency, and location of hydrogen sulfide tests. How many per month are you recommending total hydrogen sulfide tests for Aloha?

A I have suggested that they do two tests per month from each well site or distribution site of each well, so that is 16 tests. And you have to do tests in duplicate to know that a single measurement is not a false positive. So you are talking about 32 tests. **And I'm suggesting that as an initial** number, once process control is established you obviously will reduce the number of tests.

Q Looking at that map, how do you know when you are -- how far out do you go from the wells before you are getting next -- like 8 and 9 are in the bottom, and I think 3 and 4 are in the middle, and 1 and 2 are way off to the east, and 6 and 7 are way to the north. How do you know when you are testing for

Wells 8 and 9 as opposed to 3 and 4, where does that break off?

A One has to be able to use a little bit of common sense about it. Because most of the water from 8 to 9 go to the areas around it. Because even though Aloha maintains that they have an interconnected loop, most of the water from the well goes to areas nearest the well.

Q Your testimony about the 30 bacteriological testing sites --

A I have given no testimony about it. I know that they do exist.

Q But would testing at those sites --

A Testing at those sites would be satisfactory. But you can also test at sites where there is black water.

Q And is it your bottom line that if there is either hydrogen sulfide or sulfur which is easily converted to hydrogen sulfide and a source of copper, say a customer's pipes, then you will have the problem of copper sulfide, what we call black water being formed, is that correct?

A It is not my opinion that it will be solved that way. What I'm saying, basically, is that there are now two hypotheses about why copper corrosion occurs. One is that it is due to the presence of hydrogen sulfide in the water, whether because it is not adequately eliminated or whether because it reforms. And therefore it seems appropriate to test for hydrogen sulfide.

And since we have provided evidence today showing that Aloha's distribution system often has discolored water, we feel that it is not enough to test it at the well site. We need to test it in the periphery. Because, otherwise, this kind of report that is from Aloha's own records should not occur, and that was associated also with low levels of chlorine. Sometimes absolutely no chlorine. You also need to test for elemental sulfur for the same reason. Because there is a hypothesis that says that elemental sulfur is associated with black water. In fact, that recommendation was made in 1991, and it is almost 14 years.

Q But didn't you say there is no simple test for elemental sulfur?

A Yes, I said that. That is why I said that you can use turbidity differences between processed water and raw water as an indirect measure. And you need to do it only in areas where there are black water problems. You don't need to do it in areas where there is no black water problem, because you are just wasting money doing that test.

Q Looking at that map, that is Exhibit 19, is it the southern half of the Seven Springs territory that seems to have the most problem?

A That is what I'm most familiar with. Others may have problems, but I have not explored that to find out.

Q Trinity, Wyndtree, Wyndgate, Chelsea, Riviera, those

are on the south side. Those are the ones that seems to be having the most problem?

MR. WHARTON: I object. Are we laying the ground for the deletion case? Doctor Kurien hasn't testified about what neighborhoods have the worse problems. These three issues are system-wide. He just said he hadn't quantified it, and Mr. Jaeger is pushing him on the issue.

CHAIRMAN BAEZ: Mr. Jaeger, can you get the information some other way or rephrase your question.

MR. JAEGER: I will withdraw the question.

CHAIRMAN BAEZ: All right. Thank you.

MR. JAEGER: That's all I have, Chairman. That was my last question.

CHAIRMAN BAEZ: Commissioners, any questions of Dr. Kurien?

Mr. Beck.

MR. BECK: No redirect.

CHAIRMAN BAEZ: No redirect. Let's take Dr. Kurien's exhibits.

MR. BECK: I would move Exhibits 1 through 18.

CHAIRMAN BAEZ: Show Exhibits 1 through 18 moved into the record without objection.

MR. WHARTON: Just subject to our earlier discussion about the fact that some of them are hearsay.

MR. JAEGER: Staff would move Exhibit 19.

CHAIRMAN BAEZ: Without objection show Exhibit 19 moved into the record.

(Exhibit 1 through 19 admitted into the record.)

CHAIRMAN BAEZ: Thank you, Dr. Kurien. And thank you again for your patience and letting us move witnesses around.

Commissioners, would you like a five-minute break, ten-minute break to get squared away? And our next witness is Witness Porter. Does he have stuff to set up?

MR. WHARTON: He does have a demonstrative he can put on an easel.

CHAIRMAN BAEZ: All right. Well, we will take ten minutes and let him set up his maps.

(Recess.)

CHAIRMAN BAEZ: Go back on the record. Mr. Porter, I don't think I swore you yet, so if you will stand.

(Witness sworn.)

CHAIRMAN BAEZ: Mr. Deterding.

DAVID W. PORTER, P.E.

was called as a witness on behalf of Aloha Utilities, and having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. DETERDING:

Q Mr. Porter, please state your name and employment address for the record.

A David W. Porter, P.E., 3197 Ryans, R-Y-A-N-S, Court,

Green Cove Springs, Florida 32043.

Q Have you been retained by Aloha Utilities to provide testimony and expert opinions in this proceeding?

A I have.

Q Did you prepare in conjunction with my office a document referred to as prefiled direct testimony of David Porter, P.E., consisting of 13 pages?

A I did.

Q If I asked you those same questions here today, would your answers be the same?

A They would.

Q Do you have any corrections to make to that testimony?

A I do not.

MR. DETERDING: I request that Mr. Porter's testimony be inserted in the record as though read.

CHAIRMAN BAEZ: Without objection show the direct testimony of David Porter inserted into the record as though read.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

ALOHA UTILITIES, INC.

DOCKET NO. 010503-WU

TESTIMONY OF DAVID W. PORTER, P.E.

Q. Please provide a brief resume of you training and experience as it relates to this proceeding.

A. I hold a BSCE degree from the University of Massachusetts where the emphasis of my studies was in water and wastewater system engineering. I have 32 years experience in the operation, management, design, construction and troubleshooting of water and wastewater facilities. During that time I have been employed as a treatment plant operator and administrator, a design engineer, principal design engineer and department head, vice president and general manager of a engineering firm that specialized in the operation and design of water and wastewater facilities, a senior engineer for an international water and wastewater equipment manufacturing firm that supplies equipment for water and wastewater treatment projects worldwide and as a independent water and wastewater utility consulting engineer. For 14 years I taught treatment facility operation, maintenance and management as an adjunct instructor at community colleges. I have also lectured on treatment plant operation and troubleshooting at State sponsored short schools for treatment plant operators and engineers. I have authored and/or co-authored technical papers and trade magazine articles related to water and wastewater treatment facility design, troubleshooting, and operation. I have served as the chairman of the American Water Works Association's Pipeline Rehabilitation Standards Committee and have served on technical advisory committees for the Florida Department of Community Affairs, the American Water Works Association and the Florida Department of

Environmental Regulation. I am an A class certified plant operator in the State of Florida, a Grade VII certified plant operator in the Commonwealth of Massachusetts, and a licensed professional engineer in the States of Florida and Virginia. I am a member of the American Institute of Chemical Engineers, the American Water Works Association, the Water Environment Federation and the American Society of Civil Engineers.

Q. Have you testified as an expert in PSC and/or County Utility Regulatory cases.

A. Yes I have testified as an expert in a number of PSC and/or County Utility Regulatory cases over the last 9 years. A listing of those cases are as follows:

DOCKET NO. 950615–SU – PSC – Aloha Utilities - This case included wastewater treatment and reuse issues as well as water quality and treatment issues.

DOCKET NO. 960545-WS – PSC - Aloha Utilities - This case included water quality and treatment issues.

DOCKET NO. 991643-SU – PSC - Aloha Utilities - This case included wastewater treatment and reuse issues.

DOCKET NO. 010503-WU – PSC - Aloha Utilities - This case included water quality and treatment issues.

DOCKET No. 2001-0007-0023 – Intercoastal Utilities - St. Johns Water and Sever Authority - This case included water and wastewater treatment issues.

Q. Have you read the Direct Testimony of Dr. V. Abraham Kurien which he has provided in this case do you have any comments related to your review of that testimony?

A. Yes. I have a number of specific comments that follow.

Q. Dr. Kurien discusses the Tampa Bay Water hydrogen sulfide (H2S) Standard in his testimony. Regarding that testimony he states " Water chemistry experts who know

what is achievable and what is not were responsible for that standard"? Do you agree with Dr. Kurien's statement?

A. Yes. However, the "Tampa Bay Water H2S Standard," as it is provided in Exhibit D of that Tampa Bay Master Water Supply Contract, was developed as a "goal" and not an MCL (Maximum Contaminant Level} because, the water chemistry experts who drafted this standard were keenly aware that it would be impossible to set an MCL that could be met and still be economically feasible to implement. A "Goal" is a target, that is to be strived for to the extent possible both from a technical and economic standpoint. An MCL is an entirely different standard which requires that a maximum concentration of a substance (in this case hydrogen sulfide) never exceed a given level. Tampa Bay water (and all its member governments) and the water experts that developed the Tampa Bay Water H2S standard recognized that to apply an MCL instead of a goal would not be feasible and would be cost prohibitive.

Q. Dr. Kurien provides testimony that states that the language proposed by Aloha to the PSC related to the Tampa Bay Water Standard was different than that actually utilized by Tampa Bay Water. Do you agree with this?

A. No. The standard that Aloha proposed to the PSC was taken directly from the Tampa Bay Water language. What Dr. Kurien claims is that the Tampa Bay Water standard is applied at the "point of connection" to the member governments water distribution systems and that some how that is different than applying the same standard to Aloha's point of connection to its water distribution system. In fact, the standard is applied in exactly the same manner in both cases. Tampa Bay Water is made up of a number of member governments who all have water distribution systems. When Tampa Bay Water produces water, in essence, it is the organization (Tampa Bay Water and all its member governments) who control the processing and distribution

of the water overall. When the water from Tampa Bay Water is distributed to a member government it flows into the member government's water system and supplements that member governments own water supplies (to the extent that they exist). Therefore, the water supplied to Tampa Bay Water's member governments (who also have control over the operation of Tampa Bay Water) is no different then if the member governments had an additional water supply system of their own from a functional standpoint. In no case does Tampa Bay Water (or any of its member governments) apply the Tampa Bay Water H2S Goal to the water supplied to an individual retail customer of any of the member governments. In fact, Aloha recently completed negotiating a bulk water agreement with Pasco County (a Tampa Bay Water Member Government). During these negotiations Aloha requested that Pasco County extend the Tampa Bay Water H2S Goal on to the Aloha for the water it will supply to the Aloha system and Pasco County refused to do so. Pasco County therefore, refuses to apply this goal to the water it supplies to its bulk water customer Aloha. The Tampa Bay Water H2S goal was meant to be a standard applied at the point of delivery of Tampa Bay Water to the distribution systems of its member governments and not to the point of connection of customer meters of the member governments. This is exactly the same use of the standard that the Aloha proposed to the PSC and the PSC provided in its Order.

Q. Do you have any additional comments related to Dr. Kurien's proposal that H2S be monitored at the customer's meters?

A. Yes. PSC staff requested that Aloha prepare comments on this issue. On September 3, 2004 I provided Aloha with my comments which were subsequently submitted to the PSC. My comments were as follows:

According to Standard Methods for Examination of Water and Wastewater (20th edition), the analytical method used for monitoring of hydrogen sulfide is considered accurate to 0.1 mg/L. While it is possible to obtain measurements of hydrogen sulfide that are below 0.1 mg/L, these measurements are not considered to be accurate. This is why the Tampa Bay Water "Standard" and, that proposed by Aloha is expressed as a "goal." To monitor hydrogen sulfide to this "goal" at the treatment plant sites, where sampling and testing procedures can be closely controlled, can be undertaken. To attempt to conduct this testing at a point in the field, where neither sampling nor testing conditions can be controlled would be highly impractical and would lead to unacceptably low accuracy and precision.

Aloha will need to utilize the services of a commercial laboratory to conduct the hydrogen sulfide sampling and testing if water anywhere other then at the plants was to be analyzed. Depending on the number of events conducted each year and the number of sites sampled and tested each event, the costs would be quite substantial. In the context of the Aloha system, monitoring of hydrogen sulfide at the treatment facilities can provide direct information on the performance of the process and used to fine-tune the facility operations, if appropriate. The water at any other location in the distribution system can consist of water from multiple wells and/or Pasco County (Tampa Bay Water) bulk finished water supply, depending on the time of day and the net water demand in the system. This mixing of Pasco County (Tampa Bay Water) bulk finished water supply with Aloha water in the distribution system would produce a combined water that would not reflect the quality of water produced by Aloha's own facilities if taken alone. The water supplied by Pasco County (Tampa Bay Water) would not necessarily contain hydrogen sulfide levels at or below the 0.1 mg/L goal. The level of hydrogen sulfide in Pasco County's (Tampa Bay Water)

water is not within the control of Aloha. In fact, Aloha has requested that the County provide a clause in its bulk water agreement with Aloha that would limit the hydrogen sulfide concentration to 0.1 mg/L or less and the County has refused to do so. Since Aloha can not control the hydrogen sulfide concentration of the mixture of Aloha produced water and Pasco County (Tampa Bay Water), it can not control the concentration of hydrogen sulfide at any point in the distribution system other then at the point where its treated water enters the distribution system (at the plant locations) prior to it mixing with any other source of water.

The detection of hydrogen sulfide in the distribution system cannot be linked to the effectiveness of the treatment system for the reasons stated above. Monitoring at the point of entry to the distribution system (where the water plant connects to the distribution system) can provide direct information on the process performance and allow for optimization of the treatment processes. Sampling and testing for hydrogen sulfide at the point where Aloha's treatment plants connect to the distribution system is equivalent to that practiced by Tampa Bay Water. Conducting hydrogen sulfide sampling and testing for the purpose of optimizing the treatment process would result in the greatest benefit to the customers.

Q. Dr. Kurien stated in his testimony that a Maximum Contaminant Level (MCL) should be ordered for H2S in stead of the goal as presently ordered. Do you have any comments?

A. Yes. Dr. Kurien's proposals would impose upon Aloha a Standard that is not required anywhere in this nation, perhaps in the world. It would be much more stringent than that utilized by Tampa Bay Water and all of its member governments.

MCL levels are set by the USEPA and FDEP for substances that pose a health related risk of sufficient magnitude that the costs of compliance are justified. The process

that these agencies go through to set and MCL is very complicated and time consuming. Once a potential risk is identified, a number of detailed studies are conducted to determine what the potential health risks are, what the level of risk is, if there are presently treatment technologies available to render the substance less of a concern, if new technologies can be developed to render the substance less of a concern. Cost-Benefit analysis is undertaken as part of the MCL development process. Stakeholders, such as utility representatives, state regulatory agency staff, water users, and many others are then assembled and detailed analysis of the feasibility of setting an MCL for the substance is undertaken. Only after a great amount of study and evaluation have been completed is an MCL for a substance established. This process often takes many years to complete. The PSC should not attempt to set an MCL for any substance without undertaking a study and evaluation process at least as detailed as that used by the USEPA and the FDEP for other water contaminants. The USEPA and FDEP have both considered establishing hydrogen sulfide limits over the years and have always chosen not to do so based on their analysis of the need for such limitations. It is generally understood that hydrogen sulfide is considered by the regulatory agencies to be a substance that affects the aesthetics of the water and does not pose sufficient health risks so as to support the establishment of a MCL.

In addition, since Aloha will soon begin taking a substantial quantity of water from Pasco County Water System to supplement its own supply, and since Pasco County has refused to provide Aloha with a guarantee that its water will meet even the present TBW H2S goal, Aloha would be put in a position that it would have to meet an MCL for the water in its distribution system which would include a substantial portion of water received from Pasco's water system, which Aloha does not control,

and which Aloha has no guarantee will meet the Tampa Bay Water Goal, much less the far more stringent MCL standard proposed by Dr. Kurien. If Aloha were ordered to meet a MCL it would have to provide its own treatment for Pasco's already treated water to ensure that the water provided at its customer's meters met the MCL. This would be very expensive to accomplish and would serve no useful purpose.

It would not be technically or economically feasible for Aloha (or any other water system) to meet the MCL as proposed by Dr. Kurien.

Q. Are there any USEPA or FDEP standards that require water systems to meet a H2S concentration goal or MCL at a customer's meter?

A. No there are not. In fact, the language in the present Order setting a goal for H2S concentration at the point of connection of the water plants to the distribution system imposes a standard that is not required by any USEPA or FDEP rule. For the PSC to set an MCL for H2S at the point of connection of the water plants to Aloha's distribution system would be a much higher standard and would be far greater then that which every other water plant in Florida must meet. To impose an MCL for H2S to be measured at the customer's meters would be an unbelievably higher standard that could not be met and has never been required of any water system in the United States to the best of my knowledge.

Q. Dr. Kurien states that Dr. Levine's study found that sulfide re-formation occurred with the transmission system of Aloha Utilities? Is this correct?

A. No. Dr. Kurien is mistaken. None of the testing completed by Dr. Levine found sulfides in the water transmission system. A slight hydrogen sulfide concentration (of 0.12 mg/L) was found in the partially treated water flowing in a pipeline connecting two treatment plants with the main ground storage tank. This water does not flow to the distribution system. It only flows to the inlet of the ground storage tank where it

receives final treatment prior to its being pumped to the distribution system. On the same day the water leaving the ground storage tank contained no hydrogen sulfide. Hydrogen sulfide testing was conducted at the meters of 8 customer's homes and no hydrogen sulfide was found at any of these points.

Q. Dr. Kurien states that he believes that there is turbidity in Aloha's finished water which causes a reduction in the effectiveness of the chlorine disinfection system resulting in hydrogen sulfide generation taking place in the distribution system? Would you care to comment?

A. Yes. Dr. Kurien is mistaken.

Dr. Levine conducted suspended solids testing of the water sampled from a number of customer meters during her work. In each case, no measurable quantity of suspended solids were found.

More importantly though is the fact that there is no indication that the disinfection process at Aloha's plants is not operating efficiently. In fact, as shown below, just the opposite is true:

Aloha tests for coliform bacteria (a measure of the efficiency of the disinfection process) on a regular basis in over 30 locations throughout its distribution system. In the time I have been associated with Aloha (approximately 9 years) Aloha's coliform testing results have been as good if not better then that of the surrounding utilities. This would tend to indicate that the disinfection process is working well and, therefore, turbidity can be assumed not to pose a problem for the disinfection process. Also, Aloha has analyzed its water for Heteratrophic Plate Count (HPC)(which is another measure of the overall biological activity of the finished water and therefore, an indirect measurement of effectiveness of the disinfection process). HPC is also sampled at over 30 locations throughout the water distribution system. The HPC

counts have been found to be extremely low overall. This is therefore another measure of how well the disinfection process is working and therefore, also indicates that turbidity is not of sufficient concentration to affect the disinfection process.

A large number of samples (many of which were taken by Dr. Kurien himself and/or by FDEP or Dr. Levine) showed that hydrogen sulfide was not present in realistically measurable quantities at the point of delivery to the customers. FDEP has conducted numerous random, unannounced tests of water provided by Aloha at the customer's meters at the request of Dr. Kurien and/or other customers and has found Aloha's water to meet the chlorine residual requirements (a measure of the effectiveness of the disinfection process) and other applicable standards.

The presence of free chlorine in the distribution system and at the customer's meters indicates that hydrogen sulfide generation in the distribution system is highly unlikely.

Q. Dr. Kurien states in his testimony that the Tampa Bay Water H2S standard requires their water to be tested at least 4 times annually instead of once per year as requested by Aloha? Would you care to comment?

A. Yes. Dr. Kurien is mistaken. The Tampa Bay Water standard requires annual testing as was requested by Aloha.

Q. Dr. Kurien states in his testimony that there is "significant consumption of free chlorine residual within the transmission and distribution system" at Aloha? Would you like to comment?

A. Yes. The data that Dr. Kurien provides in his exhibit and references in his testimony are monthly reports that Aloha submits to FDEP. These reports show the free chlorine residual of the water as it left the water plants and the lowest free chlorine residual found each day at a remote location. The remote locations are points where

the water may sit for a substantial amount of time (as required by FDEP rule). This is where one would expect the free chlorine residual to be at its lowest level. FDEP rules require that the free chlorine residual at this point be at least 0.2 mg/L. The reports referenced by Dr. Kurien show that Aloha's water easily met the FDEP standard each time it was tested, and in most cases, exhibited free chlorine residual greatly in excess of the minimum free chlorine residual required. His own referenced data shows that Dr. Kurien's statement is not correct.

Q. On pages 12 through 14 of his testimony, Dr. Kurien provides testimony related to his evaluation of the potential merits of two hydrogen sulfide treatment technologies – conversion utilizing oxidation (with hydrogen peroxide) and removal utilizing aeration or the MIEX process. Do you have any comments about this testimony?

A. Yes. First, I believe that Dr. Kurien's testimony here is not appropriate since this topic (choice of treatment technology to meet the specified goal)is not one of the matters at issue according to the Commissions consummating order. However, since Dr. Kurien chose to provide testimony on this issue anyway, I feel compelled to respond to it.

Dr. Audrey Levine, a well-respected expert in water treatment, conducted a two-part study of Aloha's existing water system for the Office of Public Council at the request of the customers as part of this Docket. In her reports she provided a series of recommendations which she believed could reduce the frequency of the odor and discolored water problems reported by some of Aloha's customers. One of her recommendations was to consider replacing the existing chlorine oxidation process with the hydrogen peroxide oxidation process. Her reasoning for proposing this process was that it would not produce appreciable quantities of the elemental sulfur or other constituents that Dr. Kurien discusses in this testimony and that this would

enhance the overall quality of Aloha's water.

Dr. Kurien also proposes that elemental sulfur limitations should be imposed in addition to the 0.1 mg/L sulfide limits already approved by the Commission. The measurement of elemental sulfur as proposed by Dr. Kurien is not technically possible. Standard Methods for Examination of Water and Wastewater (20th edition), the laboratory standards manual used in the industry, does not even include a testing method for elemental sulfur. If the commission was to impose such a requirement, there would be no recognized method for complying with the order.

Q. Would you care to offer any additional comments regarding your position on Dr. Kurien's testimony in this matter?

A. Yes.

Dr. Kurien is not an expert in water treatment, FDEP rule compliance, or any other factor upon which he as testified. He is a layman attempting to provide technical testimony about a subject which even the true experts do not fully understand. He attempts to rationalize his proposed new standards to regulate a water constituent that the experts in the industry have not been able to develop due to the complexity of the issues. What might appear to be "common sense" to Dr. Kurien regarding how to address these issues is far from being so. The USEPA and the FDEP have not seen fit to attempt to establish the standards Dr. Kurien is requesting the PSC impose on Aloha. This is because they are true experts in the water treatment and regulatory field and understand that there are far-reaching ramifications and costly nature of attempting to do so. They also recognize that a great deal of study, investigation and evaluation must be undertaken before any new standard is put into place.

The Tampa Bay Water standard, as outlined in the current PSC Order, is already very difficult for water utilities to meet, even the large Tampa Bay Water member

government facilities. A recent report prepared for Tampa Bay Water illustrated that some of the member governments were still working on achieving this standard and may not be doing so. Pasco County to this day, will not provide assurances that the water it supplies to Aloha will consistently meet the 0.1 mg/L hydrogen sulfide goal. To expect any utility to meet the much more stringent standards proposed by Dr. Kurien would not be technically and cost-effectively feasible for the large neighboring utilities, much less for Aloha.

Dr. Kurien has not provided any proof in his testimony which shows that implementing his recommendations regarding modifying the existing PSC Order would result any benefit to anyone including the customers. His protest should be dismissed and the present Order as it related to setting an H2S concentration goal and testing requirements should stand as is.

Q. Do you have anything further to offer?

A. No.

BY MR. DETERDING:

Q And, Mr. Porter, do you have a summary of that direct estimony?

A I do.

MR. BECK: Mr. Chairman, if I may, before Mr. Porter gets started, he apparently is going to use a document that I have never seen before until he stepped up to the stand here in his summary. It has never been provided to us before. It looks like an attempt to bolster his direct testimony, and I object to his use of that document.

MR. DETERDING: Commissioners, it is not going to be requested to be admitted into the record. It is not evidence. It is simply a demonstrative to help him explain what is in his testimony, to give you points of reference on a map, to show you the connection point between Aloha and Tampa Bay Water, or the county, the connection point between Aloha's treatment facilities and its distribution system. It is merely a schematic that illustrates what he said in his testimony.

CHAIRMAN BAEZ: Mr. Beck, you were going to say something?

MR. BECK: Commissioners, first of all, this is a summary of his testimony that is in it. He could have easily provided this schematic in his testimony ahead of time. We could have looked at it, we could have critiqued it, we could have deposed him about it. It is brought in at the last

second, nobody else has seen it before.

CHAIRMAN BAEZ: Mr. Beck, I am going to allow his use of the schematic. And that said, I'm going to tell you how busy it is, and how much I can't even see what all is -- I mean, I don't know how much it's going to be, but that is your choice to use it.

MR. DETERDING: And we have small ones. But the point is we are not asking that this be admitted into evidence.

CHAIRMAN BAEZ: I understand that, and that is precisely why it is okay to use it is a demonstrative device.

BY MR. DETERDING:

Q Go ahead and give us your summary, Mr. Porter.

A Okay. First of all, I would like to say the standard as ordered by the Commission previously in this docket set a very high level for compliance for Aloha and should not be changed. Aloha's finished water meets all the FDEP and EPA standards as we sit here today. And unlike what you may have heard here or heard inferred previously, the water as it is delivered to the customers is always clean, clear, and odor free. The problems that have been discussed previously are those which occur inside the homes. They are not those which occur in the distribution system themselves or at the point where the water is provided to the customer. I know there has been some conjecture about that, but that is just not the case.

One of the issues that we have talked about here is

he point at which the hydrogen sulfide standard should be monitored or it should be measured. The Tampa Bay Water standard as it has become known in this case requires that the hydrogen sulfide level be monitored at the point of connection of the Tampa Bay Water system with its member governments. The important thing to understand is that Tampa Bay Water and its member governments are one in the same. The member governments make up Tampa Bay Water and they in turn have an ability to financially and managerially control Tampa Bay Water. They have a vote. So, therefore, they are really one in the same.

So when Tampa Bay Water provides water to its member government, it is essentially no different than if a member government had its own well system in addition to the wells or other treatment systems it has to that point. And that is the purpose of the demonstrative. Would you like for me to bring it closer?

There are two different ones. The first one please look at, simplified TBW member government water system schematic. It is important to understand the concept of the connection point as required in the Tampa Bay Water standard. I have three different colors outlined here. One is just a schematic of the Tampa Bay Water system itself. The other, the green is one of the member governments, and the blue would be the member governments' distribution system itself. The differences are the Tampa Bay Water system and the pipelines in

it essentially operate as treatment systems and transport systems, to get the water from the Tampa Bay Water sources and treatment systems into the member governments one way or the other.

Depending upon the member government, it can occur in two different ways. One way is that raw water in some cases from the wells of Tampa Bay Water can be sent to a treatment plant in a member government system and be treated along with or in addition to the water that the member government itself treats. So it is not retreating the water, it is treating it for the first time as raw water. The second one is that the water is treated by Tampa Bay Water, it comes through a pipeline and then enters into the distribution system of a member government.

MR. BECK: Commissioners, I am going to renew my objection. He is going beyond the description contained in his direct testimony. This is nothing but an attempt to bolster his direct testimony with surprise schematics and a summary that exceeds what he has in his direct testimony.

CHAIRMAN BAEZ: Mr. Porter, the day is getting late. I mean, if you can find somewhere to -- brevity is key.

THE WITNESS: I will speed it up.

CHAIRMAN BAEZ: Thank you.

THE WITNESS: I think it is important to understand then that the water supplied by Tampa Bay Water to its member

government into a distribution system, the point at which it tests the water is the point at which the member government connects to the Tampa Bay Water system. So it is not in the distribution system of the member government anywhere, it is at

is that what you just referred to?

THE WITNESS: Yes, H2S, Commissioner.

COMMISSIONER BRADLEY: Okay, H2S.

THE WITNESS: And that is to indicate the water just as it leaves the pipeline in the Tampa Bay Water pipeline going into the distribution system. So it is just before it gets to the distribution system. In Aloha's case it is exactly the same. If we look at green here, that is the Aloha system. The red in Aloha's case would be Pasco County's system interconnecting with Aloha. **The green is Aloha's own wells and** its own treatment plants. And the blue, again, is Aloha's distribution system. What is being proposed is exactly the same.

The water that leaves the treatment system and travels in the pipeline, it connects to the distribution system. It would be tested just before it goes into the

distribution system. The same is true on each one of Aloha's different treatment plants. So what is being proposed or what has been proposed and what is in the order is exactly the same n both cases.

I do not believe that monitoring of H2S at the ustomers' meters themselves as proposed by Dr. Kurien in his protest is of any value because of a number of reasons. Number ne, as Doctor Levine said earlier, there is no benefit to the peration of Aloha's treatment systems by measuring it at that oint.

MR. BECK: Commissioners, now the witness is eferring to the testimony given by another witness and this is supposed to be a summary of his prefiled direct testimony. I bject.

MR. DETERDING: Commissioners, I will instruct Mr. Porter, don't refer to other people's testimony, you are here to summarize your own.

THE WITNESS: Summarize my own. Okay. I do not believe there is any value to it. And as I said in my testimony, it has been looked at a number of times, and it has always ended up being zero or nondetect at those points. So to do so is just to add another level of complexity and cost that doesn't have any bearing on operating the system.

An MCL versus a goal. The existing Tampa Bay standard specifies a goal. An MCL is a different animal. An

MCL is something that is of a maximum level, not an ongoing monitoring point. An MCL is very carefully determined or developed within the EPA and the FDEP. And to develop an MCL for hydrogen sulfide has never been done by any other agency that I am aware of anywhere. It would set a new standard far beyond anything that has ever been done.

The test method used to monitor hydrogen sulfide in the field where these tests are being proposed to be done in the protest, the test method itself is only accurate down to a minimum of 0.1 milligrams per liter. **So what we have said so** far is that the .1 milligram per liter is what we are willing to, or Aloha is willing to accept. So, therefore, it is already at the lowest level that can be detected in the test method. So there is no value in doing an MCL anyway.

To have chlorine, another indicator of whether H2S is in the system, or in the distribution system, or is not, or is reforming or not is the fact that if there is free chlorine available in the system, then by definition hydrogen sulfide doesn't exist. And, again, that has been borne out in a number of, many other tests that have been done by others other than myself and Aloha and been put into testimony in many cases here.

It has never been determined, or shown, or even inferred that sulfide reformation in Aloha's distribution system has ever occurred. There was some discussion in Dr.

Curien's direct testimony that I talked about in mine where he claimed that Doctor Levine had shown there was a 0.12 milligram per liter concentration of hydrogen sulfide in the water in Aloha's distribution system. That is not the case. Where that point was, or where that sample was taken was in a pretreatment line, not in a line going to the final water treatment line or any water that was entering the distribution system at all. It was in a line between two treatment plants, or actually three different treatment plants. It is a line that conveyed water from one plant to another. It is not indicative of what is going on in the distribution system.

Regarding the turbidity issues, number one, there is a number -- or the elemental sulfur issues, there is a number of ways to determine whether you think hydrogen sulfide is being converted to sulfate or some other intermediate form, including and possibly elemental sulfur. There is no direct method to test for elemental sulfur. Therefore, you have to use an indicator of some sort. Turbidity is one. In all of the years that I have seen turbidity analysis coming out of the water treatment plants from Aloha, I have never seen excessive turbidity. And that has just not been the case.

There are other indicators as well, though, and that is the bacteriological quality of the water itself in the distribution system. That has been looked at repeatedly every month for the last ten years we have been talking about this,

and there has not been any indication in the bacterial quality of the water that there is a problem with turbidity in that system. You know, one of the biggest problems recognized in the industry with turbidity is that it lowers the ability of the water to be disinfected by the chlorine that is added to do the disinfection, to accomplish the disinfection. If you had a serious turbidity problem, or if there were some other issues with turbidity, you would expect to see the biological characteristics of the water to be such that it wouldn't meet the requirements of the DEP, which this water does.

Also, recently, as I mentioned in my testimony, Aloha has done another more intensive level of screening for bacteriological quality called heterotrophic plate counts in preparation for chloramination switchover, and those numbers were extremely low. Very, very low. As a matter of fact, in most cases out of the 30 that were tested they were nondetect. So, all indications are, at least from a bacteriological standpoint, that this water is of high quality and, therefore, if you were to hazard a guess as to whether you thought there was turbidity issues in the water or not, you would guess that there were not.

Regarding significant consumption of chlorine in the system, that is not the case, either. Aloha's data that you have seen put into the record by others indicates there is chlorine throughout the system. The DEP mandated 0.2

milligrams per liter of free chlorine through the system has been met and continues to be met. And, therefore, that isn't a significant uptick of chlorine.

Regarding the conversion versus removal process or issues, removal is going to be extremely costly. You know, over $10 million. Exactly how far over 10 million depends on how the system is finally configured, but it is going to be very expensive and the ratepayers will have to bear the cost. What Doctor Levine is proposing in the way of hydrogen peroxide treatment will be much less expensive, and as you hear from -- well, I won't say that. If Doctor Levine's process proves out to be what she believes it is and what she has represented it to be, then it will be a far better solution for the customers from a monetary standpoint.

There has been a quite a bit of discussion about sulfides or sulfate generation versus elemental sulfur generation and the effect of that. The reality is that sulfates are those which convert very easily in hot water systems in homes. There is a tremendous amount of data out there on sulfate conversion back to sulfides, and virtually none on elemental sulfur. Dr. Kurien has talked about one paper generated back in 1992. That paper only says that the potential for black water problems exists when there is elemental sulfur.

MR. BECK: Commissioner, the witness is going beyond

his direct testimony and has been going about ten minutes.

CHAIRMAN BAEZ: You know, whether that is true or not, Mr. Porter, I have just about had it with the twenty-minute summaries. We are just going to get into the questions. I think -- you know, I think I have afforded you plenty of time to finish up.

THE WITNESS: Those issues were in my direct

That's fair enough. I'm sure they will all get crossed.

THE WITNESS: Okay.

CHAIRMAN BAEZ: Thank you.

MR. DETERDING: I tender the witness for cross.

CHAIRMAN BAEZ: Thank you. Mr. Beck.

MR. BECK: Thank you, Mr. Chairman.

CROSS EXAMINATION

BY MR. BECK:

Q Mr. Porter, could you turn to Page 10 of your testimony, please.

A Certainly.

Q Lines 14 through 18.

A Yes.

Q You say Dr. Kurien is mistaken --

A Yes.

Q -- in his statements about Tampa Bay Water requiring

their water be tested at least four times annually instead of once a year, is that right?

A That's my understanding, that is correct.

Q I would like to hand you a copy of Dr. Kurien's rebuttal testimony.

A Uh-huh. Thank you.

Q And ask you if you would please turn to Exhibit BAK-26, Page 3 of 3.

A Yes. The one that is titled proposed compliance and action levels?

Q Yes. Exhibit D, supplemental.

A Right. The one that says proposed, correct?

Q Is that not the actual compliance levels that are in effect?

A I wouldn't know. It says proposed here.

Q Did you look to check?

A Actually what I referenced my testimony on was the comment at the very beginning of supplemental quality parameters, Exhibit D, that says water supplied by the authority system shall be sampled annually at a minimum at the point of connection of the following parameters. And the parameter that is specifically specified is sulfides at .1 milligrams per liter for a goal.

Q And you focused on that without looking at the Table 3?

A Well, the Table 3 that you have here and the one that have seen also says proposed.

Q Okay. Could you turn to BAK-27, Page 3 of 3?

A Certainly.

Q This is a letter in response to a staff data request by Aloha Utilities, is it not?

A I'm sorry, repeat that again, please.

Q This is a letter that -- is this part of a letter hat Aloha sent to the staff in response to a data request of heirs?

A Yes.

Q Did you have any -- were you involved in preparing he utility's response to this, or in preparing this response?

A I would say I did.

Q Let me ask you about the statement by Aloha that is nderlined. Do you see the underlined section on Page 3 of 3?

A The underlined section on page what?

Q 3 of 3.

A Yes.

Q Page 3 or 3 of BAK-27.

A Uh-huh.

Q And in there it says the average concentration of hydrogen sulfide is no more than .1 milligram per liter based on an annual average of four quarterly samples collected at the point of entry to the distribution system. Do you see that?

A Yes.

Q Would you agree then it is Aloha's position that there are four annual samples taken?

A I don't think it ended up this way. I think what happened was at the beginning when this letter was written, and it was quite a long time ago, March 29th, this was February 20th, 2004, that it was really unclear as to whether it was one or four or what it was.

Q Well, would you agree that this statement doesn't state there is anything unclear about whether it is one or four? It states four quarterly samples, isn't that right?

A That is what it says.

Q Has Aloha now changed its position so that it doesn't agree with that now?

A I believe after this was written and in between the time that the final proposal went in it was brought to our attention when we had Schedule D in our possession that it said that the water supply for the authority system shall be sampled annually at a minimum. This was based, if I remember correctly, there was based on some conversations that were had in general with some other folks, and I don't remember exactly how it came into being. But that was back in February of 2004.

Q So have you done any investigation to see whether that is no longer effective? And what have you done to check on this?

A Nothing other than look at Schedule D. I think it is important also, though, to go back to the table that you talked about that I called proposed compliance and action levels. There are really two different things you are talking about on this table. I think you need to look at both. Under total sulfide, you will notice on the action level, see Note 2, there they are talking about a single sample, okay. And on the other one they are talking about a max average. **That one there is** the only one that references the four a year. So it is not clear. In three different places in this Schedule D it says three different things.

Q Okay. On that exhibit, total sulfide is listed under the column parameter, is that right?

A That is correct.

Q That is one of the exhibits. And then when you go to compliance level next to it, it says .1 milligram per liter (max-average), right?

A Correct.

Q And then in the compliance notes on the bottom it refers to max-average, does it not?

A Correct.

Q And so wouldn't you think that the compliance notes about max-average apply to what it says about total sulfides?

A I think you need to look at the column next to it, too, that talks about an action level. And it says that it

will be a max value, and a max value is a value that is one time not exceeded. So there is three different places in this document that describes the sampling parameters; two of them talk about once, one of them talks about four times.

But it is even more important, I think, to realize that what they are talking about here on a running annual average, or an annual average, that you are still talking about one compliance. You take it four times in that case, but you only report it once.

Q But there is four samples, right?

A There may be four samples, which is one report, and that is one place in a document with three references to it.

Q Okay. Now, let me ask you, the place where it says .1 milligram per liter on the table, that is under the column compliance level, is it not?

A Yes.

Q And it says, "See Note 1," under compliance level?

A Yes.

Q Then action level is the last column, which is completely different. It says, "See Note 2," is that right?

A That is correct.

Q And so would you agree that when it refers to compliance level, it is referring to compliance notes, which is 1?

A Yes.

Q And that is where it states four quarterly sample average, right?

A Yes.

Q Isn't it referring, the four quarterly samples referring to the .1 milligram per liter?

A On that proposed document, yes. But, again, next door to it in the action level, and you can guess which one is which, it also talks there about a max, which is a one sample. And then in the beginning of the document it specifically says water supplied from the authority system shall be sampled annually, at a minimum, at the point of connection for the following parameters. So, you know, I can't speak for Aloha, but whether it is one or it is four, at the point of connection to the system, I don't think it makes much differences. Open to interpretation, I guess.

MR. BECK: I have no other questions.

CHAIRMAN BAEZ: Mr. Wood.

CROSS EXAMINATION

BY MR. WOOD:

Q In your chart, Mr. Porter, you hook up to the distribution center in several places?

A You need to tell me which chart to look at.

Q I'm looking at the simplified water system.

A Yes, sir.

Q You hook up at three different places on your chart

here.

A Yes, sir.

Q How do I know that there is a correlation from what you sample at that point and what enters into the home?

A Well, again, I think it is important to understand that what we are talking about is setting a standard. And what Aloha agreed to was a standard that was established by another agency that is more strict than any other standard ever generated.

Q Mr. Porter, that is not the question. The question is how do you know there is a correlation between where it is tested and after it is ready to leave the distribution center?

A Okay. I will answer that. That is going to take some time, and the reason for that is this: It is important to understand that the water does enter the distribution system in many different places. In this case I showed three. In reality there is going to be eight, and nine with the Tampa Bay Water or Pasco County connection. I think what you have to understand is what your goal is when you measure the hydrogen sulfide here is to be able to control the processes of these treatment plants in order to obtain the level of .01 milligrams per liter.

If you were to measure, let's say here, the furthest point from that plant, and you were to get a number, whatever that number is, there is no way to correlate that number with

anything that goes on at any one of these treatments plants because the water is an intermix of all of those different systems. There is no value to it. It can't tell you whether you should adjust the plant here, should you adjust the process here, should you adjust the process here. **There is no value to** that.

If, however, you measure here, or here, or here, that will tell you without a doubt what the effect of the operation of that plant is on the water entering the distribution system. That has value. **That allows you then to control the process.** So the fact that the system is totally interconnected, the fact that all the water mixes, the fact that Pasco County mixes -- I'm going too fast, sorry. **The fact that all the water** intermixes means that to test anywhere other than the points of connection won't tell you anything. It won't tell you whether you should adjust the process or not, or whether you are meeting a requirement to it.

Q You haven't answered the question yet. I asked you how do you know that there is a correlation between testing it into the customer's home versus where it is entering the distribution center?

A I think I just told you there is no direct correlation between what that plant is doing and what happens out here at a customer's home if you were to measure it there.

Q Shouldn't you from the testing point know that there

.s a correlation in the product that you deliver?

A Again, I think you have to understand that if you ieasure it at this location, let's say at a customer's home in :he distribution system itself, there is no correlation)etween -- direct correlation between that and anything that iappens at the treatment plant because the water is intermixed.

Q Doesn't that tell you you have a problem?

A No, not at all. It tells you have an intermix of vaters.

Q It tells you you have a problem.

A No, I didn't say you would have a problem. Mr. Wood, :onversely --

Q If you deliver --

CHAIRMAN BAEZ: Hold on. Hold on, Mr. Wood. Okay. What I'm going to need you to do is to let Mr. Porter answer the question. And, Mr. Porter, you are going to have to watch out for when he starts asking his next one, and maybe we can meet somewhere in the middle, shall we?

THE WITNESS: Okay. Very good. I think it is important to understand that conversely if you were to measure it here at the customer's home and you had 0.1 milligrams per liter of hydrogen sulfide, the opposite is also true. That doesn't tell you that at each one of your plants that they are operating properly, because there is a time of travel through the system. I mean, I could be measuring water here today and

that is reflecting water that was made two or three or four days ago back here. So by the time I measure it here, and it shows a problem with the hydrogen sulfide level, it is too late. I have got a whole distribution system full of water now that doesn't meet the standard.

Where I need to be measuring the standard in order to be able to adjust the process and meet the goal has got to be at a point where I can do something about it. If I measure it here, I could have a whole distribution system full of water that doesn't meet the standard. That doesn't help anybody. So both is true. You could find water that meets the standard here that really doesn't at that day coming in.

BY MR. WOOD:

Q Is what you are telling me then, Mr. Porter, that the water is not stable?

A No, not at all. What I'm telling you is what you are trying to measure here is the effect of the treatment plant operation on the water quality that enters the system. If I was to measure again -- to pick this location right here -- if I was going to measure the hydrogen sulfide level there rather than at the point at which it comes in from the plants, two things could happen. A, I could find that the water meets the standard. Well, that is all well and good except that water essentially could be as much as two and three days old. It doesn't tell me anything about when it is entering the system

oday from any one of these systems. It is only telling me
hat is happening back where the water originated. The other
problem is it may not meet the standard. That doesn't tell me
nything about where the problem is, it only tells me there is
problem. Now I have got to go find it.

The reality is the way to have an effective system
hat actually measures hydrogen sulfide is to do it at the
point where the water enters the distribution system so that
one can then determine if the plants are functioning and
whether they meet the goal.

Q Okay. You have determined that all the plants are
functioning from what you are saying. If the final product is
not of an acceptable quality, then the plants aren't
functioning, is that not correct?

A I'm not sure if I understand your question.

Q If you can't deliver a product that meets the
standard, then you haven't delivered a quality product, have
you?

A The water as it leaves the treatment system and
enters the distribution system, if that is where the standard
is being met, then it has met the standard.

Q If you went to the grocery store and you bought a
pound of butter and you got it at home and it was moldy, has
the grocery store met the standard?

A Well, that is not a true analogy, because the butter

had to be moldy when it left the store. What I'm saying to you here is this is a test to determine whether the butter met the requirement as it left the store. Therefore, when you got it home, it should have met the standard.

Q And when it gets here in the system in the blue, even if it has met the standard there, it hasn't met the standard there. And you have to find a way, don't you, why it is doing that? You can't just wash your hands of the whole thing and not take any responsibility, can you?

CHAIRMAN BAEZ: Mr. Wood, I hate to do this, but I think we have crossed the line into questions that aren't -- that is, in fact, what we are here to answer, okay?

MR. WOOD: Okay.

CHAIRMAN BAEZ: So if you have got another line of questions, try and find it. If you are not, we will --

MR. WOOD: We'll let it go at that.

CHAIRMAN BAEZ: Thank you, sir. Where was I? Staff, do you have questions?

MR. JAEGER: Yes, Mr. Chairman.

CROSS EXAMINATION

BY MR. JAEGER:

Q Mr. Porter, please look on Page 4, Lines 9 through 15 of your direct testimony. That's is Page 4, Lines 9 through 15. You state that in negotiations Pasco County refused to extend the Tampa Bay Water hydrogen sulfide goal for the water

Pasco County supplies Aloha, is that correct?

A That's correct.

Q And how was that put to them?

A We were in negotiations on the bulk water agreement. was sitting in the room. The question was asked will you gree to put a clause in this agreement that extends the Tampa Bay Water standard to the point of connection with Aloha. The answer was no.

Q Was there anything in writing?

A I don't know. There wasn't anything on that particular day in writing.

Q Who was in the meeting for the county, do you remember?

A You know, again, it was either Doug Bramblett and/or Bruce Kennedy. And I think on that day it was also the county administrator, but I would have to go back and check that.

Q And Doug Bramblett, was he the utilities director?

A That's correct.

Q And is he now retired?

A He is.

Q Did the county give a reason for its refusal?

A No, other than they said that they couldn't guarantee it.

Q And can Aloha obtain water directly from Tampa Bay Water?

A No. I have been told not.

Q And that is even if you put a pipeline right up to one of their lines, that they only give water to member organizations?

A That's correct, member governments only.

Q You keep talking about optimizing the water treatment process at the plant, and that you need to test as it comes right out of the plant. I think what Mr. Wood was getting at, you want to test the water as it leaves the plant, that is to optimize it. What if you want to evaluate the process itself for continued effectiveness out in the system, why wouldn't you test out in the system?

A What we are talking about here is setting a standard for hydrogen sulfide. Aloha agreed to a standard that Tampa Bay Water agrees to. And the standard that they have specifies where and how often and when the testing will be done. And that testing, according to Tampa Bay Water, which is probably the strictest standard in the United States that I'm aware of, says it will be done at the point of connection. And there is a number of reasons for that.

There is no way for Tampa Bay Water to know what happens to the water once it leaves their facility, and that is true with Aloha or anyone else. When there is intermix of waters like in the case of Aloha with Pasco County's water, there is no way for Aloha to be held responsible for the water

that is intermixed afterward. There is nothing Aloha could do about it. One of the things, Ralph, that has been talked about here in that vein is what would you do if you found a number that didn't meet it after the water is intermixed. And someone has said, well, maybe it ought to be treated. The problem is the water can't be treated. It has already been chloraminated. So there is no way good way to retreat the water. It is a technical problem.

Q Please turn to Page 7, Lines 20 to 25.

A Yes.

Q You say something to the effect that if Aloha were ordered to meet an MCL, it would have to provide its own treatment for Pasco's already treated water to ensure that water provided at its customers' meters met the MCL. This would be very expensive to accomplish and would serve no useful purpose, is that correct?

A That's right. And the reason it would be very expensive is I'm not even sure how you would do it.

Q Did you prepare a 2002 water facilities upgrade report for Aloha Utilities?

A I did.

Q As part of that report, did you prepare a section which estimated the cost for building packed tower aeration facilities in the Aloha service area?

A I did.

Q Did your study conclude that to provide packed tower -- or, I'm sorry, packed tower aeration for all of Aloha's well sources, it would be necessary to build three centralized water treatment plants?

A Yes, I did.

Q And was one of these centralized water treatment plants designed to tie in only Wells 8 and 9?

A That's correct.

Q And is this referred to as the new Wyndtree water treatment plant?

A That is correct.

Q What was your estimated total capital cost of building packed tower aeration for Aloha?

A You're going to have to give me a minute to look for it.

Q Turn to Page 30, I think you will find it there.

A I was going to say, I believe it was $14,950,000.

Q And 918?

A And 718.

Q What was your estimated capital cost for building the Wyndtree water treatment plant only? I think that's on Page 32.

A About $3.5 million. Wait a minute, that's not true, because you still have to have the piping modifications.

Q I'll ask that question.

A You're going to help me?

Q Yes. Would there also be additional piping required of 120,000 to get the water delivered to the appropriate location in the distribution system?

A Yes, and there may be more. I realize that the Line Item Number 6, I think that you are talking about --

Q That's Page 35.

A Yes, 6 and 7. There's others that would need to be done, too, Ralph, and off the top of my head, without looking, I couldn't tell you which ones.

Q Would Aloha have to buy additional land for this packed tower aeration?

A Well, at 8 and 9 they have some land available at this time. Whether it is suitable or the right size is yet to be determined, but it is not at the existing well sites. So it may be that there is more land required.

Q Would there be other costs such as engineering survey fees that would have to be added in to get to a total cost for the Wyndtree water treatment plant?

A Yes.

Q And I believe somewhere you estimated that would be approximately 12 percent of the final total?

A Well, back in those days, yes. Those numbers have risen over the last three or four years.

Q What would it be?

A I couldn't tell you off the top of my head. Permitting requirements have gone up, and the amount of effort that goes into permitting has also gone up.

Q Did you also estimate the annual O&M budget for all three water treatment plant facilities?

A I did.

Q And that was on Page 34. What did you estimate that cost to be?

A About $4 million.

Q Can you estimate what the annual cost would be to operate the Wyndtree water treatment plant only? I think that's on Page 34.

A Well, close. I mean, some of the personnel and administrative costs would still have be attributed to it, but

Marshall -- let's see if you know this subject. In the annual report it shows annual revenues for the Seven Springs water system of $1,663,692. Subject to check, would you agree that's the annual revenues for the Seven Springs water system?

A Subject to check, sure.

Q Would you have any idea what percentage increase in revenue it would take to provide only packed tower aeration for the new Wyndtree water treatment plant for Wells 8 and 9?

A I have got to be honest, I do not.

Q Would it be probably over 100 percent increase?

A Oh, I think that is probably a safe bet.

Q Can you tell me if Aloha has converted all of its water treatment plant currently from chlorination to chloramines?

A It is in the process of doing so.

Q How many wells have been converted?

A None of them have been totally converted because they all have to be done at once. **All of them are** in construction, and all of them are far along in the process.

Q How soon do you think that will be done, the chloramines?

A If you asked me this question after Thursday I could tell you, there is a progress meeting. I really don't know off the top of my head at this point. Soon.

Q Are you still filing those progress reports?

A Yes.

Q Has Aloha constructed any facilities for the hydrogen peroxide process that Doctor Levine is proposing?

A Well, no. The hydrogen peroxide process, no, because Doctor Levine's work is still underway.

Q So that is still in the pilot project process?

A Uh-huh.

Q And is the utility going to construct any of these facilities for the injection of hydrogen peroxide?

A That is the intent once Doctor Levine's work is done and proves to be correct.

Q I think right now there is only one interconnect with the county, is that correct?

A There is only one interconnect that is provided for in the agreement with the county, that's correct.

Q And that is up by Little Road and State Road 54?

A That's correct.

Q Is there any room there to build any treatment facilities?

A None.

Q And you don't know of any other planned interconnects?

A No. At this point in time, that is the only one that has been identified.

Q Now, can Aloha buy untreated water from the county?

A No.

Q And what is the catalyst for Aloha having to buy the water from the county?

A The fact that the water management district would not allow Aloha to develop any new wells or pump its existing wells at a greater rate than it does in the permit.

Q So they are at the limit of their CUP or WUP or whatever they call it?

A The WUP. The water use permit, that's correct.

Q Now, Aloha's system consists of eight wells and they are all interconnected, right?

A That's correct.

Q And so when a customer gets his water, he can't be sure what well he got it from?

A That's correct. It depends on the demand and a number of other issues.

Q Wouldn't common sense tell you that if you are having trouble in the south, and that when Wells 8 and 9 went on line they started having the black water, that Wells 8 and 9 are in the south, that possibly the problem might be with Wells 8 and 9?

A Well, it depends on -- Ralph, you listen to the customer testimony I have heard in the various cases we have had, some people say that the problems began before those wells were put on line. Others say it happened after.

Q I thought somewhere in your testimony you said something about in late '95 or early '96 these problems -- that you became aware of these problems?

A That's when Aloha became aware of them in mass numbers or in larger numbers.

Q But can you tell me where most of the complaints about black water are coming from?

A I think it is that section of the service area.

Q So all of those subdivisions are in the south of

Aloha's territory?

A Pretty much so, yes, the majority.

Q And, again, that's where Wells 8 and 9 are?

A That's correct.

Q And weren't Wells 8 and 9 put in in the fall of 1995?

A I didn't put them in, but I think that's correct. Subject to check, I believe that is correct.

Q If you could take Wells 8 and 9 off line, if the water management district would let you, and they would let you drill two new wells in another area that might not have the problem, **what would be that cost?**

A I don't have those numbers.

Q Do you have any estimate whatsoever?

A No.

Q You don't know how much it cost to drill Wells 8 and 9?

A To be perfectly honest, I'm not sure.

Q Is there any way we could get that in a late-filed exhibit? How long would it take you to calculate that number?

MR. DETERDING: Commissioner, this is way beyond anything in his direct testimony.

MR. JAEGER: He talked about cost and expense, and we are trying to figure out --

CHAIRMAN BAEZ: Hold on.

MR. DETERDING: He talked about costs and expense

related to the issues in this docket, not in relation to moving treatment facilities.

CHAIRMAN BAEZ: Mr. Jaeger, exactly what is your point in trying to get this information. Because I'm --

MR. JAEGER: We are trying --

CHAIRMAN BAEZ: Is it a matter of identifying alternatives of some sort?

MR. JAEGER: Alternatives, cheaper alternatives.

MR. DETERDING: Again, I don't see -- I believe this is far outside the scope of his direct testimony. And, frankly, I think it is outside the scope of the issues in this proceeding.

CHAIRMAN BAEZ: Well --

MR. DETERDING: Chairman, if we were dealing with --

CHAIRMAN BAEZ: Exactly what is it that you are requesting? I'm sorry, I want to be clear.

MR. JAEGER: Chairman, staff tells me that we don't need that information and that we can withdraw the question.

CHAIRMAN BAEZ: Very well.

MR. JAEGER: And I have no further questions.

CHAIRMAN BAEZ: No further questions.

Commissioners, do you have any questions of Witness Porter at this point? Redirect.

MR. DETERDING: I have a few redirect.

REDIRECT EXAMINATION

BY MR. DETERDING:

Q You mentioned the people in attendance from the county at meetings at which they refused to commit to providing water in conformance with the Tampa Bay Water standard. You mentioned a Mr. Bramblett and Mr. Kennedy?

A One or the other, or perhaps both. I don't remember who was there, to be honest.

Q And Mr. Bramblett, I believe you said in response to the questions from staff counsel was the utility director for the county at that time?

A Yes.

Q And is now retired?

A Yes.

Q And who is his replacement?

A Bruce Kennedy.

Q What is the effect of the Tampa Bay Water standard? What happens if Tampa Bay doesn't meet it?

A Well, if Tampa Bay Water does not meet the standard, then there are monetary issues that kick in. In other words, they must meet the standard. If they do not, they either provide the water -- my understanding is they provide the water at a cheaper rate to the member government, if the member government is willing to retreat the water or do something along those lines. And I'm not aware of any governments who are willing to do that. I think they have all put it back on

'ampa Bay Water, to the best of my knowledge.

Q But it doesn't impose on Tampa Bay Water an obligation to do something to come into conformance?

A Not that I am aware of, no.

Q Are you aware of whether Tampa Bay Water has always met that standard?

A No. As a matter of fact, I think my understanding is that they have had trouble meeting that standard from time to time. And the also time I was aware of it was at a seminar that I attended where I believe there was some handout information that showed that they hadn't met it in many cases.

Q You were asked about your report that you prepared sometime ago?

A Yes.

Q What is the date of that report?

A October 2002.

Q Have prices changed since that time?

A Oh, dramatically, especially for construction materials.

Q Specifically as to construction materials?

A Yes, specifically. I mean, steel prices have gone up considerably and so have, in many cases, concrete and some other materials.

Q Now, you were asked about the relationship, I think staff was asking you about the relationship between Wells 8 and

going on-line and the complaints. Didn't Aloha start a rate proceeding at the exact same time that those complaints started?

A Not only a rate proceeding, but the largest one ever asked for by Aloha. And the first one that had been done and asked for, I believe, in 20-some-odd years, as far as not a pass-through. I mean, an honest to God rate case. So, yes, it was.

MR. DETERDING: That's all I have. Thank you.

MR. JAEGER: Chairman Baez, I would like just a couple of questions on that last question.

CHAIRMAN BAEZ: Can you come on over, because I don't think Jane can hear what you are saying and neither can I.

MR. JAEGER: That last question Marty asked, I just wanted to ask a couple of questions on that.

CHAIRMAN BAEZ: Go ahead, Ralph.

RECROSS EXAMINATION

BY MR. JAEGER:

Q There was a rate proceeding that was filed in '95, and they had a customer meeting in August of '95. Were you there for that?

A If it was '95, no, I don't think so. You know, I don't know. A customer meeting in --

Q It's Docket Number 950615, and it was filed in '95 and the customer meeting was in August. Were you there?

A I don't remember, to be honest with you. I would have to look at something. Can you stand by a minute? What was the docket number again, Ralph?

Q 950615. And it was combined with 960545 was the combination.

A Yes, I was.

Q Do you remember there being the first complaint about black water in August of '95? I mean, there was complaints about discolored yellow or green, but was there the first complaint at that customer meeting about black water?

A You know, Ralph, I'm going to be honest with you, I'm not sure I was at that customer meeting. I was at the hearings later. Was this the reuse case that you are talking about?

Q It started out as a reuse case, yes, and then the customers piggybacked their complaint about the black water problem.

A You know, I've got to be honest, I don't know if I was at that customer meeting or not. I don't remember.

Q Would you, subject to check, be surprised if you listened to the tape of that meeting that there was not the first black water complaint at that meeting?

MR. DETERDING: Commissioners, we don't even know if he was there, so why are we asking him about what when on there?

MR. JAEGER: You asked about he was involved in the

largest rate deal and about when these black water complaints started in earnest. And I just wanted to see if he was there.

CHAIRMAN BAEZ: Mr. Jaeger, hold on. Let me short circuit this. I think the question was merely one of timing. And I don't remember his involvement being -- I don't know, Jane, you can correct me -- but I don't remember his involvement being questioned whatsoever. I will let the question go. Up until now he has answered it, he doesn't remember being in it, and I don't know that we can go any farther than that. **Do you have any other questions?**

MR. JAEGER: No further questions, Commissioners.

CHAIRMAN BAEZ: Mr. Deterding, do you have any other redirect?

MR. DETERDING: No.

CHAIRMAN BAEZ: Commissioners, do you have any questions at this point? No.

Mr. Porter, thank you.

THE WITNESS: Thank you.

CHAIRMAN BAEZ: We are on to rebuttal. Dr. Kurien, rebuttal witness.

MR. WHARTON: You know, Mr. Chairman, I discussed with Mr. Jaeger that he doesn't have any cross questions and neither do I. Maybe we could stip Dr. Kurien's rebuttal.

CHAIRMAN BAEZ: Well, with all the cross-examining out of the way, is there any reason we can't stip?

MR. BECK: Unless the Commissioners have questions.

CHAIRMAN BAEZ: Commissioners, do you have questions of Dr. Kurien on rebuttal? No questions? All right. We will stipulate Dr. Kurien's rebuttal testimony into the record.

Does he have exhibits?

MR. BECK: Yes, VAK-19 through 27.

CHAIRMAN BAEZ: VAK-19 through 27, correct.

MR. WHARTON: And my objections to those exhibits would only be as before, that I believe some are hearsay in the purest sense.

CHAIRMAN BAEZ: You can reserve those on brief. And that would be VAK. Any objection to a composite exhibit at this point? We didn't do it the first time, but since you have the same objections reserving --

MR. WHARTON: Correct.

CHAIRMAN BAEZ: -- we will do Composite 23 will be Dr. Kurien's rebuttal Exhibits VAK-19 through 27. And with Mr. Wharton's exceptions noted, we will admit them into the record.

(Exhibit 23 marked for identification and admitted into the record.)

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

ALOHA UTILITIES, INC.

DOCKET NO 010503-WU

REBUTTAL TESTIMONY

OF

V. ABRAHAM KURIEN, M.D.

IN RESPONSE TO TESTIMONIALS BY DR. AUDREY D. LEVINE PH.D AND MR. DAVID W. PORTER. P.E.

Q. COULD YOU PLEASE EXPLAIN WHY YOU DECIDED TO INTERVENE AND FILE DIRECT TESTIMONY IN THIS PROCEEDING?

A. As someone who experienced poor quality of water in his domestic plumbing, I was forced to take upon myself the burden of attempting to find ways of getting Aloha Utility involved in addressing whether its processing methods were adequate to create a product such that its quality did not deteriorate within domestic plumbing under reasonable and nationally recognized conditions of material structure and appropriateness of daily use of water. As part of my effort, I unearthed a great deal of evidence that was not previously

available to the customers or was unknown to regulatory agencies. While doing so, I discovered that the reasons for the poor quality of water in the domestic plumbing of some areas of Aloha's territory was not adequately investigated and appropriate interventions had not been instituted to improve the quality of water for over ten years after being brought to the attention of regulatory agencies.

Q. COULD YOU PLEASE INDICATE WHETHER YOU HAVE ANY EDUCATIONAL BACKGROUND OR EXPERIENCE THAT ENABLES YOU TO ADDRESS THIS ISSUE AND WHICH MAY CONTRIBUTE TO THE RESOLUTION OF THE PROBLEMS?

A. First of all, I like to indicate that I have no educational background in engineering of any kind, and specifically in water engineering. However, the aspects that I have chosen to comment about in this proceeding relate to fields of my educational background, namely chemistry, bacteriology and "circulation". I received a cum laude Batchelor of Science degree in chemistry from the University of Mysore in India in 1954 and taught analytical chemistry at college level. This involved identifying unknown substances through analytical methods. I received a Summa Cum Laude M.D. degree from the University of Edinburgh in Scotland in 1963 and graduated as the most distinguished graduate of the year and was awarded the Gold Medal for Medicine. A major part of medical training consists of the

understanding of bacteriology and therapeutics. I have undertaken postgraduate research into human circulation and am a Fellow of the Royal College of Physicians of Edinburgh and was an Assistant Professor at the University of Edinburgh between 1968-1970. I practiced Internal Medicine and Cardiology for twenty years in Connecticut and was on the Staff of the University of Connecticut as a Clinical Instructor. Thus I have a sound background and training in the methods of scientific investigation, the principles of diagnosis and treatment. I have published many articles in various peer-reviewed journals.

Q. CAN YOU NOW SPECIFICALLY ADDRESS TESTIMONY PROVIDED BY DR. AUDREY LEVINE AND MR. DAVID PORTER IN RESPONSE TO YOUR TESTIMONY IN DOCKET NO 010503-WU WITH REFERENCE TO THE STANDARDS AND THE POINTS AT WHICH THOSE STANDARDS MUST BE COMPLIED WITH TO IMPROVE THE QUALITY OF WATER IN THE DOMESTIC PLUMBING OF CUSTOMERS IN ALOHA'S TERRITORY?

A. I must first address the reason why I requested modification of Aloha's re-wording of the Tampa Bay Water Authority ("TBWA") standard.

The intermittent occurrence of black water and rotten egg smell in the homes of certain customers in Aloha Utilities' service territory has been well

documented for many years. No specific factors or combination of factors have so far been identified as responsible for these phenomena. There have been two **hypotheses** that have been advanced to account for these findings. Mr. Porter, the consultant engineer of Aloha, elaborated on the first hypothesis in his testimonial before the Public Service Commission in 1996 when he claimed that the only reason for the phenomenon of intermittent black water was the re-formation of hydrogen sulfide *in situ* and *de novo* in the domestic plumbing due to the action of sulfur reducing bacteria (SRB) on sulfate naturally present in the underground water. The re-generation of corrosive hydrogen sulfide in domestic plumbing was explained as being due to the removal of chlorine by water softeners and conditioners installed by customers in their homes, thereby reducing the disinfection capability of delivered water. Aloha Utilities has consistently maintained that the water it delivers at the domestic meter is "clean, clear and safe" and therefore it has no responsibility for what happens in domestic plumbing and finds no need to alter its method of processing in such a way as to provide greater stability for water in domestic plumbing. This set of reasoning is only a hypothesis, since Aloha has not demonstrated re-generation of *hydrogen sulfide from sulfate* as the primary reason for copper corrosion and rotten egg smell in its service territory. PSC staff has documented that black water **does occur** even in homes that have no water softeners or conditioners of any kind.

A second *hypothesis* can be inferred from research literature in which the effect of the **sole** use of chlorination for processing water has been studied, and from FDEP guidelines that have been proposed after extensive discussion among experts in the field of water processing for the prevention of copper corrosion and black water formation in domestic plumbing. Stated simply, this hypothesis maintains that the *sole use of chlorination* for processing source water that contains hydrogen sulfide above a certain level will result in turbidity caused by elemental sulfur formed during the process and that the amount of turbidity formed is proportional to the amount of hydrogen sulfide present in water, among other factors. This turbidity may be *associated with* formation of black water due to the production of copper sulfide in domestic plumbing containing copper. Both Mr. Porter and Dr. Levine, the university consultant of Aloha for the implementation of a new processing method, have observed that this association may be related "to increased chance for bacterial contamination" and "the lowering of the effectiveness of disinfection". Over a year ago, FDEP instituted new guidelines for **removal of elemental sulfur** when chlorination alone is used for processing source water that contains more than 0.3mg/l of hydrogen sulfide.

I indicated in my direct testimonial that the audit conducted by Dr. Levine documented the presence of hydrogen sulfide in the transmission system of Aloha contrary to the claim of Mr. Porter previously that there was no hydrogen sulfide in the transmission and distribution system of the Utility.

Dr. Levine has addressed this matter in her testimonial by saying, *"the only location in which detectable hydrogen sulfide was observed was at the inflow to the ground storage tank which is not in the "transmission" or distribution system"* (page 3, lines 5-7). Mr. Porter has addressed the same finding by saying, *"A slight hydrogen sulfide concentration (of 0.12mg/l) was found in the **partially** treated water flowing in a pipeline connecting two treatment plants with the main ground storage tank. This water does not flow into the distribution system"*(page 8, line 22- page 9, line 1). Both of them have concluded that I was mistaken in maintaining that hydrogen sulfide was detected at a level of 0.12mg/l in Aloha's "transmission" system.

The accuracy of my statement depends on how one defines *transmission* and *distribution* system. "Transmission system" is the system of pipes that *transmits* water from the wells to the storage tank. "Distribution system" is the system of pipes that *distributes* water from the wells or the storage tank to the customers.

The water in which hydrogen sulfide was detected above the 0.1mg/l level suggested as a standard had already been processed at the wells with the **sole** use of chlorination and was recorded to have only 0.01 mg/l of hydrogen sulfide when it was delivered into the "transmission" system. Further down in its travel in the "transmission" system a water sample was taken and found to have 0.12 mg/l of hydrogen sulfide. There are only two possible conclusions

as to why this happened. Mr. Porter prefers the explanation that the water was only "**partially treated**" at the wells and needed "**final treatment**" and the latter was undertaken at the storage tank and that the water in the outflow from the storage tank the same day contained no hydrogen sulfide when it was pumped into the "distribution system". Dr. Levine's explanation implies that this was an isolated finding. "This sample site was re-sampled **several times** in succession and did not have detectable hydrogen sulfide upon re-sampling"(page 3, lines 7-11). Both Dr. Levine and Mr. Porter were on this sampling tour along with Dr. John Gaul PhD, customer representative, but I was not. Therefore, I cannot verify the accuracy of that statement. However, the disparate explanation by the two testimonials in response to my reference to the audit report's conclusion raises serious concern as to what might be the real explanation.

The detection in the "transmission system" of Aloha Utilities of hydrogen sulfide above the level recommended as a standard is of serious concern to the customers. **My education in chemistry taught me that science is no respecter of persons or locations. Where conditions are suitable, reactions take place!** If significant concentration of hydrogen sulfide was found in one location of Aloha's system after the water left the treatment plant at a well, then the same event could occur at other sites in the "transmission" and "distribution" system into which finished water is introduced after using the same processing method. Whether the hydrogen sulfide detected was

present due to re-formation as I suggested in my testimonial or due to "**partial treatment**" of hydrogen sulfide in source water as Mr. Porter suggests in his testimonial, **the concern is that the method of treatment at the well is either inadequate to completely remove hydrogen sulfide from raw water or that the processing method used is easily reversible during the transport of water in Aloha's system from one location to another**. This raises the serious possibility that hydrogen sulfide may intermittently be delivered into the domestic plumbing and thereby cause corrosion. I realize that this is a hypothesis contrary to accepted "wisdom", but it is a testable hypothesis. Customers have reported black water in the pipes between the domestic meter and before delivered water enters their homes. This is well before any water softener or conditioner systems and therefore does not conform to Mr. Porter's complaints about such installations being responsible for re-formation of hydrogen sulfide in water the Utility has previously claimed was **adequately** treated. Now for the first time, Mr. Porter is admitting, what he must have known all along, that source water is only partially treated at first pass at the wells and requires **further treatment!** In reports submitted by Aloha's own technical staff during flushing procedures carried out by them, there is documented evidence of black and discolored water in Aloha's distribution system even when fire hydrants are flushed on a daily basis and large volumes of finished water were removed from the distribution system to raise free chlorine residual levels to 1.5 mgs/l (Exhibit VAK-19). These documents provide corroboration that finished water is not

adequately treated before discharge into the distribution system or that the processing method is easily reversible. Dr. Levine's proposal that there is no significance to an isolated finding is also not very valid, because when the degradation of water quality is intermittent, one does not expect to find evidence for it all the time!

Most of the water that Aloha supplies to its customers flows **directly** from wells to domestic plumbing without receiving a second **"final treatment prior to its being pumped into the distribution system"** (Mr. Porter; page 9, line 1). Such re-treatment is provided only when water is distributed from the storage tank. If a chlorine booster is necessary to **treat water further** in the ground storage tank (which has no water softener or water conditioner) before the water left the same day to travel along the distribution system to the customers, it would suggest that the chlorine decay in Aloha water is much higher than documented by monthly operation reports (MOR) submitted to the FDEP. What is responsible for this phenomenon? What impact does this have when most of the water supplied to homes goes directly from wells to domestic plumbing **without a second final treatment**? Are the levels in the MOR submitted to FDEP truly the lowest free chlorine residual in the distribution system or were most of the readings obtained from samples taken after the flushing procedure that raises free chlorine residuals?

It is this concern that prompted me to suggest that the total sulfide standard of 0.1mg/l should be complied with at the domestic meter to ensure that the water that enters the domestic plumbing does not have more total sulfides because such presence could cause significant copper corrosion.

Q. HOW DO YOU ANSWER THE TESTIMONIAL THAT THERE IS NO NEED TO MEASURE ELEMENTAL SULFUR LEVELS OR HAVE A STANDARD FOR ELEMENTAL SULFUR IN ADDITION TO THE STANDARD FOR HYDROGEN SULFIDE BECAUSE ACCORDING TO DR. LEVINE "THERE HAS BEEN NO VIOLATION OF THE BACTERIOLOGICAL STANDARD (TOTAL COLIFORM) WITHIN THE SEVEN SPRINGS SYSTEM" (PAGE 3, LINES 21-23)? "

A. As I indicated earlier, in their prior statements referred to in my direct testimony both Dr. Levine and Mr. Porter have suggested a role for turbidity induced by colloidal elemental sulfur in lowering bacterial disinfection capabilities. Both *now* argue that there is no factual evidence of lowered disinfection capability as demonstrated by the lack of high coliform colony (Dr. Levine; page 3, lines 21-23) and heterotrophic plate colony counts (Mr. Porter; page 9, line 22-24). It is also pointed out that the **reported levels** of free chlorine residuals in MOR submissions to FDEP show levels above 0.2 mg/l, the minimum required for **human pathogens** according to EPA requirements.

From the information that I have gathered from Aloha's own flushing program reports, there is evidence that free chlorine residuals have fallen below 0.2mg/l at a number of sites in Aloha's **distribution system** even when flushing is undertaken on a daily basis and that there has been discoloration of water in the distribution system on many days (Exhibit VAK-19). PSC Staff has documented black water in homes that have no water conditioner systems and should have adequate chlorine levels during periods of daily use, if such were present when water was delivered. Aloha has not provided any evidence to suggest that SRB, the bacteria considered responsible for the *in situ* and *de novo* regeneration of hydrogen sulfide in domestic plumbing, can be inactivated by the 0.2mg/l level of free chlorine residual. SRB is an **anaerobic organism** and its sensitivity to chlorine may well be different from that of human pathogens. **Anaerobic organisms** are more effectively inactivated by the presence of oxygen in the medium in which they live, as those who understand bacteriology know, and as indicated by Dr. Levine in her audit recommendations. Since the underground water that Aloha processes contains very little oxygen, it is likely that this organism is capable of being active even in "finished" Aloha water at all levels of its system, including the domestic plumbing. . The evidence that exists in a study done by FDEP, **"The Pasco County Black Water Study" performed by FDEP in 1998-9** (Exhibit VAK-20) showed significant growth of bacteria, I presume SRB, from 10-30 % of delivered water at the point of its entry to the domestic plumbing. **The most likely manner in which SRB is delivered into the**

closed system of the domestic plumbing is by its entry through the delivered water. The lower incidence of black water and rotten egg smell in aerated water systems may well be related to the reality that in aerated water, this bacterium is inactive.

Therefore, from the point of view of corrosiveness of metals the evidence suggesting the absence of human pathogens such as coliform bacteria or maintenance of adequate chlorine levels at FDEP standard of 0.2mg/l may not be adequate to exclude introduction of active SRB from the wells of Aloha into the domestic system. **Aeration may be necessary to inactivate this organism.**

Q. MR. PORTER STATES, "DR. LEVINE CONDUCTED SUSPENDED SOLIDS TESTING OF THE WATER SAMPLED FROM A NUMBER OF CUSTOMER METERS DURING HER WORK. IN EACH CASE, NO MEASURABLE QUANTITY OF SUSPENDED SOLIDS WAS FOUND". DOES THAT NOT SUGGEST THAT THE LEVELS OF ELEMENTAL SULFUR ARE VERY LOW?

A. The levels of suspended solids and their composition in a water processing system obviously are very variable according to Dr. Levine's testimonial (page 5, lines 3-4). These were semi-quantitatively tested for at the wells, not at other levels of Aloha's systems or in the domestic plumbing, as Mr. Porter

seems to suggest. Dr. Levine in fact demonstrated minute quantities of elemental sulfur by the use of scanning electron micrographs (SEM) at **Well 8** and significant amount of suspended solids when customers' whole house filters and water from hot water systems were tested (Exhibit VAK-21, Dr Levine's Phase II audit report pages 27-32). From the examination of installed whole house sediment filters, customers have reported wide variety of suspended solids in the water they receive from Aloha including sand, debris of other kinds and varying concentration of black material even before delivered water enters their homes (Exhibit VAK-22). The only suspended material we need to consider as an antecedent to metal corrosion, on the basis of hypotheses that have been advanced, is elemental sulfur. The amount of elemental sulfur produced in finished water is a function of the concentration of hydrogen sulfide in raw water and the amount of chlorine added, in addition to factors such as oxygen level in raw water and pH. At the pH of Aloha's source water, and with no oxygen present, it seems very likely that elemental sulfur is formed when the sole use of chlorination is the processing method and the ratio between hydrogen sulfide level and chlorine added is insufficient.

As Dr. Levine has pointed out, I concede that at the present moment, there is no accurate method to measure the levels of elemental sulfur in delivered water. However, scanning electron micrographs (SEM) can indicate the presence of sulfur particles and other aggregates consisting of sulfur,

phosphorus and many different metal elements at different stages of the water processing system and the domestic plumbing.

Dr. Levine spent enormous amounts of effort to do exactly that in processed water from **Well 8** and other areas in the transmission system and domestic plumbing, (Exhibit VAK-21). On 10/29/03 when **Well 8** was sampled, the hydrogen sulfide level in source water was 2.20 mg/l. On November 12, 2003 hydrogen sulfide level was 1.73 mg/l. Both these levels of hydrogen sulfide in source water are within the theoretical capacity of the chlorinator at that well to completely convert to sulfate without the production of elemental sulfur. Dr. Levine calculated the specific chlorine demand of hydrogen sulfide in **Well 8** on November 12, 2003 as 7.83mg/l. This suggests that the oxidation reaction of hydrogen sulfide in that well on that day had proceeded almost completely to sulfate. Theoretical value for chlorine demand of hydrogen sulfide for complete conversion from sulfide to sulfate is 8.33mg/l. (Exhibit VAK-23). Therefore, one would not have expected to see much colloidal elemental sulfur in finished water from that well on that day. However, the question that needs answering is: What happens when the amount of hydrogen sulfide in raw water exceeds the theoretical capacity of the amount of chlorine added or the maximum capacity of the chlorinator at any well to convert hydrogen sulfide to sulfate? The maximum theoretical capacity for conversion of hydrogen sulfide to sulfate at **Well 9** is only 2.6 mgs/l according to Dr. Levine. (Exhibit VAK-24). On 11/12/03 the amount

of hydrogen sulfide present in raw water from **Well 9** was only 2.43mg/l within the capacity of the chlorinator at that well. So on that day only minimal elemental sulfur would have been formed. However, would it have been possible for the chlorinator at **Well 9** to prevent formation of elemental sulfur (in greater quantity than was demonstrated in **Well 8** on 11/12/03) when the level of hydrogen sulfide was 3.95 mg/l in **Well 9** on 10/29/03 and the maximum theoretical capacity of the chlorinator at that well to convert to sulfate was only 2.6mg/l? **What might have happened during the 3 months of April –July in 2001, when the raw water in Well 9 was documented to have hydrogen sulfide levels between 3.5 –6.71 mg/l on twenty different occasions?** (Dr Levine's Phase I Report, page 10, Exhibit VAK-25) It does not seem unreasonable to conclude that theoretically during that season in 2001, there may have been 1-3 mgs/l of elemental sulfur in water processed from **Well 9**. If so, what is the implication of this for the production of black water and rotten egg smell in domestic plumbing served by water from that well if elemental sulfur is associated with black water? Scanning electron microphotographs provided by Dr. Levine in the Phase II Report show increasing quantities of suspended solids as water moves through Aloha's system from well to storage tank and finally reaches domestic plumbing after the domestic meter. Greater amount of suspended solids was demonstrated in the hot water system. (Exhibit VAK-21).

Production of SEM to detect presence of elemental sulfur in processed water is not an economically viable proposition and in any case it is not a quantitative method. Turbidity increase in finished water after processing has been suggested as a simpler method. **Turbidity measurements were not carried out during the sampling of water from any of Aloha's eight wells during Dr. Levine's audit nor were SEM made of water from Well 9 on 10/29/03 when hydrogen sulfide level was 3.95mg/l and beyond the capacity of the chlorinator to convert completely to sulfate.** That would have been more relevant than producing scanning electron micrographs of particulate matter from **Well 8** where the likelihood of elemental sulfur production was low on the day the water was sampled.

Q. **YOU HAVE NOT ANSWERED THE CONCERNS RAISED BY MR. PORTER THAT YOU ARE ASKING FOR STANDARDS THAT ARE DIFFICULT AND EXPENSIVE TO ACHIEVE AND ARE NOT USED "ANYWHERE IN THIS NATION, PERHAPS IN THE WORLD" (PAGE 6, LINES 21-23).**

A. I must agree that this observation may indeed be correct! However, scientific methodology also requires **stringent standards** to achieve therapeutic goals especially when there is no track record for a new method. The method that Aloha plans to adopt is not being used anywhere in this nation for oxidizing

hydrogen sulfide in source water to produce drinkable water. Perhaps, for that matter it is not used any where in the world!

When I used the words "standard" and "MCL", I was using the terminology the way it is used almost interchangeably in Exhibit D of the TBWA such as maximum contaminant level, goal, standard, compliance level and action level. (Exhibit VAK-26) **The important point is that TBWA requires action if the level of total sulfides exceeds 0.1mg/l and that action is to be taken by the TBWA and its member governments that are utilities and not allow customers to suffer the consequences that may arise.** It has been demonstrated by a number of utilities that black water and rotten egg smell can be significantly reduced by methodologies without strict measurement and conformity with standards for total sulfide and elemental sulfur levels, such as membrane technologies (Dunedin Municipal Utility) and aeration and biological oxidation (Pasco County Utility), manganese green sand and potassium permanganate oxidation (Port Richey Utility) along with more appropriate adjustment of pH levels. These methods obviously address the issues of black water and rotten egg smell through other effective interventions. Aloha does not use any of these methods now and did turn down the suggestion of increasing the pH of delivered water.

The new processing method using hydrogen peroxide that is being considered by Aloha utility as well as the current processing method of the **sole** use of

chlorination are **reversible oxidative methods** that can result in re-formation of hydrogen sulfide and the production of elemental sulfur. In the absence of the use of more successful methods for reducing copper corrosion, strict adherence to more stringent standards that lower the levels of these substances that have been considered to be significant factors in the production of black water and rotten–egg smell are necessary to improve water quality in certain areas of Aloha's territory. The directive given by the PSC to the Utility in April, 2002, was to implement a method that ensures a *significant* reduction of black water and rotten egg smell in domestic plumbing.

An essential approach to remediation in any system whether it is a material system or a living system requires that the correct diagnosis and causative agency should be established before a therapeutic strategy is recommended. If a "therapeutic trial" is being undertaken without an accurate diagnosis, (as Aloha is attempting to do at this time), it is important to establish that the levels of incriminated factors such as hydrogen sulfide, elemental sulfur and presence of SRB are adequately monitored and controlled, especially where the history of poor water quality is of long standing without effective intervention.

Q. DO YOU HAVE ANY ADDITIONAL COMMENTS?

A. Yes. Mr. Porter has stated very categorically that I am mistaken in a number of my statements (page 10, lines 14-18). I am always willing to be corrected about inaccurate statements, and would do so in this instance also if the shifting claims of Mr. Porter were true. Much has been made of the succinct, but important distinction that I made between the Tampa Bay Water Standard (goal) in exhibit D and the re-wording that Aloha has used for modification of the "98% hydrogen sulfide removal" standard. As I indicated in my direct testimony, Exhibit D makes no mention of *treatment facilities* at all, but indicates that the "water quality parameter" will be "sampled annually at a minimum at the Point(s) of Connection". Further down in Exhibit D on page 3, (Exhibit VAK-26), the Notes section says, "maximum average= not to exceed average value using a running four quarterly sample average". To me this represents the way TBWA arrives at the compliance level determination for itself. I assumed, correctly I maintain, that this means TBWA samples processed water **at least four times at its treatment facilities** to establish that it has complied with its own standard (goal). In fact Mr. Porter himself admitted this to be accurate in a document submitted by Aloha's attorney, Mr. Deterding, on March 29, 2004 to the PSC (Exhibit VAK-27). Testing was recommended at a *minimum* of annually only at the point(s) of connection. The responsibility, if desired or necessary, to sample more frequently at the points of connection was left to the member government utilities. **Aloha is requesting that the standard be reduced to an annual sampling at the treatment facility and claiming that such a frequency to be the norm at the TBWA. That is patently incorrect.**

Aloha Utilities wants to be left alone to produce potable water that does not remain drinkable in customer plumbing by the claim on the one hand that according to Florida Statutes its responsibility ends at the **outflow of the domestic meter**. Yet when it comes to ensuring that the water it delivers to the customers meets the TBWA performance standard (compliance level, action level, goal) which the Utility claims it is ready to meet, it no longer wants to do so at the domestic meter which is the point of delivery, but only at the treatment facility and only once a year. No other product can be sold in this country by the claim that it met standards at the production plant as automobile, home appliance and electronic product manufacturers know only too well. They have to meet standards at the point of delivery. There may not be a law so far that potable water should meet standards at the point of delivery, but no customer should have to put up with stinking black water for ten years with a claim from its producers that its water is "clean, clear and safe" at the point of delivery, without tests confirming that it has the ability to remain so.

As a last statement, I want to indicate that I do understand very clearly the limits of my knowledge. I have based everything that I have stated in my testimonials on public and Aloha's records and statements by **experts** including Dr. Levine and Mr. Porter. As a person committed to scientific methodology, I maintain that there is a difference between a hypothesis and documented facts and that this differentiation must always be maintained. My interpretations of the data may be different from "accepted wisdom", but that is what scientific judgment and dialogue are all about. My scientific

knowledge base is solid and I do not venture out beyond my knowledge base to make **inappropriate categorical statements** about the cause of black water but merely request those who have regulatory responsibilities, to consider the totality of circumstantial evidence in a **new** way. The claim that the black residue seen in the toilet tanks of customers is the result of the corrosion of *black flotation ball*, as Mr. Porter told me when he visited my house in January, 2002 and that black water would disappear from customers' toilet tanks if *black flapper valves* were replaced by *red* valves, as Mr. Crouch another engineer of Aloha suggested at an Aloha Customer Workshop in June, 2004, came from consultants who have water engineering degrees and who were introduced at customer workshops as **experts**. Such nonscientific and absurd statements offered as facts were used for a long time and is still being used to prevent an adequate scientific investigation of black water and rotten egg smell in customers' plumbing.

Scientific investigations and appropriate therapeutic interventions by professionals who have no conflict of interest are always necessary to solve complex problems of water quality. It is very appropriate for regulatory agencies to always insist on expert consultations free of conflict-of-interest from extramural water processing professionals and engineers, especially when offers at good faith negotiations with utilities to solve issues have been rejected.

Q. WHAT IS YOUR SPECIFIC RECOMMENDATION TO THE COMMISSION IN THIS PROCEEDING?

A. I have presented enough evidence based on objective facts and data gathered from numerous sources **that stringent standards are essential** for Aloha's current method and the proposed new method to deliver water that will **significantly reduce** the incidence of black water and rotten egg smell in domestic plumbing. If Aloha is not willing to accept these logical standards, the Utility should be prepared to implement other well-recognized methods that even without the use of these strict standards have been associated with much lower incidence of these phenomena and have a well established track record of being able to deliver water that remains stable in domestic plumbing without a high incidence of black water and rotten-egg smell. Where such phenomena occur, and where Aloha has not provided remediation for ten years, the customers are now requesting the PSC to provide them with an opportunity to get better quality water by deletion of those territories from Aloha's service area.

Q. IS THAT THE END OF YOUR REBUTTAL TESTIMONY?

A. Yes, thank you.

MR. WHARTON: We might be able to handle Mr. Porter's rebuttal the same way, Mr. Chairman, but I haven't talked to Mr. Beck.

CHAIRMAN BAEZ: Well, we will have to take a poll on that.

Dr. Kurien, you are excused. Thank you, sir.

And, Mr. Beck.

MR. BECK: I'm all in favor, let's stipulate Mr. Porter's rebuttal and Mr. Sowerby.

CHAIRMAN BAEZ: I'm sorry?

MR. BECK: I would agree to stipulate Mr. Porter's testimony, the rebuttal testimony.

CHAIRMAN BAEZ: Very well. Mr. Jaeger, do you have --

MR. JAEGER: No cross for Mr. Porter.

CHAIRMAN BAEZ: No cross for Mr. Porter.

Commissioners, did have you any questions of Mr. Porter on rebuttal? No. I think we can stipulate Mr. Porter's -- and I am trying to look, I don't see any exhibits for Mr. Porter on rebuttal, or do I?

MR. DETERDING: No.

CHAIRMAN BAEZ: He has no exhibits. So without objection, we will stipulate Mr. Porter's rebuttal testimony into the record as though read, as well.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

ALOHA UTILITIES, INC.

DOCKET NO. 010503-WU

REBUTTAL TESTIMONY OF DAVID W. PORTER, P.E.

Q. Are you the same David W. Porter, P.E. that provided direct testimony in this case?

A. Yes.

Q. Have you read the direct testimony of John R. Sowerby, P.E. filed in this case?

A. Yes.

Q. Do you have any comments regarding the testimony of John R. Sowerby, P.E.?

A. Yes as provided below:

Q. Mr. Sowerby states that the Department would have no problem if the Utility chose to extract water quality samples for analysis at locations other than those prescribed by FDEP Rule so long as the Utility also tested at the sites required by FDEP Rule. In your opinion, by his making this statement, did you believe the FDEP encourages sampling at other locations?

A. In my opinion, they do not. As far as Mr. Sowerby went with his answer I agree with him, however, based on my many years of working with the FDEP and its rules, it is my experience that their rules do not prevent a utility from taking whatever samples they choose. In

fact, if the utility chose to sample and test for any parameter what-so-ever, no matter how meaningless that sampling and testing may be, the Department would not object. However, just because the Department would not object to a utility taking non-required samples and conducting non-required analysis, that does not mean that they encourage or endorse this practice.

Q. Mr. Sowerby states that the Department would have no problem if the Utility chose to extract water quality samples for analysis at intervals more frequent than those prescribed by FDEP Rule. **In your opinion, by** making his statement, do you believe FDEP encourages sampling and testing at frequencies greater than those prescribed by FDEP Rules?

A. In my opinion, they do not. Again, as far as his answer to this question went, I agree with him. However, based on my experience working for many years with the FDEP and its rules, I think that Mr. Sowerby could have added that the FDEP rules do not prevent a utility from taking samples more frequently the required by FDEP Rule if they choose. In fact, if the utility chose to sample and test at any frequency greater than that required by FDEP rule, no matter how meaningless that sampling and testing may be, the Department would not object. However, just because the

Department would not object to a utility taking more frequent samples than required by FDEP rule, that does not mean that they encourage or endorse this practice.

Q. Mr. Sowerby states that the Department would allow Aloha to modify its facilities to enhance sulfide removal capabilities. In your opinion, by his making this statement, do you believe FDEP endorses or encourages the construction of such modifications?

A. In my opinion, they do not. Again as far as he went, I agree with Mr. Sowerby, however, I believe that his response would have been more complete if he had stated that the current FDEP Rules do not require Aloha to undertake such modifications (as he did elsewhere in his testimony). However, based on my many years of experience working with the FDEP and its rules the FDEP rules do not prevent a utility from adding additional treatment processes to their facilities beyond those required by FDEP Rule if they choose; so long as the modifications are permittable by the Department. In fact, if the utility chose to add any treatment process to their facilities, no matter how meaningless those new facilities may be, so long as they were permittable, the Department would not object. However, just because the Department would not object to a utility adding treatment processes in excess to those

required by their rules, that does not mean that they encourage or endorse this practice.

Q. Mr. Sowerby stated in his testimony that Aloha consistently maintains throughout its distribution system a free chlorine residual equal to, or greater than, the minimum 0.2 mg/L required by FDEP rule. In your opinion, does this statement indicate anything that can be assumed about the hydrogen sulfide concentration of the water in the distribution system?

A. Yes. While I agree with what Mr. Sowerby stated, I think this answer could have provided additional important information, especially in the context of the issues surrounding this docket. The presence of a free chlorine residual at the extremities of a utility's water distribution system is measured to determine a number of important things, not only about what **is** in the water flowing through the distribution system, but at least as importantly what is not in that water. When a free chlorine residual is present, it is generally understood that substances that are oxidized by the chlorine (such as hydrogen sulfide) are not present in the water. **This is especially true when the** free chlorine residual is present at the extremities of the water distribution system. Also, the presence of the free chlorine at these points, along with the

proper coliform bacteria testing results, indicates that the water has been provided proper disinfection.

Q. Do you have anything further to offer?

A. No.

CHAIRMAN BAEZ: Where does that leave us, Ralph?

MR. JAEGER: I believe that it is now just what do we do about post-hearing.

CHAIRMAN BAEZ: That does it? Okay. So then why don't run down -- we are done with the witnesses, why don't we run down some post-hearing scheduling.

MR. JAEGER: Right now the transcripts are scheduled for March 24th, 2005. But I do note that that was when this was a three-day hearing, and so all the dates were set giving them a little bit more time. And briefs by April 7th, with a staff recommendation scheduled for May 19th for the May 31st agenda.

CHAIRMAN BAEZ: Can you say those again, because I couldn't hear you?

MR. JAEGER: March 24th is the dates for transcripts.

CHAIRMAN BAEZ: The briefs?

MR. JAEGER: And we have briefs scheduled for April 7th, 2005.

COMMISSIONER BRADLEY: And the rec?

MR. JAEGER: May 19th, 2005.

CHAIRMAN BAEZ: To file, right?

MR. JAEGER: For the May 31st, 2005 agenda.

CHAIRMAN BAEZ: Any questions or objections on the schedule?

MR. WHARTON: I do think two weeks for briefs is a

little tight.

MR. JAEGER: Chairman Baez, I talked to Mrs. Faurot, I think she could address this, but she said she could get the transcripts out probably a lot sooner than March 24th. And I think she said that say she could probably much say the 15th might be hard, or 16th, but she could probably have the transcripts out by the 16th.

CHAIRMAN BAEZ: Maybe we can wrap your concern into this, and so I'm only -- I would like to keep the outside dates intact so that whatever days you are picking up, whatever days you are picking on briefing, it sounds considerable, you will pick it up off whatever Mrs. Faurot can do on the transcripts.

Jane, what I would ask is that you get together with staff counsel and -- on the 15th? On the 15th. Now you are picking up ten days, nine or ten days by my --

MR. WHARTON: Thank you very much.

CHAIRMAN BAEZ: Well, it is all Jane's fault. I had nothing to do with it. So thank her. Very well. So we will have transcripts on close of business on the 15th, briefs on the 7th of April, recommendation to be filed on the 19th, and agenda on the 31st.

Is there anything else we need to take up?

MR. JAEGER: None that I know of, Mr. Chairman.

CHAIRMAN BAEZ: Mr. Beck, anything?

MR. BECK: No, sir.

MR. WHARTON: Not from us.

CHAIRMAN BAEZ: Not from you. All right. Very well. Thank you very much. Thank you for staying late.

MR. JAEGER: Thank you, Commissioners.

CHAIRMAN BAEZ: We are adjourned.

(The hearing concluded at 6:25 p.m.)

STATE OF FLORIDA)

: CERTIFICATE OF REPORTER

COUNTY OF LEON)

I, JANE FAUROT, RPR, Chief, Office of Hearing Reporter Services, FPSC Division of Commission Clerk and Administrative Services, do hereby certify that the foregoing proceeding was heard at the time and place herein stated.

IT IS FURTHER CERTIFIED that I stenographically reported the said proceedings; that the same has been transcribed under my direct supervision; and that this transcript constitutes a true transcription of my notes of said proceedings.

I FURTHER CERTIFY that I am not a relative, employee, attorney or counsel of any of the parties, nor am I a relative or employee of any of the parties' attorney or counsel connected with the action, nor am I financially interested in the action.

DATED THIS 15th day of March, 2005.

JANE FAUROT, RPR
Chief, Office of Hearing Reporter Services
FPSC Division of Commission Clerk and
Administrative Services
(850) 413-6732