STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

CASE 9955

EXAMINER HEARING

IN THE MATTER OF:

Application of Sunco Trucking Water Disposal for a Permit to Construct and Operate a Commercial Wastewater Evaporation Pond, San Juan County, New Mexico.

TRANSCRIPT OF PROCEEDINGS (Volume III)

BEFORE: MICHAEL E. STOGNER, EXAMINER

STATE LAND OFFICE BUILDING

SANTA FE, NEW MEXICO

June 22, 1990

ORIGINAL

A P P E A R A N C E S

FOR THE DIVISION:

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FOR THE PROTESTANT:

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ALSO PRESENT:

GEORGE COLEMAN

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E X H I B I T S

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WHEREUPON, the following proceedings were had at 9:10 a.m.:

EXAMINER STOGNER: This hearing will come to order. This is a continuance of docket number 16-90. Today's date is Friday, June 22nd, 1990.

I believe we were on the cross-examination of Mr. Cheney, if I remember right; is that right, Mr. Stovall?

MR. STOVALL: I believe what we asked was Mr. Cheney to provide some additional information. I believe Mr. Dean has advised me that Mr. Cheney is prepared to do so, and we need to recall Mr. Cheney at this time; is that correct?

EXAMINER STOGNER: Let the record show that Mr. Cheney has been previously sworn.

Mr. Dean?

MR. DEAN: Mr. Examiner, before we proceed I have an additional appearance of Mr. George Coleman, who is the owner and president of Sunco, the Applicant in this case, who is present today.

EXAMINER STOGNER: Mr. Dean, will Mr. Coleman be presenting evidence today?

MR. DEAN: I don't anticipate that at this time.

EXAMINER STOGNER: Mr. Dean?

MR. DEAN: Mr. Examiner, I think for purposes of somewhat of an attempt at brevity, I'm going to go ahead, and I've asked Mr. Cheney to put his response to Mr. Stovall's questions, actually, in the form of a letter that I have marked as Applicant's Number 11.

If permissible, without further -- if I could go ahead and introduce it and simply then ask Mr. Cheney to answer the question that was asked of him. Therefore, I move for the admission of Applicant's Number 11.

EXAMINER STOGNER: Are there any objections?

MR. HORNER: Well, I haven't read it, but I'm assuming that what we're talking here is something from Mr. Cheney that's pertinent, so in that regard I really don't have any objections to it.

EXAMINER STOGNER: Okay -- Sorry, Mr. Stovall?

MR. STOVALL: I guess that perhaps what we can do is go ahead, Mr. Horner, if it's agreeable with you, do whatever we need to with Mr. Cheney and then give you a chance to look at the report and ask any questions about it, if that suits you.

MR. HORNER: Fine, that will be fine.

EXAMINER STOGNER: In that case, Exhibit Number 11 will be admitted into evidence.

MR. DEAN: Thank you, Mr. Examiner.

RICHARD P. CHENEY,

the witness herein, having been previously duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION (Continued)

BY MR. DEAN:

Q. Mr. Cheney, at the conclusion of the last day that we were in this hearing, it was kind of left that you would answer the question of -- I guess sort of a two-part question of what loads should be treated, and how they should be treated at the time that those loads appear at a disposal site such as the one here.

Have you had an opportunity to look into that question?

A. Yes, sir, I have.

Q. And have you formed a conclusion as to what you would suggest to this body as to what you would do in this case?

A. Yes.

Q. Could you briefly outline what you considered?

A. Well, we looked at what we thought the loadings might be, and in this letter -- I want to talk -- the reduction of chlorine takes place -- or hydrogen sulfide with -- utilizing chlorine -- takes place in

two stages. I'll talk about that just a little bit, if I might.

If you have hydrogen sulfide in the waters and you add chlorine, you can add it to about 2 parts per million chlorine for every 1 part per million hydrogen sulfide, and you will create an acid and a free precipitate of sulfur.

If that occurs, the reaction has not been driven to completion.

I believe, then, that where you have your major hydrogen-sulfide problems in these type of ponds, then, as that colloidal precipitate is picked up by the salts and carried to the bottoms of the pond, as it becomes anaerobic, then the micro-organisms will change that free sulfur back into hydrogen sulfide, and you'll create odor in the ponds.

If you add enough chlorine, upwards of about, theoretically, 8.4 parts per million of chlorine for every part per million of hydrogen sulfide, you should drive that reaction to completion so that you create sulfuric acid and hydrochloric acid.

Theoretically, then, you should not have the free sulfur available in the ponds.

What we would suggest is that -- and what was in the Application, said that if hydrogen sulfide was

detected, then they would treat it. I would think that probably if you can detect hydrogen sulfide from a standard point at one-half of 1 part per million, that it should be treated prior to going into the pond.

The proposal for Mr. Coleman, then, what he had requested me to look at, was to treat it in the trucks so as to be able to recirculate it in the trucks.

And I have looked at that. We've got a one-line diagram of a flow situation that would occur if you treat it in the trucks. I think it's a practical situation to be able to treat it in the truck before you unload it, and to treat it at the level, probably, of 8.4 parts per million of chlorine to every 1 part per million of hydrogen sulfide in an attempt to drive that reaction to completion so that you don't create free sulfur in the pond.

In the letter we also discussed -- and I think you have -- these would have to just be assumptions. In the original letter we discussed a 1/2-part-per-million residual, but we made the assumption that there would be very little oxygen demand in the pond. I think that you're going to have to assume that there is going to be an oxygen demand in the pond, and what oxygen demand level you want to make

that assumption, I would suggest that it wouldn't be over probably 1 part per million.

In that case, then, any aeration system would have to be able to maintain a 1/2-part-per-million residual plus supply a demand of 1 part per million.

The calculation for horsepower calculations there, I went back through them. I wasn't sure last week if it was a straight-line calculation, but it is a straight-line equation, and so the horsepower calculations that we had in there indicating for a 1/2-part-per-million residual at 32 horsepower, you just multiply that times three and it comes out to -- In order to supply half a part per million, or 1-part-per-million demand and a 1/2-part-per-million residual would take 96 horsepower.

Q. Would that recommendation by you be on both the aeration systems, then, that are separate --

A. No, I don't think so. I think that the aeration system, the fine-bubble diffuser is a -- is a system that's a standby-type system or a redundant system, in addition to the one you have.

I don't think the one-third horsepower is appropriate on the fine-bubble, but I don't know that I would go to the full horsepower, because it's a system that's in addition to the coarse-bubble diffusion system.

Q. I think last time you testified that you would reduce that one to at least -- horsepower engine close to the 32.

A. I would think that at that 32 horsepower, at least you would be able with that fine-bubble diffuser to supply it, to theoretically furnish the 1/2-part-per-million residual.

You wouldn't be able to meet any demand, but again, I think that's a system that's in addition and part of the redundancy of the proposal rather than the major operating portion of it.

Q. After taking these things into consideration which you set out in your letter, which is Applicant's Exhibit 11, did you come up with a system that you could treat in-truck sufficiently and take into consideration those things mentioned in your letter to adequately get the H_2S out of a load and put the oxygen -- or take the oxygen demand out of a load, I guess, is what we're trying to do?

A. Yes, we did, and that's the one-line diagram that we have in back there that essentially shows how the flow situation -- how that would be done.

Q. Well, for purposes of the record, that's the fourth page of Applicant's Number 11.

A. Right. We also went through and prepared a

draft that would give you a little bit of an idea of the two different reactions that occur and the levels at which -- the amounts of chlorine you're talking about.

We also provided -- I don't know that I included the calculation, but some discussion that just for informational purposes -- Let's say a truck containing 10 parts per million hydrogen sulfide arrives. That requires about 2.3 pounds of chlorine or 1-1/2 gallons of commercial bleach, which is probably what we would use.

You have a truck that arrives at 70 parts per million hydrogen sulfide, that would require about 3.25 gallons of commercial bleach. It would run 60 percent chlorine on a theoretical basis.

So the quantities per truckload which you're talking about are not huge quantities.

Q. And this would be -- that treatment -- Determining how much to treat a load would be something that would be readily and simply quantified on site?

A. Yes, it could. There's testing equipment that will quantify the amount of hydrogen sulfide available, and you could have a graph similar to the one we've included there, that an operator could just look at and see how many gallons of bleach that he has

to put in.

Q. All right. Explain briefly, if you would, the setup that you imagined in what is page 4 of Applicant's Number 11. Just briefly tell us how --

A. What we had envisioned was that the water truck would come in. Then the -- this will -- A 300-gallon-per-minute pump is what was proposed, and that would circulate the truck in about 11 minutes.

And they would have a quick-connect system on the suction line, on the suction side of the pump, and also a quick-connect on the discharge side of an arrangement where they could just hook the back of the truck up to the suction side, the front of the truck up to the discharge side of the pump.

On the suction side of the pump you can have a chlorine container that you could pre-measure the amount of chlorine that you want to inject, have a flow-control valve so that you can regulate it, and then have an in-line static mixer on the discharge side, and just circulate the water in that. You want to at least circulate it for the full 11 minutes, and maybe more if you have to put in -- depending on the amount of chlorine that you want to feed, to assure that you have a good mix.

But that's something I think an operator

could determine by experience. If all the chlorine goes in there, obviously he's put enough chlorine to satisfy the theoretical demand, but you want to make sure it's mixed properly, and that's the reason we had suggested an in-line static mixer.

Q. What does an in-line static mixer -- How does it work?

A. It's just a pipe with some vanes in it that --

Q. -- churns the water --

A. -- that's fixed to the -- Well, the vanes are fixed and the water flows over it. Yeah, it churns the water and mixes it.

Q. All right. Once again, would this be a system that would be easily -- easy enough to operate that people on site could be trained simply and efficiently in operating it so they could operate it correctly, I guess?

A. I believe so. I think it would be a -- I think simple construction and simple operation.

Q. Do you think that the things in your letter and these diagrams adequately address the problem of supplying the oxygen or controlling the oxygen demand and the residual and the mixing to -- that you could treat loads up to what level that came in? What level

of hydrogen sulfide?

A. Well, theoretically, you could treat them up to whatever level was delivered. It's just a matter of putting the chlorine in.

Q. All right.

A. Now, at higher levels you might have to fill that chlorine container two or three times before you --

Q. But theoretically, anyway --

A. -- depending on the size.

Q. -- you could treat any load that came in?

A. That's right.

Q. It wouldn't be a matter of limiting a maximum amount of H_2S that came in, as long as you treated it correctly?

A. Not from a treatment standpoint.

Q. And then a minimum, you said, would be the .05 parts per million. Do you think you ought to treat anything that registers that?

A. Anything that registers a half part per million should be treated.

Q. How does the -- How does this treatment process in the truck affect the ability of the operator of this pond to keep it aerobic?

A. Well, it's the -- I think it enhances that

ability, because -- if you drive that reaction to completion, particularly -- because you don't have the oxygen demand in the pond, then, that you're going to have if you allow hydrogen sulfide to get into the pond.

Q. And once again, hydrogen sulfide has a high oxygen demand; that's the problem?

A. Well, it's --

Q. That's part of the problem, anyway?

A. That's part of the problem.

Q. All right. This system and the other systems that we've talked about in the several days of this hearing all tend to work together to allow the operator to keep this pond aerobic and free of hydrogen sulfide?

A. That's correct.

MR. DEAN: I don't have any other questions.

EXAMINER STOGNER: Thank you, Mr. Dean.

Mr. Horner, would you like a few minutes before I turn this witness --

MR. HORNER: If I could, please, to review the letter and kind of go through what we've got here, and then --

MR. STOVALL: If you wouldn't mind, Mr. Examiner, I do have a couple of questions, and I'd like to go ahead and get those, and then Mr. Horner can keep

those in mind when he goes through the letter. Let me --

EXAMINER STOGNER: Mr. Stovall?

EXAMINATION

BY MR. STOVALL:

Q. This will kind of be shotgun, because that's how I took my notes, but what you're proposing, if I understand correctly, is -- We now have added an element to the system as originally proposed, and that is the in-truck treatment process. And from -- Once that treatment process is completed, then you proceed to -- proposes -- recommending they still empty the truck into an open tank to allow visual inspection, separation, et cetera, of --

A. That's correct.

Q. And from there to the pond.

Now, the other thing, if I understand what you're saying correctly, and I think it helps clarify my understanding of your prior testimony, is you're now saying that in order to remain aerobic the pond needs .5 ppm of residual oxygen, and in addition you believe that there should be some provision made for an oxygen demand, sort of a constant state of oxygen demand above that residual level; is that correct?

A. Well, actually, a pond can be an aerobic pond

if it has 1/10 part per million of oxygen. I mean, there's an abundance of oxygen.

What we're doing saying that you maintain a 1/2-part-per-million residual is that you are supplying a little more of abundance of oxygen available in case there is a problem.

By saying that you're also going to make provisions for an oxygen demand, then if the pond is creating an oxygen demand, you'll be able to furnish that oxygen demand as well.

Q. And then -- So what you've done then is you've gone back and recalculated and the pump size on the coarse-bubble aerator, if I'm using the right terminology, to say we're tripling the oxygen requirements that need to be put into the pond, and therefore triple the size of the pump motor because we've got to move three times as much oxygen through the system?

A. That's correct.

Q. That system, then, that you're talking about, this coarse-bubble aerator, in effect is capable of supplying all of the oxygen requirement for the pond; is that correct?

A. Assuming that the oxygen demand of the pond is -- doesn't exceed 1-1/2 parts per million.

Q. Is that a safe assumption? Assuming -- And again, adding this treatment thing going, so you don't introduce a high demand because you're treating the -- any H_2S-contaminated water going into the pond?

A. That's correct. I think it's a reasonable assumption in here. You really don't know how effective you're going to be.

Theoretically you can drive that reaction to completion. From a practical standpoint in the field, I'm not sure that you will always be able to guarantee that that reaction has gone to completion.

So you know that there may be some oxygen demand in that pond.

And I believe that with the backup systems that they have, because they can also inject chlorine through the coarse-bubble diffusion system and through the fine-bubble diffusion system, and actually could do it through the evaporation system if they needed to -- with that redundancy, I believe that the 1-part-per-million demand and the 1/2-part-per-million residual is a reasonable requirement.

Q. If I understand what we talked about previously too, it is possible to measure the oxygen demand at any given time in the pond; is that correct?

A. That's correct.

Q. So if we add a -- If we were to require the addition of some sort of measurement of that demand, that would enable both the operator and the OCD to determine that in fact it was being maintained in an aerobic state and all the preventive measures to prevent the buildup of H_2S were being taken?

A. I don't know that I would measure the demand, but I think I would measure the oxygen residual in the pond. That's a much easier measurement to make, one that can be done on site.

Q. And so that --

A. The demand might -- Measuring the actual oxygen demand of the pond might be a little bit more difficult.

Q. If I measure the residual and I find that it's, say, below .5, which you recommended as a safe residual level, that indicates -- would indicate, then, that it's -- additional oxygen needs to be introduced to meet the demand that has apparently driven that residual down; is that correct?

A. Or perhaps maybe you need to chlorinate the pond to assist that.

Q. Okay. So back to my original question. Is the -- your assumption of -- the assumptions upon which you made these calculations of .5 ppm residual oxygen

level and an assumed demand based upon all the conditions of the pond of 1 part per million, a -- is an appropriate level, a safe level at which to design the primary aeration system for the pond, that it is likely to meet most operating circumstances?

A. Based on the data that we have available on these types of ponds at the present time, I believe it's a reasonable --

Q. And should --

A. -- consideration.

Q. Should the oxygen demand on a -- oxygen requirements, I'll use, to try to get away from scientific terms, maybe -- go up for any period of time, or should there be developed a -- or be determined that there is reduced residual oxygen or anything, that can be met with this total system, as developed either through the introduction of additional oxygen or chlorine into the pond?

A. I believe that it can.

Q. So that should there be a sudden increase in demand, it could be satisfied with available systems?

A. I believe that it can.

Q. Which leads me to the next -- I kind of got out of order on this, but the fine-bubble aeration system is going to supply over and above that 1-1/2-

parts-per-million requirement that you've designed -- that your design is premised upon; is that correct?

A. That's correct. The coarse-bubble diffusion system is designed to furnish the 1-1/2 parts per million. Any other aeration that you have, the fine-bubble diffusion system and the spray system, which is also going to provide aeration and provide oxygen into the pond, is over and above the requirements of the 1-1/2 parts per million.

Q. So if your assumptions are correct, theoretically, we could go out and find a residual oxygen level of, say, 1 part per million rather than 1/2 part per million?

A. I'm sure that at times you will be able to. Again, all the -- That residual will be a function of temperature too. Cold water can hold more oxygen than hot water can.

Q. What about the -- You talked about mixing last time. Now, is this system, the way it's designed, in your opinion, going to provide sufficient mixing so you're not going to have any anaerobic pockets in the -- of any significant size or potential --

A. I believe --

Q. -- growth area?

A. Yes, I believe they will.

Q. Now, mixing is a result of the aeration systems and the spray all working together; is that correct?

A. All of them working together, with the three systems together. If the pond needs to be mixed, I believe that with the coarse-bubble diffusers, the fine-bubble diffusers and the evaporation system, that mixing will be sufficient.

Q. Okay. Now, one of these -- We've already talked about one of the changes you've recommended is a fairly complete treatment of any H_2S-contaminated water coming in, so you don't introduce oxygen demand into the pond; is that correct?

A. That's correct.

Q. Now, you're talking about determining the chlorine requirements for the truck, and you're recommending that it be 8.4 parts per million of chlorine for every 1 part per million of H_2S?

A. That's correct.

Q. How are you measuring H_2S, and where?

A. Well, they'd have to just measure it at the truck. That's before they get ready to dump it. They're going to have pull a sample on it and measure the H_2S, and they can get a colorimetric device to measure the H_2S.

Q. You're measuring the H_2S in the water, then --

A. That's right.

Q. -- the actual H_2S, I guess. Is that dissolved? Is that the correct term or --

A. Well, it's --

Q. -- suspended, or whatever it is?

A. It's in the water, yeah. It's --

Q. Okay. And you've indicated that with the type of system that you've recommended, that there really is no upper limit to what they could treat; it just is a case of having enough chlorine to move into the system, and probably a little bit of space to get the chlorine in, I assume?

A. Right. There might be a practical upper limit from the time standpoint, the amount of chlorine available, how long you want to spend circulating the tank and everything, but --

Q. Is that -- I mean, is that practical upper limit that you've just identified, is that over and above any likely limits, likely levels of contamination that you would expect to experience?

A. I believe that it is. I think if they -- I really don't think that they're going to get a truck in there that's been hauled from any given distance,

that's been -- water's been transferred, probably, from an open container.

I don't know exactly how the oil field operates in this, but I think generally it's coming from an open container of some kind, and then it's been hauled for 30 or 40 miles, however many miles it's been hauled. I think it would be extremely unusual if you would get a truck come in there that has hydrogen sulfide in excess of 80 to 100 parts per million.

Q. Now, looking at your graph on Exhibit 11, I believe it is, the last page, the -- Let's see, the horizontal is the X axis, right, on a graph?

A. Yes, sir.

Q. And you're identifying --

(Off the record)

Q. (By Mr. Stovall) The X axis, the unit identified is parts per million of H_2S?

A. Yes.

Q. And the Y axis, then, what is the unit?

A. I'm sorry, that got cut off. It's parts per million of hydrogen -- or parts per million of chlorine required.

Q. And so what you -- Then what you have to do is figure out the volume of the tank to determine how many millions there are to know how many parts to put

in; is that correct?

In other words, when you're telling an operator, put in --

A. Right.

Q. -- put in X gallons of chlorine, he's got to be able to calculate that?

A. That's right. But you could prepare the same type of graph right here, so that he could just -- If it's 20 parts per million he can go up the graph and --

In fact, you could do it for various size trucks. I think most of them are about 3300 gallons. And so you could do one graph for a 3300-gallon truck. You could go right up there, up the graph, and pick out if he's got 10 parts per million chlorine, then he could see -- or, I mean 10 parts per million of hydrogen sulfide, he could just go right up the graph and pick up how many --

Q. He could pick out --

A. -- gallons of chlor- -- of bleach you'd have to put in that particular truck.

Q. So you could take an operator with, say, a high-school education, give him some reasonable amount of training, and he could sit there, take the measurement of H_2S and use a couple of graphs and without any sophisticated engineering knowledge figure

out, I need to put five gallons of chlorine in this truck and mix it for 30 minutes, or something to that effect?

A. Certainly.

Q. Okay. Let me see. I think that just about covers all the questions I have.

Let me ask you, Mr. Cheney, are you planning to stay around for a while and listen?

A. Yes, sir.

MR. STOVALL: Oh, good, because I think -- you may need to respond, I don't anticipate, but possibly respond to some additional information that will come in. Appreciate your being here if you can.

And I don't have any further questions, Mr. Examiner.

EXAMINER STOGNER: Thank you, Mr. Stovall.

At this time, let's take about a five-minute recess.

Will that be sufficient, Mr. Horner?

MR. HORNER: How about ten?

EXAMINER STOGNER: Okay, let's go ten.

(Thereupon, a recess was taken at 9:37 a.m.)

(The following proceedings had at 9:50 a.m.)

EXAMINER STOGNER: Thank you, we'll reconvene.

Mr. Horner, your witness.

CROSS-EXAMINATION

BY MR. HORNER:

Q. Okay, I'd like to talk a little bit about these reactions, chlorine and hydrogen sulfide reactions.

First, I'm assuming that these reactions are not instantaneous; is that correct?

A. They are as the chlorine comes in contact with hydrogen sulfide. At that contact point it will be instantaneous.

Q. So the only variable timewise is the mixing?

A. That's -- I believe that's correct.

Q. But now you've stated that you didn't think that theoretically you could -- even if you put in the appropriate amount of chlorine -- that you would get total reduction of the hydrogen sulfide. So I'm assuming there must be some sort of time element there.

A. Well, the time element essentially is going to be the time element that you take injecting the chlorine into the total truckload, which is -- in this instance, 300 gallons per minute is going to be about 11 minutes.

Q. Okay. Now, the 11 minutes that you talk about is 300 gallons per minute into 3000 gallons; that

circulates the water one time, right?

A. Uh-huh.

Q. Now, is circulating the water one time, in your opinion, going to be sufficient for complete mixing?

A. I believe that it will, but I think that's something that an operator -- that's going to be determined by the operator.

Q. In fact, you may have to circulate it two or three times to get complete mixing?

A. Well, I think that's going to depend on the level of hydrogen sulfide in the water and the amount of chlorine that has to be injected. I think that's something that may need to be determined by operation.

Q. But in fact, you may end up -- Rather than 11 minutes' worth of mixing, you may have to have half an hour's worth of mix?

A. That's possible if you have extremely high levels of hydrogen sulfide.

Q. Well, I mean if we're talking about just complete mixing as the variable here, then it really isn't a function of the level of hydrogen sulfide but just the length of time it takes to get complete mixing, correct?

A. Well, there's several variables there.

That's the reason that we suggested that they put an in-line static mixer in on the discharge side of the pump, because that's going to assure complete mixing of the water that's going through that mixer and the chlorine that's in there at any given moment, and I believe probably you're going to achieve a complete mix in a one-time turnover of the truck.

I don't know if there's any way to guarantee that. I think that's just going to have to be an operational procedure that -- with operational experience it will be determined.

Q. Well, then, you are taking the position that your mixing is actually occurring in the mixer rather than in the truck?

A. That's correct.

Q. So therefore you're going to have to have the appropriate amount of chlorine in the mixer with respect to the -- whatever water is in the mixer at any particular given time, right?

A. Well, the feed rate of the chlorine should be adjusted so that it's going out at some given rate, approximately, so that it's equivalent to the 300 gallons per minute that's going through the pump.

Q. So the feed rate of the chlorine is going to be a critical factor in getting your mixing

appropriate?

A. Certainly -- I don't know that it's a critical factor, but certainly it's an important factor.

Q. Well, if you don't have the appropriate amount of chlorine in your in-line static mixer, then the mixing is going to have to occur in the truck itself?

A. The mixing is going to take longer.

Q. Okay. So your operators also are going to have to be -- are going to have to have some pretty good guidelines, not just to -- with respect to how much chlorine is required for each truckload, but flow rates of the chlorine into the system with respect to how fast the system is mixing, correct?

A. Well, there are valves that -- and different metering devices that you can purchase -- that will meter that chlorine at the proper rates.

Q. Well, still, the proper rate is going to be a function of the hydrogen sulfide level in the water; is that correct?

A. That's correct. It's also a function, but it's still a very simple procedure to set the feeding device -- or the injection devices at the proper rates.

Q. It may be a simple procedure, but it's going

to have to be a different setting for each load, depending on the hydrogen sulfide level of each load, right?

A. That's correct.

Q. So it's not something that you can set one time and walk away for a couple months, then. It's going to have to be adjusted for each load?

A. That's correct.

Q. Now, in talking about your systems here, now you're talking instead of a 32-horsepower motor, we're talking 96. So we're quite a ways up from the 1/3-horsepower motor that we started with initially.

A. Well, I don't think we ever started with a 1/3-horsepower.

MR. DEAN: I'm going to object.

MR. HORNER: Well, that was what was proposed in the --

MR. DEAN: I'm going to object. It's not a question; it's testimony. Mr. Horner --

MR. HORNER: I'm working up to the question.

MR. DEAN: Let me finish, Mr. Horner.

Mr. Horner is not testifying. Never was a question.

EXAMINER STOGNER: Mr. Horner, do you want to restate your question?

MR. HORNER: Well, I'm working up to the question. I'm just kind of setting the tone for what we're talking about here.

EXAMINER STOGNER: Well, I think the record states, if you'll just -- Get to your question.

Q. (By Mr. Horner) Now, the 96-horsepower motor, then, that you're talking about on the coarse-bubble diffuser -- let me get this straight -- is going to provide sufficient aeration in this pond to put the oxygen levels where you think they need to be in the pond, in and of itself; is that correct?

A. Well, let me make one thing clear here. I have not recommended a 96-horsepower motor.

Q. Well --

A. I have merely stated that if the OCD determines, or the regulatory agency, whoever that may be, determines that they will -- that they want a 1/2-part-per-million residual and the capability to supply a 1-part-per-million demand, then a 96-horsepower motor will be required for the coarse-bubble diffusion system.

If the OCD were to determine that they did not care whether you had a residual or not and they're not worried about a demand, then obviously the 32-horsepower would do it. If they want a 1-part-per-

million residual and say that you have to supply 2-part-per-million demand, then the motor's going to have to be bigger.

Q. Okay. If we assume that the OCD's position is going to be that they don't want hydrogen sulfide generated, therefore they want a system that's maintained aerobic, I get the impression that they are relying upon you as much as anybody else to tell them what oxygen levels are required; is that correct? Is that the way you understand --

MR. DEAN: I'm going to object to that question. It asks him to assume something that the OCD is thinking, which is impossible. He has no idea what the OCD is thinking or assuming. Cause for him to speculate.

EXAMINER STOGNER: Objection sustained. Mr. Horner?

Q. (By Mr. Horner) Okay. Then the levels that you have talked about here so far, the 1/2-part-per-million residual and the 1-part-per-million demand, those numbers that you have come up with, you have come up with based on the fact that you believe that's what OCD wants?

A. No. No, those numbers are just -- are suggested as guidelines, saying that if this is what

you choose or if this is what is a reasonable -- which I believe those are reasonable numbers, based on the preliminary treatment before it goes into the pond, then this is what is required. I have -- I don't know what OCD wants and I don't know they might require.

Q. Well, you just stated that those numbers are suggested. Did you suggest those numbers?

A. Those were the numbers that I suggested as numbers that I felt like were reasonable, based on the pre-treatment.

Q. Based on the pre-treatment?

A. That is correct.

Q. Not necessarily based on the needs of the pond itself?

A. I don't think at this point, without any operating data, that there's any way to determine what the needs of that pond will be, and the object is to try to estimate what you think they will be, and I think that's what I've done with the 1/2-part-per-million residual and 1-part-per-million demand, and if that is the operating conditions of the pond, that this is what's required.

Q. Okay. Now, in your wastewater system, you normally design for 2 parts per million rather than --

A. No. Do you want me to explain that for you?

Q. If you would, please. I thought that's what you stated in your letter that we had before.

A. No, I said that that had been an old rule of thumb, that if you maintained 2-parts-per-million dissolved oxygen, then you were assured of maintaining a complete mix. But that is no longer the case.

And it also depends on what you utilize for mixing. The old systems relied entirely on oxygen for mixing. The newer systems use mechanical mixing, and this system that has been designed for this is going to use a -- more of a mechanical mixing device, utilizing a recirculation pump.

Q. Now, then, if in fact these numbers play out to be reasonable, your 1/2-part-per-million residual and your 1-part-per-million demand, will it be necessary to operate the spray system in order to maintain adequate aeration levels in this pond?

A. No.

Q. Okay, because before, at the 32-horsepower level, you said it would be critical that the spray system be operated in order to maintain adequate aeration levels.

A. No, I said -- Not aeration levels.

Q. Oxygen, residual oxygen?

A. No, I said mixing and contact with the

available oxygen. I said that the mixing is critical to provide contact to the available oxygen.

A. Okay. So the -- Before, then, the spray system was a critical element because it was needed for the mixing of the water in the pond, mixing of the oxygen?

A. That is correct.

Q. Now, is the spray system going to be required now in order to maintain adequate mixing levels in the pond?

A. I still maintain that the spray system is required to maintain mixing of the pond.

Q. So do you have an opinion as to how many hours a day the spray system would need to be operated to maintain adequate mixing levels?

A. I believe the Application states 10 to 12 hours a day. That may be sufficient. It may require -- It may require more, and that's going to be a variable depending on temperature as well.

Q. Well, is it your opinion that 10 to 12 hours a day will be sufficient?

A. I think that it probably will.

Q. You hesitate. Could it be considerably higher than that?

A. Well, I made the statement previously that it

could vary, depending on the temperature and conditions in the pond, it could vary with the level of the pond. And these are operational procedures that I think are going to have to be determined.

Q. And so in order to determine them, you're just going to have to have constant monitoring of the residual oxygen in the pond?

A. I wouldn't say constant, but periodic monitoring.

Q. Periodic. In what period?

A. Two or three times a day. And then until -- And I think that's until you have developed operating experience.

I think if you develop some operating experience and you can see that, based on time and temperature and the experience of the operator of the pond, I think that even that could be down, maybe, to once or twice a day measuring oxygen residual in the pond, but that's not a complicated matter either, to measure that oxygen residual.

Q. Okay. In looking at your diagram here that demonstrates the two reactions on Exhibit 11, the last page, are these two reactions that you have indicated here supposed to be -- represent balanced equations, chemical equations?

A. Merely the reaction that takes place, and the --

Q. But within the equation, it should be balanced?

A. I really didn't make any attempt to see whether or not they balanced, other than just to show what the by-products of the equation are.

Q. Well, I find that the equation for the reaction, for your first reaction, in fact, does not balance.

A. Well, I think if would if you apply the 8.4 parts per million of chlorine.

Q. Well, but that's a separate reaction. That involves water.

A. I did not make an attempt to balance the equations. I didn't feel like if we determined the amount of chlorine that's required, merely showing the by-products of the equation.

Q. Now, where did these equations come from?

A. Well, some of this came from Betz' Handbook of Water Conditioning.

Q. How do you spell "Betz"?

A. B-e-t-z.

Q. Now, you say some of these. Does that mean both of these or --

A. Both of these equations came from that Betz Handbook.

Q. Because I noticed in your first equation, you've got eight parts -- or eight molecules of chlorine on the left side and only two on the right.

A. Well, I think that I stated I didn't attempt to balance the equation. Just merely to show the reaction that takes place and then to show the amount of chlorine -- I've got it down underneath there, it shows the amount of chlorine that's required to drive that reaction to completion, which would then provide the balance.

Q. But it looks like there must be some sort of error in here someplace.

MR. DEAN: I'm going to object. The first question was, was this supposed to be a balanced equation? The witness testified no.

EXAMINER STOGNER: Mr. Horner?

MR. DEAN: I don't see the point of this.

EXAMINER STOGNER: Objection sustained.

Q. (By Mr. Horner) Now, in the design of these facilities it appears that the initial recommendation for the motor was 1/3-horsepower. Now it's up to 96.

Would you recommend that these facilities, the aeration systems and the spray systems, as well as

the chlorinating and aeration schemes, be designed by a civil engineer?

A. Well, I think that the design as it is, is adequate at the present time. I think that's going to be a little bit -- the design of these facilities by a civil engineer -- I think Jim Leese has got his seal on the ponds and on the aeration system up there as the distribution system, and he is a civil engineer.

Q. But I thought he had signed there with respect to surveying-type stuff. Is it your understanding that he stamped that as a civil engineer?

A. Regarding the design of the ponds for the State Engineer's Office, yes.

Q. Regarding the design of the aeration systems and the spray systems and that sort of thing?

A. No, no, I think -- I think it should be designed by a civil engineer.

Q. So would that be a reasonable requirement that OCD look at --

A. Certainly --

Q. -- now or in the future?

A. Certainly.

Q. Okay. Now, we've talked about a distinction between residual oxygen levels and oxygen demand in the pond. Now, in fact, your oxygen demand is going to

have to be something that is related to time, would it not?

A. No --

Q. I mean, if something is using oxygen, it's going to use X amount of oxygen in a certain period of time, in a minute, an hour, a day, a month, and therefore is going to have to be replaced every minute, hour, day or month because it's been used in that period of time?

A. No, once the demand is satisfied, unless there's something generating additional demand, then there -- it's complete.

Q. So it's not a function of time, then, in your opinion?

A. If there is an oxygen demand, once that demand is satisfied, if there is not anything else generating additional demand, then it's complete.

Q. Okay. Now, you've stated that the time limits for mixing in the trucks, I believe -- and correct me if I misunderstood this; I was trying to make notes -- but that the time limits required for mixing in the trucks may have certain practical limitations; is that correct?

A. I think they may have, yes.

Q. And so if, in fact, the practical limitations

are such that they limit the mixing time below what is required for adequate mixing, you may end up with inadequate mixing before the stuff is put in the pond?

MR. DEAN: Is the question, if you don't mix enough will you have inadequate mixing? Is that what you're --

EXAMINER STOGNER: I didn't understand the question either.

Q. (By Mr. Horner) Okay. If in fact you're setting a time limit based on practicalities, you're liable to end up with inadequate mixing before the stuff goes in the pond, correct?

A. I don't think so. I think that you can establish a feed rate, you have a known pumping rate and you have a static mixer following the pump, and if you feed the chlorine in at the proper feed rate, you are going to achieve mixing.

Q. Now, I think you said if this reaction doesn't go so far as to get into your second reaction where you're generating sulfuric acid, you in fact are generating free sulfur, which is what the anaerobic bacteria feed on, correct?

A. That's correct.

Q. So a partial mixing, in fact, creates problems here?

A. Well, it could. That's the reasons that you have the aeration system in the pond, and that's the reason you have the further capabilities of injecting chlorine into the pond. That's where the oxygen demand in the pond would come from.

Q. Does hydro- -- sulfuric acid, H_2SO_4 -- does that break down over a period of time?

A. Well, it's -- There are other items in there that it could react with and certainly dissipate, and it's going to be diluted over a period of time as well.

Q. Now, the only way that the sulfur is going to escape the pond is to escape as hydrogen sulfide; is that correct?

A. Yes, if there's free sulfur there, that's probably the primary way it's going to escape the pond.

Q. Now, you talked about -- in your letter here that -- You talk about removing the hydrogen sulfide from the pond by aeration.

A. Let me back up. I want to clarify something there on the sulfur just a little bit. That's the only way it's going to escape the pond, if the pond is anaerobic, probably. I think that reaction is -- if there's an anaerobic condition there, that it's going to escape the pond as hydrogen sulfide.

There are probably some other reactions that

would take place in there if the pond is maintained in an aerobic condition and also depending on the pH of the pond, but I'm not prepared to go into all of the chemical calculations today that might take place there.

Q. But if the pond is maintained aerobic and you're getting chemical reactions with your sulfur, it's going to stay in the pond, though, is it not?

A. Well, again, that's going to depend, I think, on the pH of the pond.

Q. Well --

A. And I'm not -- I'm just not prepared to discuss that. If it's in the pond and the pond is not anaerobic, then there's not going to be hydrogen sulfide, and I thought that was our primary concern.

Q. Okay. Are you aware of any way that the sulfur can escape the pond, other than as hydrogen sulfide gas?

A. There's going to be some other reactions that could take place, depending on the conditions of the pond.

Q. But I mean, still ultimately the sulfur stays in the pond, though, does it not?

A. In some form of a sulfur compound, probably.

Q. Okay, that's my question.

Now, then, in your letter here you talked about removal of the hydrogen sulfide by aeration. Now, I was surprised that you weren't talking about oxidation of hydrogen sulfide, so are you talking about removal of the hydrogen sulfide here by aeration, by simply releasing the hydrogen sulfide to the atmosphere?

A. Well, we're trying to -- I was trying to explain what occurs under a given set of conditions there. If you can't -- It's difficult, if you have high levels of hydrogen sulfide, to remove all of it strictly by aeration, and I think it's well known that if you spray it up into the atmosphere you're going to strip the hydrogen sulfide out of it.

Q. But the removal that you're talking about here of the hydrogen sulfide by aeration is by oxidation, or --

A. Partially. Both reactions would take place.

Q. Okay, as opposed to releasing it to the atmosphere?

A. Both reactions would occur.

Q. Okay. Now, there was a considerable discussion here that confused me -- I didn't have time to go through it -- talking about the effect of pH levels within the pond. The -- What causes the pH

level to increase?

A. To increase?

Q. Right.

A. The addition of an alkaline substance.

Q. Such as?

A. Caustic soda, lime.

Q. Would you expect any of these substances to be introduced into the pond through the water coming in?

A. No.

Q. Would you expect these substances to be introduced into the pond by any form of treatment of the pond?

A. I can't foresee any reason to put lime or caustic soda in those ponds.

Q. Okay. Now, it talks about, here, some sort of relationship of carbon dioxide in your discussion of pH levels. What is going on with the carbon dioxide in relation to pH?

A. Well, it's -- The only thing we were trying to do was to show what takes place and causes the lowering of a pH or the increase of a pH, and as -- Let's see.

As carbon dioxide is removed from a system -- there's several ways -- then you're essentially

removing carbonic acid and you're going to increase the pH, and you're going to make it much more difficult to strip hydrogen sulfide at a high pH than it is at a low pH.

There are conditions here where you're injecting the chlorine that are going to lower the pH, and that's what the reaction on the graph shows, that you're going to create some acids when you lower it -- when you convert the hydrogen sulfide and drive those reactions to completion.

This is in the letter. It was merely a discussion to indicate the direction that the reactions take place and what occurs if you do get the free sulfur precipitate collected in the pond.

Q. Okay. Well, it looks like with your chlorine reactions you're going to be creating hydrochloric acid and sulfuric acid, correct?

A. That's correct.

Q. Which should drive the pH down; is that correct?

A. That's correct.

Q. And now you seem to have a concern about high pH, and so I'm trying to figure out how high pH becomes a factor.

A. Well, there's really no concern about high

pH. I don't care what it goes to.

Q. You don't care what it goes to because you don't think it's going to go up?

A. No, I just don't care if -- what the -- If the pH is above 7, I don't really have a concern at what level it gets to above that.

Q. Okay. Well, I'm trying to find out what is going to make it go above 7.

A. If there was aeration alone in there and no other reactions take place, you might drive that pH up.

Q. By releasing the carbon dioxide?

A. By releasing the carbon dioxide. If you've got a heavy algae growth, which I don't think is going to occur in this pond, but if you've really got a heavy algae growth, where the algae began extracting carbon dioxide from the bicarbonates that are in the water, then you could increase the pH. But that's not a -- I don't think anybody cares if the pH does go up.

Q. Okay. What -- Are high-pH conditions conducive to algae growth?

A. Algae, there are different types of algae, and they'll grow in either -- There are algas that will grow in low-pH waters, algas that will grow in high-pH waters, and algae that will tend to raise the pH of waters as they grow if they grow -- if they get into a

logarithmic growth pattern.

Q. Okay. Now, the growth of algae will be a function of what, then? Apparently they'll grow at different pH levels. A function of temperature, possibly?

A. Temperature is not so critical as the amount of sunlight. But if you have algae growing in that pond it's a good sign, because algae -- for every pound of algae you grow, you'll create 1.6 pounds of oxygen. I've actually seen ponds become supersaturated with oxygen at heavy algae growth. So if you've got algae growing in the pond, you've got a good, clean operating pond.

Q. Now, also as algae would die, you've got a decomposing organic matter that's going to create an oxygen demand, would you not?

A. That's right.

Q. And also, organic matter as sludge on the bottom of your pond?

A. That's -- That's correct.

Q. Now, with this new information you brought in today, I don't see where you have done any calculations regarding water velocities or ability to mix the water sufficient to keep the sludge moving; is that correct?

A. That's correct.

Q. So is it still your position that this aeration system that you've got designed here will be sufficient to keep the sludge suspended in the water?

A. I don't -- I think it will provide adequate mixing to maintain the ponds in an aerobic condition.

Q. Now, I believe you testified before that the -- that if sludge accumulates on the bottom, you can get anaerobic conditions within the sludge; is that correct?

A. That's correct.

Q. Now, would you recommend that this sludge be removed periodically?

A. No.

Q. Then it's your recommendation, or you have no concern that this sludge accumulate over the life of the pond?

A. Not if we're able to maintain the pond in an aerobic condition.

Q. Now, then, when you talk about maintaining the pond in aerobic condition, is this simply the water or also the sludge itself?

A. Primarily the water, but I think with the mixing that you have here, that you -- and the capabilities of adding other chemicals to the pond -- that you will -- possibly not aerobic conditions, but

you're going to have methods in there of supplying the reduction equations that would have to take place.

Q. Within the sludge?

A. Within the sludge.

Q. Then is what you just said, does that mean that you may have to add chlorine in order to deal with the sludge?

A. That's correct.

Q. Now, can you envision any circumstances that would require chemicals added to this pond, other than chlorine?

A. No, I can't foresee any, but I wouldn't want to limit it to chlorine because there are other reducing agents that the operator might decide would be more effective or more economical or that he can control better than chlorine.

Q. But anything that you're considering now would simply be something used for the purpose of reducing hydrogen sulfide?

A. That's correct.

Q. So you cannot envision chemicals being added to this pond for any other purpose?

A. I don't foresee that.

Q. Okay. You talked about in your letter, Exhibit 11, using bleach with approximately 60 percent

chlorine. Is that a reasonable value for chlorine?

A. I think you can buy different grades of commercial bleaches and various types of materials for chlorination, and I think that 60 percent is a reasonable value.

Q. Well, I thought they had been talking about a 16-percent level because anything over 16 percent becomes unstable.

A. I don't remember any discussion about a 16-percent level.

Q. Well, I think it was in their -- in the file someplace.

A. Well, I haven't seen it.

Q. Okay. Well, just asking you with regard to bleach, are you aware of any -- at any point when, as the -- as the chlorine level in your bleach increases, that the storage capability of the bleach decreases?

A. Put it this way: There may be a point. I'm not aware of it. But we buy this type of bleach for water-treatment facilities on a regular basis, and I believe that the type of bleach that is purchased is a 60-percent chlorine content.

Q. And the -- Your sample calculations are based on a 60-percent --

A. That's correct.

MR. HORNER: -- chlorine level?

Well, I'm out of paper, so I guess I'm going to stop for a while.

EXAMINER STOGNER: Thank you, Mr. Martin.

Mr. Dean, any redirect?

MR. DEAN: Yes, Mr. Examiner.

REDIRECT EXAMINATION

BY MR. DEAN:

Q. Your comment about the fact that you wouldn't want to limit the operator of this pond or the Order controlling the operation of this pond to simply chlorine, does that mean that if you limit it to chlorine you might limit the ability of the operator to react to different situations in the future?

A. Well, I think so. There are other reduction agents on the market, and there might be a time when he might want to use one. I don't know -- I can't predict what that might be but --

Q. So in the Order that controls the operation of this pond, you want some flexibility there, perhaps subject to the approval of OCD, what's injected?

A. I would think so. That would allow you to use different oxidizing agents. I don't think that they should --

Q. And in fact, in the operation of this pond

you've mentioned several times that operating experience and conditions may control some of these factors, for instance what kind of mixer is on the line that goes from the truck to the chlorine and back up, things like that. Are those the kinds of things that you might need some flexibility on in the operation of this pond and would require -- maybe require the future approval of OCD, as they come up?

A. I believe that an in-line static mixer will basically provide the mixing that's required, but I think, certainly, that operation is going to be an important factor and give you some good indication of how long that mixing is required.

Q. That experience will be the most vital, I guess, to some of those determinations?

A. I think so.

Q. So some flexibility in the Order controlling operation of this pond would be needed for those kinds of things?

A. I think so.

Q. Subject to the approval of OCD?

A. I believe so.

Q. We talked about, last time when we were here, that this pond was designed sufficiently, in your opinion as an engineer, that it would -- they would be

able to maintain it if they operated the pond, as you have read, in an aerobic condition. Does the fact that this -- if they follow this recommendation to treat the truckloads add or take away from that opinion that they would be able to do that?

A. Well, I think that in the treating of the truckloads, prior injection of the pond is an important part of maintaining it in an aerobic condition.

Q. And do you think they would be able to do that if they treated the loads, as you've suggested, and the design of the pond is reasonable in your opinion as an engineer to maintain it in an aerobic condition?

A. I believe that they will.

Q. And a reasonable assurance that it would be free of H_2S?

A. That -- free of H_2S, I guess, is a relative term. Do you mean completely and totally free of hydrogen sulfide or --

Q. That's not possible, is it?

A. I don't think so.

Q. Free that it would not have a smell?

A. That it -- that the smell won't be such that it's going to be an off-site condition.

Q. And this discussion in your letter today,

Applicant's Exhibit 11, does that add to or take away from that opinion? Does it help it or hurt it?

A. I think it adds to it.

MR. DEAN: I don't have any other questions.

EXAMINER STOGNER: Mr. Horner?

RECROSS-EXAMINATION

BY MR. HORNER:

Q. A couple of follow-ups, stuff that I probably should have asked you before, and that is, talking now about an in-truck treating, does this mean that the concept that was initially proposed, the open-tank treating, should be scrapped?

A. No, this is in addition to the open-tank treating. In fact, the -- After it's treated in the truck, it will be dumped into an open tank.

Q. Well, for purposes of hydrogen sulfide, should there be only in-truck treating as opposed to open-tank treating, when hydrogen sulfide is present?

A. I guess that depends on the method of treatment. This operator has proposed to treat it in-truck, so I don't guess I see the relevance of that particular question.

Q. Well, I mean if he's got two trucks and one in-line mixer, do you see a problem with him treating one load in the open tank?

A. Yes, because his proposal to the OCD is that if it has detectible levels, is what they said, in the operation -- I've suggested 1/2 part per million -- then his operating permit's going to require him to treat it. So yes, I think from that standpoint I see a problem.

Q. Well, I don't think we've got an order yet, so I think we're trying to get to an order.

A. That was the operators proposal, and I assume that he was serious about that.

Q. Okay. I haven't seen that proposal. Is there more correspondence here than I'm aware of?

A. Pardon me, but it said in the Application that if hydrogen sulfide was detected, it would be treated.

MR. DEAN: That's right.

Q. (By Mr. Horner) That it would be treated, but did it say in-truck?

A. Probably not at that point, but that's what this proposal is --

EXAMINER STOGNER: Which exhibit are you -- I'm sorry. Mr. Horner, what -- Mr. Cheney, what exhibit are you referring to?

THE WITNESS: I don't recall the exhibit number.

MR. DEAN: One. He's talking about the Application, which is Applicant's 1.

MR. STOVALL: May I perhaps simplify this a little bit? The OCD intends to get into with its people what standards may be required, so I don't think we need to spend a lot of time on that.

MR. HORNER: Well, the -- Well, what I'm trying to find out is if Mr. Cheney has a recommendation, if we assume that that is not a fixed position at this point, that they will treat everything in-truck, do you have a recommendation that everything be treated in-truck, as opposed to an open container, when there's hydrogen sulfide present?

MR. DEAN: You mean in general, or at this site or what?

MR. HORNER: At this site, at this site.

MR. DEAN: Well, what we've recommended, that's what we're going to do. We haven't testified, I don't think, that we're going to test-treat any tank. This is what we're recommending.

MR. HORNER: No, I mean -- As I understood it, the original proposal was an open-tank, and the treating was going to occur in the open tank.

MR. DEAN: I don't think it says that anywhere, but I would defer to maybe -- I don't see it.

I think we said we were going to test and treat.

MR. STOVALL: If I may help again, gentlemen, try to expedite this, I believe there was some discussion at the prior hearings about adding chlorine to the open tank, and I think Mr. Horner is not -- not mistaken completely as to that.

As far as I understand where -- the position of the Applicant at this point, is to the extent there was any such proposal on their part to treat H_2S coming in in that manner, they are revoking that -- rescinding that proposal -- and now proposing to treat in the manner as provided in Mr. Cheney's letter, Exhibit 11 --

MR. DEAN: We were asked --

MR. STOVALL: -- is that correct?

MR. DEAN: This is what we proposed.

MR. STOVALL: So this is the proposal that Sunco is making at this time?

MR. DEAN: Uh-huh.

MR. STOVALL: And again, I will tell you that the OCD will address that in terms of staff recommendations when they call the staff witnesses, so --

Q. (By Mr. Horner) Okay. Then my next question, then, deals with -- We've talked about levels

of hydrogen sulfide that you can smell. Can you -- Do you know what levels of hydrogen sulfide you can smell?

A. I don't know what levels I can smell. I haven't been exposed to it that much.

Q. Well, generally accepted levels at which there's a noticeable odor?

A. Generally, it's -- In water treatment, it's been stated that levels as low as 5/100 of a part per million can be detected.

Q. And that's be detected by the smell?

A. That's correct.

Q. Now, then, for a neighbor, someone driving down the highway, would they find 5/100 of a part per million hydrogen sulfide offensive, or is it just --

MR. DEAN: I'm going to object, because it calls for speculation on the part of the witness.

MR. HORNER: I'm asking what he knows.

THE WITNESS: An odor --

MR. DEAN: Well, I'm going to object. That's not what you asked him.

EXAMINER STOGNER: Sustained.

MR. DEAN: You asked if any person would find it offensive driving down the road.

EXAMINER STOGNER: I'm going to sustain the objection. That question is somewhat ambiguous.

Q. (By Mr. Horner) Okay, let me be more specific then.

Do you know whether or not a point -- or a 5/100-part-per-million hydrogen sulfide would be an offensive smell?

A. No, I don't know that.

MR. HORNER: I have nothing further at this time.

MR. STOVALL: Just a couple of quick questions, Mr. Examiner, if I might.

FURTHER EXAMINATION

BY MR. STOVALL:

Q. Discussing the mixing process in the truck, Mr. Horner spent a fair amount of time on that. It would be very simple -- I mean, would it be relatively simple to simply remeasure the H_2S or sulfide content of the truck after treatment to determine if there's any remaining H_2S?

A. Certainly.

Q. So you can avoid the concern which he seems to be addressing of whether there's adequate mixing treatment simply by remeasuring and not allowing the water to go out of the truck until you've removed measurable H_2S and sulfides; is that correct?

A. That's correct.

Q. I believe I understood you to say that it would be your opinion that it would be better to have a system designed by a -- I'll say registered engineer rather than civil engineer to describe it.

A. I believe that it would.

Q. Would it be adequate, in your opinion, to have a design reviewed by a registered engineer in terms of adequacy, as opposed to actually designed?

A. I'm trying to remember what the law is exactly, regarding the design of projects and sealing and stamping. I think that it would have to be a very thorough review, but I believe it would be adequate.

Q. And we're talking about review. The context in which the questions were asked, I believe, were in the context of the aeration, the complete H_2S treatment package, and I'm not talking about any of those systems that may perform another function, such as evaporative.

The spray system, for example, is a dual-purpose system. Its primary purpose is to create more surface area to allow faster evaporation of the pond. But it's your testimony also that that spray system has the additional benefit of introducing some additional oxygen to the water and of mixing the water more thoroughly to cause the oxygen to be uniformly distributed throughout; is that correct?

A. That's correct.

Q. And the aeration system, there are two -- If I understood what's been said so far, we're talking really two aeration systems and two enhanced spray systems, and let me take those piece by piece -- or -- Well, maybe I'm not. Let me see how I'm going to do this.

You're going to have a gross -- a coarse-bubble system, which is going to be the primary oxygen supply in the water, correct?

A. That's correct.

Q. And that also is going to provide a mixing function?

A. That's correct.

Q. And the effectiveness of both the oxygenation, but primarily of the mixing, is going to be largely a function of the design of that system. In other words, is it -- throughout the pond, does it keep all the water in the pond moving and not allow pockets of stagnation?

A. That's correct.

Q. You now -- you also -- This system has been proposed to have a fine-bubbler system, which is going to provide some additional oxygenation and hopefully some additional mixing; is that correct?

A. That's correct.

Q. And so again, you'll look at that to determine whether it's doing this, but you have to look at that in the context of supplemental use, not primary use; is that correct?

A. That's correct.

Q. All right. Now, stopping there for a minute, you've suggested that to meet an oxygen demand of 1-1/2 parts per million -- that's a 1/2-part residual and a 1-part oxygen requirement, excuse me -- to maintain a 1/2-part residual and a 1 -- and assume a 1-part-per-million demand -- requires a 96-horsepower pump.

A. For the coarse-bubble.

Q. For the coarse-bubble, yes, excuse me, you're correct.

And that in order to determine the size of the pump, you've determined that it is a linear relationship, so whatever level of oxygen requirement the OCD determines is necessary, it's very simple just to say -- If it's 2, you just add another 32.

I mean, you could start with a base of 1/2-part-per-million oxygen requirement at a 32-horsepower, and just move up mathematically from there; is that correct?

A. That's essentially correct. There are some

other variables there that would deal with the size of the lines, the size of holes and so on there. There are some things that you have to assume would be constant.

Q. Right.

A. So -- But also, as the more air you push through -- it's just -- Air is essentially just a liquid. The more air that you push through, you probably need to look at the line sizes and pressure losses and so on, and I think those types of things probably should be reviewed.

Q. Okay. Then we -- They had this reference to this 1/2-pump motor -- or 1/2-horsepower pump motor, I guess is what it was -- and that dealt with the fine-bubble system; is that correct?

A. That's correct.

Q. And it's your opinion, if I understood you correctly, that that 1/2-horsepower is not going to be adequate even for the fine-bubble system to move sufficient air through that system?

A. That's correct.

Q. Have you done any calculations, or can you express an opinion as to what size, based upon the design that's been submitted --

A. On the fine-bubble diffusers?

Q. Yes.

A. No, I have not looked at that.

Q. Okay. Now, the next part of the system we're going to have, if I understand, is a floating sprayer with -- I think they said two -- two spray mechanisms floating in the pond --

A. That's correct.

Q. -- approximately splitting, you know, a third of the way from each side, and that this is going to take water from the pond and push it up into the air and hopefully cause it to evaporate and also add oxygen and mix, correct?

A. That's correct.

Q. And then the last part of this complex system is the perimeter sprayers, of which each side will be able to operate independently, and depending on wind conditions they may have spray coming -- water being, in effect, sucked out to these sprayers from each -- on each of the four sides, or any combination of the four sides, and sprayed back towards the pond to allow, again, additional evaporation, further oxygenation and more mixing; is that correct?

A. That's essentially what would take place.

Q. Now, back to the basic question. As far as the design of those systems, it really is an integrated

system, is it not?

A. That's correct.

Q. And what you have suggested in terms of having this system designed or thoroughly reviewed by a registered engineer, would have to look at the total system to determine whether it's --

A. That's correct.

Q. -- it's adequate; is that correct?

A. (Nods)

Q. And one of the questions that would have to be answered there in terms of all of this is what is -- what oxygen requirement should be satisfied?

A. That's correct.

Q. So -- And your opinion is that the 1/2-part-per-million residual, with proper mixing, is a sufficient residual level to prevent anaerobic conditions from --

A. If the demand has been satisfied.

Q. Yes. That's what I say. A residual assumes the demand has been satisfied, does it not?

A. That's correct.

Q. And you're not really expressing an opinion at this point, or are you, as to whether or not being able to meet a demand level of 1 part per million over and above the residual is likely to be sufficient in

this case to satisfy all the demand and still maintain the residual oxygen level, is it?

A. There's a possibility that the 1-part-per-million demand is going to be exceeded. That's the reason I think it's important that they have the -- to know that they have the capabilities through these other methods.

Obviously, if they run the sprayer mechanism on the float assembly at night, they're not going to get as much evaporation as they would in the daytime. They'll probably get more aeration in the pond and more mixing.

They have the capability of injecting chlorine or other reducing agents through the coarse-bubble diffusion system, and I think it's important that they have that because at this point we don't have any data on the qualities of the water that they're receiving and do not have scientific data on how to estimate what the demand might be.

Q. How can we, the OCD as the agency approving this, determine what -- Let me back up.

What I would anticipate that in this approval we would have to say, all right, the primary aeration system is going to have to provide an oxygen requirement at -- Let's use your level at the moment of

1-1/2 parts per million to meet residual and assumed oxygen demand. And then that there will be additional systems, the fine-bubble system and the spray systems, which are actually going to go above that and can meet higher-demand requirements, should they occur in the pond.

How do we determine -- Can you guide us in saying -- Do we want them to have a 96-horsepower motor on there? Do we want them to have a 64- or a 32- -- What --

A. Well, I think if you established a level that, say, we want you to be able to maintain, a dissolved oxygen residual of 1/2 part per million, and meet a demand of 1 part per million, then in a pond of this size -- I don't think you need to specify horsepowers. I think you need to say this is the levels of oxygen that you have to maintain, because that has to do -- then the horsepower is going to be based -- The size of that pond is going to come into consideration. A smaller pond would require less horsepower, a larger pond is going to require more.

Q. Okay, I understand that. Now, then, are you recommending -- I'm assuming at this point that you're recommending that 5 parts per million residual dissolved oxygen is a satisfactory level to maintain to

get --

A. Half a part.

Q. I mean, excuse me, 1/2 part per million, correct.

A. (Nods)

Q. And am I correct, now, in hearing you say that you are now suggesting that the system be designed to meet a 1-part-per-million demand over and above that --

A. Yes --

Q. -- residual oxygen?

A. -- I believe that you should assume a demand of some kind.

Q. Is 1 part per million a --

A. I think that's a reasonable assumption at this point.

Q. Is it possible, looking at this system, for example -- Let's assume that we've made that assumption, and then we go and find that in fact they are unable to maintain the residual oxygen level, and that's measurable, right?

A. That's measurable.

Q. So if we find that they are consistently unable to maintain that level, is it physically possible, designwise possible, to say, all right, you

need to put a bigger pump on the existing flow system, oxygen -- air-flow system -- to increase the oxygen being introduced into the pond?

A. If the diffusion system has been designed properly, yes. If it's undersized, then putting a bigger pump on it is just going to create higher discharge heads, probably.

Q. And that's part of the engineering design that probably needs to be --

A. Correct.

Q. -- reviewed; is that what you're saying?

A. (Nods)

Q. But back to the -- Probably one of the most important points, as I can see it is that in order to determine if the system is doing what it's properly doing, rather than building tremendous amounts of redundancy, you can effectively measure the oxygen-saturated -- or your dissolved-oxygen residual, you can measure H_2S or the presence of sulfides to determine whether the risk of H_2S buildup is present; is that correct?

A. That's correct.

Q. So it's something that could -- We could set a level and then go in and determine whether it's working --

A. That's correct.

Q. -- before any dangerous conditions are allowed to develop?

A. I believe that you could.

Q. So we can, for example, say any time there's detectable H_2S in a truckload coming in, it will be treated till it's -- and it will not be allowed to discharge even out of the truck into the tank until the H_2S has been eliminated, detectable H_2S has been eliminated?

A. Or until it's below a certain level that you want.

Q. So, I mean, that level may be the level of detectability, or it may be something above that?

A. That's correct.

Q. And your suggestion is that .5 parts per million H_2S -- below that level, it's not necessary to treat it. Is that what I heard you say?

A. I think that's a good beginning point.

Q. Okay. And then once -- So now we've prevented the introduction of oxygen demand into the system by seeing that that demand is removed before that water ever gets to the system?

A. That's correct.

Q. And then we can set some requirements that

establish that a level of oxygen residual be maintained in the pond, and that can be measured --

A. That's correct.

Q. -- regularly and easily determined?

And so by doing this, again, as I say -- and I am being repetitive at this point, and I'll stop after this -- we can actually measure and determine that the hazard which we're trying to avoid is properly being prevented, and then modify the system design if necessary to insure that that hazard continues to be prevented?

A. I believe that's correct.

Q. But the one thing, probably, we should insist upon at the beginning is that the initial system, as designed, and the complex -- the whole complex of the four independent parts we talked about earlier -- should be reviewed to make sure they're working together to provide sufficient oxygenation and sufficient mixing?

A. That's correct.

Q. Okay. I assume also -- We had some pH discussion -- pH is measurable, is it not?

A. pH is measurable as well, yes.

Q. So -- And if I understood you correctly, your concern is not whether pH goes up but rather whether it

goes down below a certain level?

A. The lower it goes, the more likely you are to strip hydrogen sulfide to the atmosphere.

Q. At what -- Is there a level that you'd recommend that we --

A. -- maintain the pH above?

Q. -- maintain the pH above?

A. Above 5.

Q. So we should -- So it would not be unreasonable to ask the operator to check the pH level periodically, and if it goes to -- if it hits 5 or goes below 5, that they add some alkaline substance to --

A. That's correct.

Q. -- raise the pH?

Any other substances which you think ought to be measured for in the pond, as far as --

A. Well, you talked about -- Let's see what you talked about. You talked about sulfides, hydrogen sulfide, and dissolved oxygen.

Q. And pH.

A. And pH. I can't think of any right off. There may be some others, but just off the top of my head, I don't...

MR. STOVALL: I have no further questions at this time.

EXAMINER STOGNER: Thank you, Mr. Stovall. Are there other questions of Mr. Cheney?

MR. DEAN: I have a couple.

FURTHER EXAMINATION

BY MR. DEAN:

Q. And in fact, in this case you did review whether or not this pond could be operated where the residual oxygen could be maintained at .5 and whether they could mix the pond and how often; is that what you did?

A. Maintained at .5 --

Q. You assume --

A. -- assuming a 1-part-per-million demand.

Q. -- that it could be properly mixed?

A. Yes.

Q. That's what you certified in this case by your first letter?

A. The first letter, no, we didn't assume a 1-part-per-million demand in the first letter.

Q. Assuming a 1-part-per-million demand, can they properly mix the pond?

A. I believe they can.

Q. And there is some discussion in one of the exhibits about 16 percent chlorine being unstable, by Mr. Frank. Is that instability as it's evaporating, or

is that instability something that's precarious?

A. If it's exposed to the atmosphere, I would assume that there would be a problem with it, but I'm not aware of any problems that I've ever encountered along that line, let me put it that way.

Q. Would it be an evaporation problem?

A. I think it would be due to the loss of the chlorine to the atmosphere.

Q. Right. Not -- It doesn't sound like anything precarious or dangerous as far as explosions or anything like that? Unstable, to me, implies it may blow up or something.

A. With any chemical, certainly you have the potential for a hazard, anytime you have any kind of a chemical that's going to be vented to the atmosphere. I don't believe that the commercial bleaches like this are a problem.

Q. And in the system that you've designed, they'd be in a closed container and registered -- or regulated directly into the line?

A. Into the line.

MR. DEAN: That's all I have.

EXAMINER STOGNER: Are there any other questions of Mr. Cheney?

MR. HORNER: Yes, I have a few.

EXAMINER STOGNER: Mr. Horner?

FURTHER EXAMINATION

BY MR. HORNER:

Q. Regarding chlorine, I don't know whether or not 60 percent is unstable; I don't want to go into that. But if, in fact, there is some sort of chlorine release from the bleach, chlorine in and of itself can be dangerous to operators and people on the site, can it not?

A. Yes.

Q. Without any kind of explosion or anything else?

A. Correct.

Q. Okay. Now, can chlorine cause an explosion?

A. Yes.

Q. Okay. Now, as we talk about the --

A. You know, you asked me if it can cause -- If the chlorine is free -- I'd have to go back a little bit -- it could contribute to the seriousness of an explosion, I suppose. Whether it could explode within itself or not, I'm not sure.

Q. But it's something that you need to be looking at. You've got chlorine, and that could be considered a dangerous substance, and it has to be handled properly and all that sort of thing.

A. Sure.

Q. So it's not something you put in a tank and you don't have to worry about forever? Okay --

MR. DEAN: If that's a question, he needs to answer it, then.

Q. (By Mr. Horner) Okay, go ahead.

A. I'm sorry, I was thinking about explosion possibilities.

Q. Okay. We're not to the point here where this bleach or the chlorine is just something you put in the tank and you screw the lid on and you can forget about it, then. You have to be careful with it, correct?

A. Yes, certainly, it's a chemical that deserves respect.

Q. Okay. Now, a lot of talk about demand levels in the pond and this sort of thing. If we're assuming a 1-part-per-million demand level, then we can work back, can we not, to what levels we find acceptable of hydrogen sulfide being placed into the pond, because that is determining the demand requirements in the pond?

A. That's not totally correct.

Q. But if we make some assumptions about number of loads and, for instance, an average --

MR. STOVALL: Mr. Horner, may I interrupt you

for a minute here? I don't want to come back in another couple of weeks here, and I intend to use Mr. Anderson to address some recommendations with respect to H_2S levels which may be introduced to the pond. Would it be appropriate to reserve your questions to that point?

MR. HORNER: Well --

MR. STOVALL: Maybe the whole picture will help in that.

MR. HORNER: No, I don't think so. What we've got here is, we're talking about the 1-part-per-million demand requirement that we're talking about, and I think we can formulate some assumptions with Mr. Cheney on number of loads deposited, basically the amount of water put in the pond and hydrogen sulfide levels that we are going to allow into the pond to be able to --

MR. STOVALL: That's exactly what I want to use Mr. Anderson to testify about --

MR. HORNER: Well, so far --

MR. STOVALL: -- as to what we're going to recommend.

MR. HORNER: So far, Mr. Cheney's the expert.

MR. DEAN: Well, we're not going to allow H_2S in the pond; I thought that was the testimony.

MR. HORNER: Well, as I understand, it's not going to be completely mixed out, so there's going to be some level. And now we're talking about measuring the hydrogen-sulfide level in the tank or truck that you've been mixing and to determine when it's safe to put the stuff in the pond, and that is going to have a direct relationship upon what the demand level is in the pond.

MR. DEAN: Well, we're not going to treat in the tank; we're going to treat in the truck. You keep throwing that out; we're not going to do it.

MR. HORNER: Okay, in-truck, I mean that.

MR. DEAN: And we're going to treat it till the H_2S is below the detectable level.

MR. HORNER: Now, Mr. Cheney is over here shaking his head, and maybe he can explain this for us.

MR. DEAN: Mr. Horner, if you want to testify, suggest to the Examiner that he call you as a witness --

MR. HORNER: I'm asking Mr. Cheney --

MR. DEAN: Let me finish my sentences. You have continually gone and tried to testify to things that I don't believe are in evidence. You're wasting my client's money and time sitting here, delaying this process with the same thing over and over, and I

object, Mr. Examiner, to this continually going on.

MR. HORNER: I'm asking the expert these questions that -- You're concerned about the levels at which you can let the hydrogen sulfide into the pond, and it appears to me that we can come up with some -- that Mr. Cheney may have the answer to those levels and can come up with some recommendations as to what levels are acceptable into the pond. That's what I'd like to ask about.

MR. STOVALL: Mr. Horner, I believe that the discussion here is focused, and Mr. Dean has stated that the level we're talking about is zero. Zero measurable H_2S is what, I believe, has been stated; isn't that correct, Mr. Cheney? Measurable is the key word?

THE WITNESS: Measurable is the key, I believe. I had suggested that in certain instances there might be times when the discharge of 1/2 part per million into the pond might be permissible, but I think that's something you have to determine, and I'm not prepared to set that limit.

MR. STOVALL: And now, Mr. Horner, in response to that, I'm going to tell you that we are going to address what level the OCD staff recommends be accepted, and that may address your concerns.

I understand your question is, how many -- what volume of water introduced to the pond with what concentration of H_2S creates what oxygen demand?

MR. HORNER: Exactly.

MR. STOVALL: And if you will give us the opportunity and the -- attempt to finish this hearing today to allow the OCD staff member to address their recommendations as to what levels will be permitted to enter the pond, and what volumes, and then based upon that, Mr. Cheney stated that he will be here. If we can -- You then can go back and ask him about oxygen demand based upon those levels.

But let's get those levels established first. Let's get some more information on that before we --

MR. HORNER: Well, I have no indication that your staff is going to be qualified to testify that the introduction of a certain level of hydrogen sulfide into the pond will create a demand of X amount in the pond.

EXAMINER STOGNER: Gentlemen, at this point I've remained silent. I'm not going to anymore. I think we're through with Mr. Cheney's testimony, and I am going to see that he be excused at this point, and we're going to take a 15-minute recess, and then I'll turn it over to Mr. Stovall and the staff. That is

all.

MR. STOVALL: Mr. Cheney, you will be here --

THE WITNESS: Yes.

MR. STOVALL: -- if I'm not mistaken, so if these questions come -- if Mr. Horner is not satisfied, then you'll be available to come back and answer the questions; is that correct?

THE WITNESS: Well, I guess that's correct.

EXAMINER STOGNER: We're off on a recess at this point, gentlemen.

(Thereupon, a recess was taken at 11:00 a.m.)

(The following proceedings had at 11:18 a.m.)

EXAMINER STOGNER: This hearing will come to order.

Before we start, gentlemen, I'd like to state that I saw the continuation of Mr. Cheney's testimony as repetitive and cumulative, and I chose to dismiss him at this time.

Mr. Stovall, I believe we're ready for you.

MR. DEAN: Mr. Examiner, could I -- I would like to offer, with your permission, Applicant's 12, which is simply the résumé of Richard Collins who was testified about by Mr. Badsgard as the safety supervisor at -- for the Coleman Companies -- and who would be in charge of that function at the pond. It's

simply offered to buttress that testimony that this company is prepared to meet the safety concerns, and that's the only reason --

MR. STOVALL: Are you -- Let me ask you a couple questions with respect to that offer of that information, Mr. Dean. Are you prepared that as a condition of the permit Mr. Collins be required to be employed by Sunco for --

MR. DEAN: Well, maybe not.

MR. STOVALL: -- or that his experiential background be that required -- I mean, what relevance does Mr. Collins' résumé have with respect to this opera- -- this permit?

MR. DEAN: Well, I think it's simply that the testimony is already in the record, Mr. Stovall, about Mr. Collins being a safety supervisor and that he would be in charge of that -- in that function at this site. I think it's relevant in those safety concerns.

I'm not -- It's unobjectionable to me that there be some mention of that in the order. Obviously I can't make Mr. Collins work here throughout the operation of the pond. He'd be somewhat holding me hostage if he decided to leave.

But since that testimony is in the record without objection from Mr. Horner that we're -- that

that's part of our Application, we submit that we are prepared to meet safety concerns, and that just shows that we are doing it and we're prepared to do it.

Like I say, the evidence is already in the record.

MR. STOVALL: Oh, I understand that his name came up. But I -- the -- I have no objection to the admission of the evidence. My personal feeling is that it's probably of little value in terms of this Application.

Mr. Horner, any objections to --

MR. HORNER: Yeah, I object, hearsay, relevance, the guy's not here to go into his qualifications on cross-examination or voir dire. You'll find that most of this stuff has to do with law enforcement, and I don't have any idea what that has to do with anything. And you talk -- And what it does talk about is some sort of safety course in hydrogen sulfide. It talks about familiarity with detectors and first-aid and breathing apparatus, and has no bearing at all on being able to operate this pond or determine when hydrogen sulfide may be present or anything like that. So I don't see how it has any relevance to --

MR. STOVALL: I don't think we'd use it for that purpose, so I don't -- As I say, I don't care, Mr.

Examiner, make a ruling on that, and we'll get on with --

MR. COLEMAN: I don't think it makes any matter to us either.

EXAMINER STOGNER: Mr. Dean, I'm going to accept your Exhibit Number 12, for what it's worth, into evidence. I've never said that on the record.

MR. DEAN: I understand that that is the standard of asking someone to admit in evidence, that you take the chance -- or take it for what it's worth. So I appreciate the comment.

That's all I -- And that's all I have, Mr. Examiner.

EXAMINER STOGNER: Thank you, Mr. Dean.

Mr. Stovall?

MR. STOVALL: At this time I'd like to call Mr. Roger Anderson to the stand, and Mr. Anderson needs to be sworn, since the OCD was not originally planning to present any witnesses.

(Thereupon, the witness was sworn.)

ROGER ANDERSON,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

BY MR. STOVALL:

Q. For the record, would you please state your name?

A. Roger Anderson.

Q. And how are you employed, Mr. Anderson?

A. I'm employed as an environmental engineer with the Environmental Bureau of the Oil Conservation Division.

Q. Have you previously testified before the Division or its Examiners and had your qualifications accepted as a matter of record?

A. I've testified before the Oil Conservation Commission.

Q. For the Examiner and the parties' information, Mr. Anderson, would you just briefly summarize your educational background?

A. I have an associate of arts degree from New Mexico Military Institute, and I have a bachelor of science in chemical engineering from New Mexico State University.

Q. And again, briefly, your engineering -- your, excuse me, work background, I should say?

A. Okay, I -- Immediately after leaving New Mexico State I obtained my EIT certificate. I went to work for a major oilfield service company, worked for them for 12 years, and I've worked for the Oil

Conservation Division as an environmental engineer for the last four years, a little over four years.

Q. And what are your responsibilities with the OCD?

A. My responsibilities are the review for accuracy and completeness of permits -- permit applications for pits, ponds, lagoons, the evaluation of brine-production wells, and the evaluation of discharge plans for gas plants, refineries and other oilfield concerns, service companies.

Q. And in the course of carrying out those duties, have you been involved in any review of the Application which is the subject matter of this hearing?

A. Yes, I have. It was initially applied for, for administrative approval, under Rule 711, and we went through the -- all the preliminary reviews.

Q. For the moment let me just ask you, so therefore you are quite familiar with all submittals in this case?

A. Yes.

Q. And have you been present for a substantial portion of the testimony in this case?

A. Just two days, just last Friday and today. I missed the whole first day.

MR. STOVALL: At this time I would offer Mr. Anderson as a qualified environmental engineer.

EXAMINER STOGNER: Are there any objections?

MR. DEAN: None from me.

MR. HORNER: Well, no.

EXAMINER STOGNER: If there are no objections, Mr. Anderson is so qualified.

Q. (By Mr. Stovall) Mr. Anderson, just as a little background material, would you just briefly describe what the Oil Conservation Division Environmental Bureau is and what its mission is?

A. The Environmental Bureau is part of the Division that is assigned the protection of ground -- of fresh water and the environment from oil and gas operations.

Q. And that responsibility on the part of the Oil Conservation Division, is that a statutory responsibility?

A. Yes, it is.

Q. And within the responsibilities assigned to the Division with respect to the -- or excuse me, under the Oil and Gas Act; is that correct?

A. We have responsibilities under both the Oil and Gas Act -- three acts, really: the Oil and Gas Act, the Water Quality Act, and the Geothermal Act.

Q. And which statutes, in your opinion -- I recognize you're not a lawyer, but as far as you know, which statutes -- not a licensed lawyer, that is -- are implicated in this?

A. This permit was applied for under Rule 711 of the Oil Conservation Rules and Regulations, which is under the Oil and Gas Act.

Q. And is it -- The Oil Conservation Division, is it -- I believe the term is constituent agency for the enforcement of water quality-control regulations; is that correct?

A. Yes, it is.

Q. Would you describe in general -- and not -- using this Application only to the extent that it is helpful for an example, for the moment, describe in general the Rule 711 review process.

And I'll just call it 711 in the future. We're referring to Rule 711 of the Oil Conservation Division Rules and Regulations, just for the record and for everybody's information.

Would you just simply describe that process as it works within the Environmental Bureau?

A. Initially, an application is received from some outside entity to construct a commercial disposal facility, whether it be a pit or a land farm or

whatever.

We receive that application and we go through -- over an initial review of what is in the Application, to see if it is complete. If it's primarily -- basically complete, we will issue a public notice and publish it in the Albuquerque Journal and in the local newspaper where the facility is to be -- is proposed to be constructed.

We will go through a review process, then, all the members of the Environmental Bureau, and determine what we think is missing from the application or what we do not agree with the application, and we will have a series of letters back and forth between the Bureau and the applicant to try and rectify any problems that there may be or ease our mind on anything, and change to where -- and try and change the application to where it would fit our requirements for protection of ground water and the environment.

Q. And when you're evaluating an application to meet those standards, do you -- What do you do? How do you determine it? Is it arbitrary? Are there guidelines that you use?

A. We have some guidelines printed up that we use statewide. However, the guidelines are just that. They are a guide for the application and for the

information required. Each application is evaluated for site-specific conditions and requirements.

We evaluate it to -- for the need to -- for protection of ground water and the environment, and when -- Once we feel that we have got -- we have obtained a facility that is going to operate safely and with proper protection, then we recommend to the Director that he can -- he either can -- or will or will not approve the permit.

Q. I'm going to ask, do you have a copy of those guidelines with you, Mr. Anderson?

A. Yes.

MR. STOVALL: And I'd ask each of counsel, I believe, that in a less formal setting last week we distributed the guidelines and asked if each of you has them, a copy of those, and review them, because I'm now going to offer them as an exhibit. So we'll make additional copies available if you need them, but --

MR. HORNER: I have a copy.

MR. STOVALL: Mr. Dean, do you also have a copy?

MR. DEAN: I have a copy.

Q. (By Mr. Stovall) Looking at those guidelines, which I'm going to identify as Exhibit Number 1, OCD Exhibit Number 1 in this case, are

those -- those are the guidelines that you used to guide you through the process of evaluating an application; is that correct?

A. Yes, they are.

Q. And were those guidelines used in this case?

A. Yes, they were.

Q. Would you describe at this point, please, how the process worked in this specific Application of Sunco -- Sunco Trucking?

A. The Sunco Trucking Application was submitted as a -- for administrative approval, and sometime during the review -- and I don't remember the exact date -- we received a letter of protest to the Application, and I don't know whether it was based on the public notice or whether it was based on the notice that the Applicant gave to the surrounding land owners. I have no knowledge of that.

At that time, we decided to go ahead with the administrative review of the Application before deciding to put the Application to an Examiner hearing. And the reason we decided to go ahead and continue is that if we could not reach agreement with the Applicant on safety features and everything that needed to be done for administrative approval, then we would recommend denial of the permit and there would be no

need for a public hearing.

We went ahead up to a point, and we got to the point of my last letter to -- their last response to my last letter -- to where we thought we were close to an agreement. There were obviously still some things that had to be determined, but it looked like it would be approvable, so we decided to go ahead with a public hearing, the Examiner hearing on it.

Q. In other words, if I understand what you're saying correctly is that in all previous cases for an application for a permit under Rule 711, that permit has been issued administratively by the Director pursuant to a process of developing the standards and criteria for that permit in a series of correspondence and -- between the Environmental Bureau and the Applicant; is that correct?

A. That's right.

Q. And in this case, let me first hand you, just to get it out of the way administratively, a copy of a document which is entitled "Affidavit -- " and it appears to have had some holes punched in it " -- Publication."

(Off the record)

MR. HORNER: Are we passing these around?

MR. STOVALL: We're passing those around.

Q. (By Mr. Stovall) The document I've just handed you has been marked as OCD Exhibit Number 2. Would you just briefly identify that?

A. This is the Affidavit of Publication for our public notice in the Farmington Daily Times.

Q. And why was it published in Farmington?

A. Because -- Well, that's the paper we publish in the San Juan County area for all our public notices.

Q. And this facility is located in San Juan County; is that correct?

A. Yes, it is.

Q. And now I'm going to hand you what's been marked as OCD Exhibit Number 3, and I'll stop so the reporter can pass it down, and would you identify this document, please?

A. This is a copy of the Affidavit of Publication from the Albuquerque Journal on the same Application, on the Sunco Trucking Application.

Q. Now, these two publications that we've just identified, they are the publications of the submittal of the Application for approval of this facility, and not of this hearing; is that correct?

A. That's correct.

Q. And when you had indicated earlier that you weren't aware whether Mr. Horner's clients were

objecting on the basis of personal notice which was mailed to them or this, but you're saying that they do get notice, obviously?

A. Yes.

Q. And this satisfies the notice requirements under Rule 711 --

A. Yes.

Q. -- for administrative process?

A. Yes, it does.

Q. So now we've determined that -- I believe you testified that you initially reviewed the Application and you had some correspondence, and we'll go into that correspondence in a minute. I believe most of it has been admitted in the record, and so we'll refer to the record of that correspondence.

But in the course of reviewing this Application under the guidelines which the OCD has, you determined that it was probable that it could be approved administratively?

A. That's correct.

Q. And because of the objection which was received from Mr. Horner's clients, you then had the Division put this on for Examiner hearing in order to offer full opportunity to be heard and to get the evidence in in this manner; is that correct?

A. That's correct.

Q. And having done that, what happened as far as your -- what I call your normal flow of processing of these types of applications?

A. From -- At the time we set it for hearing and developed a date for the hearing process, I stopped all action, other than receipt of paperwork and sending it out to the various attorneys. I did no further review of the Application at that time.

Q. So in other words, if we look at these items, these bits of correspondence -- and again, I know you don't yet have them in front of you, but it's correspondence that you participated in -- that doesn't represent a complete package of what you would have required had you continued processing this Application administratively; is that correct?

A. That's correct.

Q. When you permit a facility under 711, do you impose conditions upon that permit or --

A. Yes, we do.

Q. And how is that done? I mean, how would you describe that process? How do you identify what the operator has to comply with?

A. Their submittals, their responses to our questions and requests for commitments and comments,

plus their application, become part of the permit by reference in the approval letter.

If there are other conditions that we want -- we feel necessary to put on the facility that have not -- either not been agreed to or not been mentioned, we will put those as specific conditions in the body of the approval letter.

Q. So in other words, if I understand you correctly, what you would have done, had you continued processing this administratively is, you would have taken the Application and then your response to the initial Application, and their response, and you would have continued refining that to the point where you had reached closure or agreement on all of the requirements for the facility, and then you would have issued a letter saying your permit is approved subject to the conditions contained in these letters, as referred.

And then the letters themselves tie together, say -- For example, I think you had some discussion -- Oh, trying to think of a matter -- Let's talk about emptying the pond, just -- not to create the standard but to describe the process. I believe they initially proposed that they would begin hauling water within seven days and empty the pond in a hundred or something; is that correct?

A. I believe something like that.

Q. Yeah. I mean, it's not important what they said, at the moment. And you wrote them back and said, no, that's not acceptable; this is what we suggest?

A. That's correct.

Q. And then they counter-proposed, in effect, something different, begin emptying immediately and continue -- or begin hauling immediately and continue emptying --

A. That's correct. And we did not -- That was the last response we got back before we put it -- set it for hearing, and we did not respond to their response. If we would agree with -- If we would have agreed with that, which I won't say we did, we would have just not mentioned that again, and that final response would have become part of the permit.

However, if --

Q. Now, let me interrupt you right there to make sure I understand that clearly. What they would have said is -- You would have, for example, said, you'll begin hauling water immediately and have the pond emptied with seven days. Let's use that just as an example number. And they would have responded and said yes, we agree to do that, and that would have been the end of that discussion?

A. That's right.

Q. And that would have been incorporated into the permit process?

A. That's correct.

Q. Into the permit.

A. Now, if they did not agree with what we said and we still -- and we would still want it, which we would, then it would become a specific item in the actual approval letter saying the pond -- the construction of the pond is approved with the following conditions: You will be -- You will have the pond emptied in two days, if that's what we decided, and that would be a specific part of it, of the approval letter itself.

Q. So in other words, they couldn't actually begin operating -- Or they couldn't begin operating until they have a letter that says you're authorized to operate it. And once they began the operations, then they had to make sure that they complied with all of these conditions?

A. That's right. They can't begin construction of the site until they have a permit to construct.

Q. Do those conditions ever change during the course of operation of a facility?

A. Definitely, yes.

Q. Based on what?

A. Based on current circumstances, what the conditions are, new technology that's developed.

Q. So in other words, we don't come up with a static set of criteria that are cast in stone, but rather you say this is the initial approval criteria, and based upon experience we can modify that criteria to suit the specific circumstances; is that correct?

A. That's correct.

Q. And again, the purpose is to protect fresh water; is that correct?

A. To protect fresh water, human health and the environment.

Q. Mr. Anderson, do you have in front of you copies of the exhibits that have been submitted in this case?

A. No, I don't.

Q. Do you have copies of your correspondence between you and Sunco?

A. No, I don't.

(Off the record)

Q. (By Mr. Stovall) I'm going to hand you the OCD case file, and I'm going to refer to some items that have been marked as exhibit -- I'll go this way this time -- that have been marked as exhibits, and

make sure that we're all talking about the same items.

Sunco Exhibit Number 1 is a letter dated May 19th, 1989, from George Coleman, President of Sunco Trucking, to the Oil Conservation Division, attention Dave Boyer. It appears to be a two-page letter with several additional pages of information. Do you see that?

A. Yes, I have a May 19th letter that is in two pages only.

Q. You don't see copies of something that begins -- Actually, I'm sorry, it's more than a two-page letter. I referred to that as a two-page letter because Mr. Coleman's signature appears on the second page, but really it begins -- Roman numeral Part I is on the first page, Roman numeral II, General Description, on the second page -- or third page -- and continues on. Do you see that?

A. No.

Q. I know why you don't see that. These are the copies that we didn't originally distribute, and I think I've got the copy of it.

A. I think the rest of them are in that other part of the file.

(Off the record)

Q. (By Mr. Stovall) Mr. Anderson, as we go

through these items I would ask that you get them to a point where you can refer to them easily, because I think they're going to be -- a lot of what I'm going to do with you for the rest of the day, is refer to these items.

A. Okay.

Q. Have you found Exhibit Number 1?

A. No, not in this file. Oh, yes. Yes.

Q. All right. Exhibit Number 1, the last part of that is a State Engineer Office well record; is that correct?

A. Yes.

Q. Okay. Exhibit Number 2 is actually the -- I believe that's a -- I believe we marked it 2-A and 2-B or something of that nature. It's the schematic diagrams of the ponds.

A. Right.

Q. And you've seen this -- You've seen all of this before --

A. Yes.

Q. -- is that correct?

A. Yes.

Q. Exhibit Number 3 is a document which is a letter dated August 18th, 1989, from Sunco Trucking --

A. Right.

Q. -- to you, it's addressed to you?
A. I have it.
Q. You have that now?
A. Yes.
Q. Okay, Exhibit Number 5 -- Excuse me, Exhibit Number 4 is a letter dated April 17th, 1990, from Sunco Trucking to yourself. Do you have that letter?
A. Yes.
Q. Exhibit Number 5 is a letter, one-page letter, from Sunco Trucking to yourself, dated May 18th, 1990?
A. Yes.
Q. Exhibit Number 6 is a letter dated July 20th, 1989, addressed to Mr. George Coleman, signed by David Boyer for yourself?
A. Right, got it.
Q. You've got that? Exhibit Number 7, a letter addressed to George Coleman dated November 3rd, 1989. I believe that's -- That's signed by you?
A. November 3rd?
Q. Is that correct?
A. Wait a second. Yes.
Q. And Exhibit Number 8 is a letter signed by you dated May 2nd, 1990, addressed to Mr. Robert C. Frank?

A. Yes.

Q. Have you examined the file and determined whether or not this is all of the substantive correspondence between Sunco Trucking and the OCD with respect to the processing of this permit?

A. Yes.

Q. So this, if you will, constitutes the administrative review of the permit?

A. On your Exhibit Number 1, the Application dated -- I don't know if this report was in on it or if it was included in that exhibit or not.

Q. I don't believe it was. Is that the geological report?

A. That's the geolog- -- geotechnical report, the geological report.

Q. So what you're saying, is that geo- -- geo- -- that report was --

A. Was part of the -- I believe it was part of the Application.

Q. It was submitted with the Application?

A. Yes.

Q. And I believe, if I'm not mistaken, that exhibit is not in the record at this time, and it is my intention to discuss that exhibit with Mr. Olson who is the hydrologist, and he has more knowledge of the

subject matter of that exhibit; is that correct?

A. That's correct.

Q. So other than that item, the items which we've just gone over, the exhibits we've just gone over, do they constitute the --

A. There is the State Engineer's approval of it, and that's necessary. I did not see that in the record.

Q. All right, thank you. I do have that, and it will be marked as an exhibit, and I will ask you to identify it and discuss it in a few minutes.

A. Yes.

Q. Let's hold on to that.

What I'd like to do now, at this time, Mr. Anderson, our purpose here, and I think -- and let me back up and make sure that this is perfectly clear. Your determination at the time this was set to hearing was not that this Application should be approved, but rather that it was potentially administratively approvable; is that correct?

A. That's correct.

Q. And would it be correct to say that the purpose of your testimony here today would be to testify as to your opinion as an environmental engineer and member of the staff of the Environmental Bureau as

to what conditions should be imposed, should the Division decide to issue an order approving the permit through the order process; is that correct?

A. That's correct.

Q. And you've reviewed this Application fairly thoroughly; is that --

A. Yes.

Q. And are you prepared to make such recommendations?

A. Yes, I am.

Q. And those recommendations are going to be based upon your review of the documents that we've just identified --

A. Uh-huh.

Q. -- the testimony which you've heard from Mr. Frank and Mr. Badsgard and Mr. Cheney; is that correct?

A. That's correct.

Q. So you're not necessarily recommending approval. What you're recommending is the standards which must be satisfied if it is to be approved?

A. If it's approved, yes.

Q. What I'd like to do at this time, Mr. Anderson, is kind of go through the parts of the Application which appear to be at issue, based upon the matters being discussed.

And I will just state that there are two primary things which seem to be of major concern to the opponents of this Application, and I think they're also of significant concern to the OCD, and that is prevention of contamination of the ground water by allowing the water in the pond to somehow enter into the ground to escape from the pond through leaks or otherwise, and what measures are adequate to prevent that harm from occurring.

Is that a correct statement of what -- your understanding of one of the major concerns?

A. Yes.

Q. And the other major concern is -- seems to be the potential for the emission of H_2S gases into the atmosphere, which may cause harm to people who would come in contact with that gas?

A. That's right.

Q. And if I'm not mistaken, in reviewing the correspondence, neither of those issues had been brought to closure in terms of any sort of administrative approval process --

A. Not that I know of.

Q. -- between you and Sunco Trucking?

Let me go -- Now, I don't want to discuss the hydrology or the actual impact of water getting into

the ground itself with you, because we have another witness who's better prepared and better trained to discuss specifically what happens if this water does escape from the pond into the ground.

I'd like to discuss with you some of the more specific matters. One of the ones that we used as an example -- and I will now get to the specifics -- is, in the event --

Well, let me back up. I want to stop on that for a minute and start first -- Let's discuss the leak-detection system as proposed by the Applicant, and I would like your opinion as to whether that system is adequation and if -- what standards should be satisfied in order to have an adequate leak-protection system -- leak-detection system -- in this facility.

Are you familiar with what the Applicant has proposed?

A. Yes, I am.

Q. Summarizing it briefly -- and I believe that appears on Exhibit -- one of the Exhibit 2's. I'm going to pull this out because my eyesight's not good enough to read it on the board. They've discussed a system on -- Somebody help me with this -- 2-B, Exhibit 2-B, which is the right-hand exhibit on the wall. It's labeled, "Leak-Detector System, Plan View."

What the Applicant has proposed -- The plan shows a four-inch perforated pipe with a one-percent slope going to a sump and two-inch perforated pipe laterals approximately 40 feet apart with a two-percent slope going into that pipe.

Now, I understand Mr. Frank's testimony was that they intended to use one-inch laterals and a two-inch main pipe going to the sump. Have you reviewed that?

A. That's what I heard was testimony in the first day of the hearing, and I -- I would recommend that we stay with the two-inch laterals and four-inch main drain, as originally proposed on the drawing, although not as proposed in the Application itself. There seems to be some discrepancy there.

The one-inch laterals going to the main line, if there was any fines in the sand, could have a tendency to plug the laterals. The two-inch, it would be a lot less likely it would be plugged.

If there happened to be a leak in the main liner, the requirement to keep the leak-detection sump pumped out, to keep all hydrostatic head off of the formation, and the possibility that there may be a pinhole leak or something in the secondary liner, would be easier accomplished with larger diameter pipe.

Q. Okay. So your recommendation is that it be built as shown in the drawing, four-inch main pipe, two-inch laterals. Is the spacing of the pipes --

A. The spacing of the pipe is adequate. That's well within our guidelines that no point in the bottom of the pond is more than 20 feet away from a lateral or a main-line drain.

Q. Okay. And then if I understand the system -- and correct me if you understand it differently -- the water will -- any water getting through the primary liner would flow through the permeable stuff between the primary and the secondary liner to the bottom where the -- the main line -- These pipes would be located at the lowest point, and the water would flow into these perforated pipes and into the main pipe and to a sump where it could actually be visually seen; is that correct?

A. That's correct.

Q. So one of the primary purposes of this system is, you could tell if you've got a leak because you've got water in your sump?

A. That's correct.

Q. Are there any additional purposes to the sump as they've designed it which you think are beneficial or which should be --

A. The sump can be used to circulate -- to drain the underliner, the space between the primary and the secondary liner, and return the fluids to the pit or to a truck for outside disposal at some other facility, to keep the head off of the bottom liner in the event there are -- you know, there may be a leak in the bottom liner.

The likelihood -- I don't know the odds of having a double leak in one place. But if there was, that would keep the had off and eliminate the possibility of the water leaking through to the ground surface below.

Q. When you say keep the head off, what you're saying is --

A. Keep the water off --

Q. You're talking to a lawyer --

A. Keep the water out of the space between the two liners. If there's no water there, then it can't go -- then there can't be any water to go below the secondary liner.

Q. And the head is really the driving mechanism --

A. The driving --

Q. -- that would cause the water to go -- to move; is that correct?

A. That's correct.

Q. So that -- Describe the process as you'd recommend it, as to how this system should work and what requirements should be imposed upon the operator.

Now, we've talked about, now, the design of the pump. Other than the discrepancy in the pipe sizes, and you've made your recommendation there, is there any other aspect of the design itself with which -- which gives you concern?

A. Are you asking about contingency if fluids are found in the leak-detection?

Q. No, I'm not. Right now I'm asking about, is the system design at this point adequate, in your opinion --

A. To detect a leak, yes.

Q. -- to detect a leak and to accomplish the secondary purpose of recirculating the water, keeping the head off?

A. Yes, it is.

Q. Okay. Now, would you describe, please, how you think this should be operated in effect, and let's now go through your recommendations of what happens if they discover water in the sump.

A. The leak-detection should be checked on a periodic basis, and since the H_2S is going -- and this

is something future, I realize. The operator has to walk around the pond and periodically inspect it during the day. I see no problem in inspecting the leak-detection sump on a daily basis.

Q. That means just looking in and seeing if there's water in it, right?

A. Just a matter of lifting the cap off, looking in, and seeing if there's water in it. If there is water detected in it, I believe -- I recommend that they be required to notify the OCD immediately, within 24 hours.

(Off the record)

MR. DEAN: Mr. Examiner, I'm going to lose Mr. Cheney, if it's okay with you, for about 30 minutes at the most. But he'll be back and he'll be available as we agreed, but he's going to have to leave and then come back. I don't know that we're going to get to anything that he necessarily needs to hear for other questions, but he will be back if that's acceptable to everybody.

MR. STOVALL: I think -- My recommendation, Mr. Examiner, viewing the hour, is I'd like to go through this leak -- and Mr. Cheney may leave to do this --

MR. DEAN: All right.

MR. STOVALL: -- because I don't think he's necessary for what I want to do here.

EXAMINER STOGNER: Are there any objections to Mr. Horner leaving?

MR. STOVALL: Mr. Horner isn't leaving.

MR. HORNER: Mr. Cheney leaving?

EXAMINER STOGNER: I'm sorry.

MR. DEAN: No.

MR. HORNER: No, I have no objection. I'm assuming that what you're talking about is --

MR. STOVALL: I will not go into anything dealing with the aeration/H_2S system while Mr. Cheney is gone.

MR. HORNER: All those good stuff that he's interested in?

MR. STOVALL: Correct.

MR. HORNER: Okay, all right, that's fine.

EXAMINER STOGNER: So be it.

Mr. Stovall?

MR. STOVALL: Again, what I'm going to recommend, Mr. Examiner, is what we'll do is -- I think this -- The discussion with respect to the leak-detection system is probably another, oh, 15 minutes or so. And then I would recommend we go ahead and take a lunch break, and then we can go into the other aspects

of this design and the criteria, if that's satisfactory.

EXAMINER STOGNER: We'll cross that bridge when we get to it. You can continue.

MR. STOVALL: Thank you.

Q. (By Mr. Stovall) All right. Mr. Anderson, I think you talked about -- We're walking around making a daily inspection of the sump, and you've said -- We're at the point where they've looked in the sump and there's water in it. What do they need to do then?

A. At that point, they need to sample that fluid to determine what type of fluid it is, whether it's fresh water from the rain or whether it is actually produced water from the pond.

Q. It's not a sealed system, in other words? It's possible for, say, rain water to get into it?

A. It's possible, there's always that possibility, rain water could get into the sump. Not likely, but it is possible. And they also need notification to the OCD, whether it be the district office or the Santa Fe office, that there is fluids in the sump.

Q. Okay. If there -- I want to get this process, I mean in the sense of writing the permit correctly. Would you recommend, then, that they sample

the water, determine its makeup -- in other words, find out if it's rain water -- is notification necessary?

A. If they can get the determination fast enough, within 24 hours, no. If it's rain water, they just -- They need to pump that out. I don't believe that we need to know that they have rain water in the pond. And that will be easily determined by a conductivity test.

Q. There wouldn't be any -- Would there be any question as to whether or not there's any pond water in the sump?

A. Initially, there would be no question. Initially, the pond water -- If there was rain water in the sump and there had not been a leak in the primary liner in the past, the conductivity of the rain water would be somewhere around 500, 600 micromhos, and there would be no question that it is rain water.

If they had, perchance, had a leak in the bottom of the pond and there were some salt precipitates left in that sand, in the underlying sand bed between the two liners, then there could be a question.

Q. And as soon as there's a question, you want to know about it; is that correct?

A. Yes, I believe we need to know about it.

Q. So is there a level of resistivity at which you'd recommend -- below or which or above which, whichever is appropriate -- that they not be required to notify OCD?

A. I'd say that would be a changing number, because -- based on the conductivity of the pond itself.

Q. Would you rather they just notified you in all cases when there's water, or is that --

A. I think so, yes.

Q. Okay. So we now -- As soon as water is detected, you want to be notified within 24 hours?

A. Within 24 hours.

Q. And then simultaneously you want them to sample the fluid to try to determine --

A. That's correct.

Q. -- the makeup of it.

What about emptying out the sump?

A. At -- They need to start that immediately once they find fluids in the sump, regardless of whether it's rain water or a leak in the pond and it is pond water. They need to start to start emptying that sump with a -- whether it's a C pump or a vacuum truck or whatever -- to drain the sump and keep it drained, keep it dry.

Q. Does it matter where they drain the fluids to out of the sump?

A. It can go back into the main pond. They can put it into the vacuum truck and dispose of it in another facility, as long as it is disposed of in an approved place.

Q. Now, you're treating it as if it were the same kind of water, and therefore --

A. That's right.

Q. -- you can't just pump it out on the ground. But they can pump it back into the pond, and that still is --

A. Certainly.

Q. -- doesn't cause any problem; is that correct?

Now, you want to keep the pump -- In effect, you want to keep the sump dry so that you can always tell if there's been water entering the sump; is that --

A. Basically correct. It's free liquid, free, not -- you know, it's -- there's going to be moisture in there from the -- if there is still water coming in, but you don't want free liquids in the bottom of the sump.

Q. Okay, so as soon as liquids are detected

they'd begin pumping out the sump. And am I correct, then, in understanding that if in fact there is a leak in the liner and it's pit water going into the sump, that they'll keep pumping and it will keep filling; is that correct?

A. That's correct.

Q. What needs to be done then?

A. Okay. And simultaneous with this, as soon as they determine whether this is pond water or fresh water -- Now, this will wait for the analysis -- they cease accepting any further water into the pond.

They will begin after notification of us; we will determine what outside measures are needed. But they need to take the measures to begin enhanced evaporation and begin moving the fluids, transporting fluids, if they are pond fluids, to other disposal facilities, if available and where available.

Q. So you're recommending now that -- If I understand you correctly, and let me just follow this through again. With my bachelor in simple engineering, I have to do it in kind of easy terms. You pump out the sump and if, in fact, there was rain water you're not going to get any water back in --

A. That's correct.

Q. -- anyway; is that correct?

A. That's correct.

Q. And that's going to tell you first that you may not have a leak?

A. That's correct.

Q. If, in fact, you do have a leak and water's in there, you'll pump out the sump, and if you're putting it back in the pond then water's going to continue to enter the sump --

A. Yes.

Q. -- and that's going to be an indication that you've got a leak --

A. That's correct.

Q. -- even before, possibly, you get the water analysis; is that correct?

A. That's correct.

Q. So if you see water continuing to enter the sump as you're pumping it out, then that may be an indication that they have to begin remedial measures; is that correct?

A. That's correct, yes.

Q. So either an analysis of the water showing that it's the disposal water or continued presence of water in the pump would indicate that --

A. That's when --

Q. -- evaporation and hauling is necessary?

A. That's when they need to start their contingency plan for a leak in the pond, yes.

Q. Now, there's been some discussion, and you've had some correspondence in the exhibits that we've referred to with respect to time periods to accomplish certain things. Do you have any recommendations -- Now, you've state that they need to begin -- immediately, they need to begin enhanced evaporation --

A. That's correct.

Q. -- is that correct?

A. That's correct.

Q. They immediately need to stop receiving any additional water into the pond.

A. That's correct.

Q. So your effort there is to begin immediately lowering the level of the pond through these two mechanisms by not allowing more water in, by getting as much into the air, in effect, as possible?

A. That's correct.

Q. And then what's your recommendation with respect to hauling?

A. They need to, you know, start hauling -- if they keep the sump pump down, now, if the leak -- If there is a leak in the pond and it's not big enough to keep the sump filled, then they can keep the sump pump

down. I think they need to start hauling water to another facility to aid in lowering the pond.

If they can't keep the pump down, then they need to haul even faster than what they would normally. The hauling of water is going to be -- to other facilities -- is going to be dependent on the availability of equipment to haul it, the availability of space at other facilities to accept it. That's a variable that we can't -- you can't determine now.

As far as a time limit, assuming a hole in the bottom of the pond to empty the pond, I couldn't give a time limit on that. I couldn't recommend that you put a time limit in that.

Q. Is that important, in your opinion?

A. I don't believe it is, no.

Q. If I understand what we're trying to do at this point, you want to empty the pond below wherever the leak is so that you can repair the leak as one part of the process; is that correct?

A. That's correct.

Q. And, of course, the broader objective, the real safety objective that we're concerned with here, environmental objective, is to prevent water from entering the ground and getting into fresh-water supplies; is that correct?

A. That's correct.

Q. Now, Mr. Olson is going to be more prepared to testify as to what actually happens when the water enters the ground and what could happen there --

A. That's right.

Q. -- so I -- Is that correct?

A. That's correct.

Q. And so I'm not going to go into that line of questioning with you.

But just in terms of general discussion of the way this operates, talking about keeping the head off, they could actually continue to circulate the water through the sump into the pond and evaporate, and did I understand you to say that what that does is, that keeps that water out of the area between the liners --

A. That's correct.

Q. -- and therefore even if there's a hole in the secondary liner, it's probably not going to go into the ground in --

A. That's correct.

Q. -- any quantity, measurable quantity?

A. That's correct.

Q. So if conditions were such that there were no trucks available or no facilities to haul that water,

is just simply enhanced evaporation and continuing to circulate through the pond going to be adequate to protect the fresh-water supplies?

A. As long as that -- the leak-detection area between the two liners can be keep evacuated of water, yes. I believe it would be, yes.

Q. And so that relates to what you said about, you know, if they can keep the sump water level from growing, that indicates that they're moving the water back in to the pond as fast as it's getting between the liners?

A. That's correct.

Q. And if the sump -- If the water level in the sump starts to rise, then there is water accumulating between the primary and secondary liner?

A. That's correct.

Q. And so your recommendation at that point is that then they're going to be required to make some more serious efforts to haul some water off and get out it out of there, because they've got a big leak.

A. And/or get a larger-capacity pump for the sump.

Q. From a ground-water standpoint only, and just from the standpoint of what we're talking about, the limited scope of that, does it matter how long it takes

to evaporate that pond, so long as you can keep -- the sump continues to draw out any water between the liners?

A. No.

Q. Does that matter, even if there's a hole in the secondary liner?

A. I would not consider it, no, not if there's no fluid between the two liners.

Q. So even if there were a hole in the secondary liner, this water's going to -- How is that going to work? Is this water --

A. It's going to preferentially take the path of least resistance, which is the sand layer between the two liners, and then to the leak-detection laterals and to the sump.

The pond also has a -- you could say a third layer of protection, which is compacted soils below the secondary liner. It's not the same thing as, say, having a third impermeable liner. We do not require a third impermeable liner, but they are compacting that soil below that secondary liner, which gives an added measure of protection. It has a lower -- a reduced permeability through that compaction.

Q. Now, just looking at it, just from a -- I mean, from an engineer's standpoint or from an

environmental engineer's standpoint, OCD, is what you're saying is that if there were no hauling capacity available or no place to remove the water to, that you can adequately protect the ground water by simply keeping the head off by pumping the sump?

A. At that site, yes.

Q. And that evaporation, regardless of how long it takes, will eventually get the water to a level where you find the leak, fix the leak, and then back into operation?

A. That's correct.

Q. And that's without regard to any issue about when -- if the water hits the ground, what happens to it? I mean, you're just talking about it from, you know, from the pond itself and keeping it in the pond and not discussing --

A. That's correct.

Q. -- what happens to any water that goes into the ground?

A. That's correct.

Q. From a practical standpoint as an operator, do you have an opinion as to how they're going to feel about this? I mean, they're prohibited from taking water, are they not, once the leak is -- once it's determined there's a leak?

A. Well, I can't -- You know, I really can't say what they feel. If I was --

Q. Well, let me back you back you up again. What I said is that you -- that under the OCD regulation you're going to want -- you're going to prohibit them from taking any water.

A. Uh-huh.

Q. So they will -- Their revenue source will cease, in effect?

A. That's right, that's correct.

Q. So there is some motivation on your part -- on their part -- Would you interpret there to be some motivation on their part --

A. I would assume so.

Q. -- to get the leak fixed?

A. I would assume so.

Q. Okay. In the process -- I mean, you've required notification. What's the OCD's response going to be when they're notified there's a leak?

A. We will take into consideration the conditions at that time as to what we require. Now, that's going to -- You know, it's hard to say right now as to what the conditions are going to be in the pond if they have a leak and when the leak's going to be. We have to see what the analysis of the water is.

Chances are, we'd go up to take a look at it, sample the water, and then determine on site what conditions, what additional conditions, you know, if they were allowed by the permit, by the Order, what additional conditions we would put on the facility.

Q. In other words, once -- am I hearing you right? -- that this facility is permitted, that OCD isn't going to walk away from it; is that correct?

A. Oh, heavens, no.

Q. And in the specific situation of a leak, you -- Are you asking them that we insure that the Order provide sufficient flexibility in there that OCD be able to mandate remedial measures based upon the circumstances at the time?

A. I would recommend that some method be placed in the Order to take care of emergency situations such as that so that they can be taken care of immediately.

Q. Would you mind restating that? I'm not sure I quite -- I'm talking about the OCD participation --

A. Yeah.

Q. -- in remediation, is what I'm --

A. Okay, in ground water, you know, if there's -- you don't -- I don't believe that it's necessary, it would be -- it should be necessary to go back to a hearing to get -- to decide that we're going to put in,

say, instead of a 3-horsepower centrifugal pump a 6-horsepower centrifugal pump inside that leak-detection sump.

I think there should be sufficient -- or I would recommend there be sufficient leeway in the Order to allow that decision to be made on-site.

Q. In other words, an OCD staff member look and say, you're not getting the water out here fast enough; get a bigger pump and move it?

A. That's correct.

Q. Do you have a recommendation as to whether or not there should be any specific time frame at which they should have -- by which they should have the water level lowered below the leak?

A. I don't believe, not knowing what the conditions would be of the leak, right now I couldn't state a time frame, I couldn't recommend a time frame.

Q. Do you have an opinion as to whether there should -- I mean, understanding that you couldn't specify a specific time frame, do you have a feeling as to whether or not there should be any sort of time frame imposed, or should that be something that's rather -- based upon your testimony, that you don't feel that evaporation alone would present any substantial hazard?

A. I believe the evaporation alone would, depending on how long it took -- and that all depends on the time of the year that a leak was discovered, if there was a leak. I don't believe that it's necessary to put a time limit on it. I think that could be determined if the -- if it was allowed in -- pursuant to the Order, that could be sped up.

There could be a time limit put on it, based on specific circumstances on site, when an inspector is up there looking at the situation. That would be a site-specific, time-specific situation. It could be.

Q. One other thing I'd like to go into here with you right now is, you have referred earlier to a -- to the State Engineer's Office documentation, and let's talk about the construction of the actual pond itself, not the facilities within the pond, the safety facilities.

Is there any other agency besides the Oil Conservation that must approve that?

A. Yes, there is, the State Engineer under certain circumstances must approve the construction of the pond.

Q. Is this one of those circumstances?

A. Yes, it is.

Q. And do you know whether or not the State

Engineer has reviewed and approved the design criteria for this pond?

A. Yes, they have.

Q. And -- I think I'm now marking OCD Exhibit Number 4, if I'm not mistaken.

I'll just ask you to take a look at that document and ask you to identify it, tell me what it is.

A. This is a copy of a letter to Robert Frank with the OC- -- with the State Engineer's approval and the conditions of approval. We obtained a copy from the State Engineer.

Q. And so they've actually -- is it my -- Am I correct in understanding that this approval constitutes the State Engineer's approval of this facility as a dam in accordance with the plans as have been submitted to the State Engineer's Office?

A. Yes, it is.

Q. And is there any need or authority for the OCD to impose any further construction requirements with respect to the dam itself, the ponds themselves?

A. I see no further need.

MR. STOVALL: At this point, Mr. Examiner, I'm -- the next area that I intend to get into with Mr. Anderson is with respect to the matters which we've

spent about a day and a half discussing, and that is the -- if you will -- the H_2S-prevention systems.

And I think Mr. Horner has expressed some concern, and I also do, that since Mr. Cheney is the primary expert in that area, that we take a break and let Mr. Cheney come back and hear what Mr. Anderson has to say in case there's any need to examine that further. It's a good logical break for lunch.

MR. HORNER: If you wanted to spend -- I mean, spend some more time, I could -- I have some questions regarding what's been talked about so far.

EXAMINER STOGNER: In fact, I was fixing to ask that. How many questions, what kind of time frame are you looking at, Mr. Horner?

MR. HORNER: Probably ten minutes.

EXAMINER STOGNER: Okay, I'll open the questioning up for you first, Mr. Horner.

EXAMINATION

BY MR. HORNER:

Q. Okay, a quick one. EIT certificate means what?

A. Engineer-in-training.

Q. Okay. Let's see. Now, you stated the OCD Environmental Bureau is charged with protection of fresh water. Did you say ground water and environment?

Is that -- I didn't get it all down.

A. Protection of ground water, human health and the environment.

Q. Okay. How about -- Does the environment include the air?

A. No, no, it does not. By a loose definition -- I'm not an attorney, so I don't know --

MR. STOVALL: And I was just about to raise that objection. I think we can -- Let us state it this way, Mr. Horner, and I will state this as a matter of law, and it's a lawyer's opinion and that's a legal issue.

MR. HORNER: Uh-huh.

MR. STOVALL: We do not have air-quality enforcement standards, and we do not enforce and are not charged with the enforcement of any air-quality standards. So to that extent, the answer to your question is no. And I think it is a legal question as to the authority. But we do not enforce, once again, the air-quality standards.

MR. HORNER: Well, I mean, if you're speaking for the witness, then that's fine, but --

MR. STOVALL: I'm speaking for the agency.

MR. HORNER: Well, that covers the witness, I would think. Okay.

Now, along that same line, then -- Well, let me ask that when we start talking about H_2S.

EXAMINER STOGNER: I'm going to remind you, Mr. Horner, to limit your questioning to what he has testified to this point.

MR. HORNER: Well, I'm going right down my notes, I'm going right down my notes.

EXAMINER STOGNER: I'm just reminding you, sir.

Q. (By Mr. Horner) Okay. Now, I got a little confused. It is -- It would be the Department's or OCD's intention upon -- if it were decided to approve this permit subject to certain conditions -- that there would be a list of conditions made or recommendations -- well, not recommendations -- conditions for the permit made and submitted to the Applicant at that time?

MR. DEAN: I'm going to object. It's not his job.

MR. STOVALL: Well --

EXAMINER STOGNER: I'm not sure I understand the question. Do you want to repeat that?

MR. HORNER: Well, I -- There was some questioning before that all of the correspondence would essentially make up the conditions that would be

imposed upon the Applicant, as opposed to if you decide to permit the -- this particular facility that --

EXAMINER STOGNER: You're talking about the administrative process, are you not? Is that your question?

MR. HORNER: Well, or basically the approval of this particular facility, whether --

EXAMINER STOGNER: Mr. Horner, evidently you don't understand. Once it hits this particular point --

MR. HORNER: Okay.

EXAMINER STOGNER: -- it's a different process. Does that help you any in your questioning?

MR. HORNER: Maybe, maybe.

EXAMINER STOGNER: Okay.

MR. HORNER: Then I'm assuming from here there will be an Order with a bunch of -- If you are to impose conditions, they will be part of the Order that --

EXAMINER STOGNER: An Order will be issued after this point, yes, sir.

MR. HORNER: Okay.

Q. (By Mr. Horner) Then at this point in the design of these facilities, is an engineer certification required?

A. No, it is not.

Q. Okay. Now, you've talked about, you think the system would be sufficient to protect the ground water, if the four-inch main line is used and two-inch laterals, by recirculating the contents of the sump into the pond --

A. Yes.

Q. -- thereby removing the head on the layer between the two liners --

A. Yes.

Q. -- and minimizing any flow out of the second liner. Now, if in fact a hole in the primary liner developed that was greater than four inches in diameter, would you not create a head -- have a problem?

A. You could, yes.

Q. So in that instance, you're limited by the four-inch diameter line into the sump --

A. Uh-huh.

Q. -- as the maximum amount of water that you can remove from between the two liners, correct?

A. Well, it would be something less than four inches in -- hole in the liner, but basically you're correct, yes.

Q. Okay. So if somebody were to accidentally

stick a shovel through the liner and you ended up with a hole that's 10 or 12 inches long, that could be sufficient to overload the four-inch sump system?

A. It's a possibility.

Q. And thereby a head could develop and you'd end up with problems to the ground water?

A. I didn't -- I wouldn't say that.

MR. STOVALL: Wait, I object to that. Yeah, he didn't say anything about the ground water, and he's specifically not testified as to the ground water. We're only talking about the confines of the pump, was his -- of the pit, was his testimony.

EXAMINER STOGNER: Objection sustained, Mr. Horner.

Q. (By Mr. Horner) Okay, take out the ground water part. Just sticking a shovel through, then, could end up overloading this scheme to pump the water back into the pond and develop a head on the secondary liner, correct?

A. If somehow a shovel got punched through the bottom of the pond, it could cont- -- It could keep the four-inch, main-line drain system full, yes, it's a possibility.

Q. Okay.

A. Depending on where the hole was.

Q. Okay. And so then you could put a pump of some sort in the sump and keep it dry, but you still have a head developed between --

A. Well, you don't necessarily have a head developed; you have fluid flowing down that line, and you have fluid flowing at the point of the puncture to a lateral. It's not necessarily going to fill the whole bottom of the pond. That depends on the size of the hole.

Q. But I mean, if the hole is in excess of four inches in the bottom of the pond, then you're going to have more water flowing into the area between the two liners than is flowing out of the area between the two liners?

A. It's possible.

Q. Okay. And that would fill up the sand area and create a --

A. Yes.

Q. -- a head of pressure in that area?

A. It's possible, yes.

Q. Okay. Now, then, you talked about if a leak develops, you would order them to begin immediately enhanced evaporation, correct?

A. I would recommend that would be in the Order, yes.

Q. And that would essentially be the operation of the spray system?

A. Yes.

Q. Now, would you condition that upon not having any hydrogen sulfide problems at the time?

MR. STOVALL: I object. We have not discussed the hydrogen sulfide at this point.

MR. HORNER: Well, I mean the point being -- is that if you have hydrogen sulfide present and you're forcing the operation of the spray system, you are going to be emitting hydrogen sulfide. And so therefore to protect the ground water, you are actually injuring air quality.

EXAMINER STOGNER: Mr. Horner, I'm going to ask you to hold on to that question until he has a chance to testify to those particular --

MR. HORNER: Okay.

EXAMINER STOGNER: -- that particular -- the hydrogen-sulfide situation.

MR. HORNER: Okay, that's fine.

Q. (By Mr. Horner) Now, if you do end up with a hole in this primary liner that's larger than four inches diameter and you do end up with the problem of the area between the two liners filling up and a head developing, under those circumstances would you be

interested in imposing some sort of a time frame, even if you do it at that time, for reducing the level of the pond?

A. I am not opposed to putting a time frame on the emptying of the pond. But I believe that that time frame would have to be imposed for the specific conditions at that time. I don't think a blanket time frame is needed.

Q. Well, in your opinion, would it be appropriate under those circumstances to impose some sort of time frame?

A. It could be. No knowing the conditions at the time, if there was a leak, when the leak occurred, I couldn't say it would be appropriate right now.

MR. HORNER: That's about all I've got of this.

EXAMINER STOGNER: Mr. Dean, do you have any questions?

EXAMINATION

BY MR. DEAN:

Q. You did, Mr. Anderson, require our engineers to have an opinion in this case, didn't you?

A. Yes, we did.

MR. DEAN: Thank you. No other questions.

EXAMINER STOGNER: Are there any other

questions of this witness?

MR. STOVALL: Let me -- Yeah, I just have -- Mr. Horner, do you have more? Go ahead and --

FURTHER EXAMINATION

BY MR. HORNER:

Q. I'm curious what you just said. Who -- What engineer had an opinion in this case about what?

A. There was a -- Well, it wasn't about the construction of the pond. Now, it has to be -- I believe we required it to be certified as built, with as-built drawings. But as far as the design and construction, I believe what Mr. Dean is talking about is the aeration system that we haven't gone into yet.

Q. Well, now, so you are saying that you are going to require as-built drawings certified by an engineer?

MR. DEAN: I'm going to object. It's outside the purveyance of this witness, and that's the job of the Examiner.

MR. HORNER: I'm following up on your question, trying to see what you're talking about.

EXAMINER STOGNER: Overruled, Mr. -- Do you want to re-ask the question, Mr. Horner?

THE WITNESS: I -- I -- If it was an administrative approval, we would require as-built

drawings. I would recommend that the Examiner, in his Order, require certified as-built drawings. We do that as a matter of course on pits.

Q. (By Mr. Horner) Now, then, the certification, would that be to all the different elements of this particular project?

A. To the construction of it.

Q. To the construction, meaning -- ?

A. As built, as designed.

Q. But I mean, dirt work and liners, or also aeration and sprays and all that?

A. If there is an engineering design with it, then they have to be certified as built, pursuant to those submittals.

Q. Now, that's contingent upon there being an engineering design? If there were no engineering design, then you don't need an engineering certification?

A. If an engineer -- registered engineer certifies that that pond is built the way they've designed it here -- and I'd recommend this -- that these designs are being submitted as built. Now, they need to be certified that they were built pursuant to the approval of those designs.

Now, if there is an aeration system in that

design, then that design has to be certified that it's -- If they add anything else into that design, they should be required to request a modification of the design and certify that it was built pursuant to that modification.

Q. Okay. So the engineering certification you're talking about, then, is simply certifying that whatever is approved here or comes out of this, that's what's built?

A. That's correct.

MR. HORNER: Okay. That's all I've got of that, then.

FURTHER EXAMINATION

BY MR. STOVALL:

Q. Let me ask one quick question in that regard. Exhibit Number 4, the State Engineer's Office, if -- point out more than anything, and Mr. Anderson can confirm this -- they have their requirement with respect to the construction and supervision and the engineering requirements; is that correct?

A. That's correct.

Q. And it wasn't your intention -- Or was it your intention to say that we would superimpose additional requirements? Again, we're talking about just the earthwork construction of the dam itself.

A. No, we -- The engineer, the State Engineer, requires the as-built certified drawings of the -- and we require copies of those. If the State Engineer -- in an administrative approval.

If the State Engineer was not involved in this -- and there are certain criteria that the State Engineer does not get involved in one of our ponds -- we would require as-built certified drawings of that facility.

But we will not -- You know, we require copies of what they submit to the State Engineer.

MR. STOVALL: Okay. I have no further questions of Mr. Anderson on this topic.

EXAMINER STOGNER: If there's no other questions of Mr. Anderson on this topic, I suggest we take a one-hour recess and reconvene at 1:30. Thank you, gentlemen.

(Thereupon, a recess was taken at 12:33 p.m.)

(The following proceedings had at 1:36 p.m.)

EXAMINER STOGNER: This hearing will come to order.

Mr. Stovall?

MR. STOVALL: Thank you, Mr. Examiner. I see Mr. Cheney is back in the room, so we can now start talking about hydrogen sulfide.

(Off the record)

EXAMINATION (Resumed)

BY MR. STOVALL:

Q. Mr. Anderson, you've indicated you've been here for the last couple of days, and there has been substantial discussion with respect to hydrogen sulfide and its introduction and development and release in the -- as a result of this facility and the concern; is that correct?

A. Yes.

Q. Is hydrogen sulfide a concern?

A. Yes.

Q. And why is that?

A. It's a dangerous gas.

Q. Are there any --

A. It's a health hazard.

Q. It's a health hazard, okay. Are there any standards that determine what levels of hydrogen sulfide might be dangerous?

A. The only standards, the lowest standards that we have, that we used for making our standards, were the OSHA standards, and those standards they had were a workplace environment of no more than 20 parts per million; one-time, ten-minute exposure, but they don't say during what period, of 50 parts per million.

Q. In other words, continuing exposure, 20 parts per million and --

A. That's the way I read the regulations.

Q. And a one-time, short-time, ten-minute exposure of 50 parts per million?

A. Right.

Q. Below those levels it's not considered harmful?

A. According to OSHA.

Q. Do you think those levels are appropriate?

A. When we were working on this problem, we did not think that they were low enough, so we instituted some lower standards than that.

Q. And what's the safest standard for permissible H_2S level, in your opinion?

A. Zero.

Q. And is that a reasonable standard to try to achieve on a -- in a facility of this nature?

A. I think it's a reasonable standard to aim for.

Q. And how do you do that? I mean, how do you --

A. You can aim for --

Q. -- eliminate --

A. -- zero emissions of H_2S by removing the

sources of H_2S. That is not to say that there would not be, every once in a while, periodically, you know, a short-term duration, a release of some minor amount of H_2S that would not necessarily be health-threatening. I'm not a doctor, so I can't say what limits are actually a health hazard.

We tried to contact the National Health -- Down in Atlanta.

Q. Disease Control Center? Atlanta?

A. Yes, Center for Disease Control. They had no data on H_2S and its impact -- or long-term data on H_2S and its impact on human beings. So we decided on other facilities, and in our basic guidelines for evaluating facilities as, you know, a 10-part-per-million emission of H_2S is the time that emergency action needs to be taken.

Q. Below 10 parts per million, no emergency action needs to be taken, but that doesn't mean no action, does it?

A. Oh, definitely, yes. There are other actions that need to be taken, yes, as soon as there is any emissions.

Q. So what you're saying, if I understand you correctly, that the objective that a facility of this type should strive for is to have no H_2S emissions by

eliminating the conditions that will allow the creation of H_2S, but that as a standard you recognize that there may be times when there could be some emissions. Can there be some steps taken to reduce or eliminate those emissions at the time they're determined?

A. Yes.

Q. Now, let me ask you, before we start getting into specifics, you've heard all the discussion with Mr. Cheney and Mr. Frank and Mr. Horner's questions --

A. Yes.

Q. -- on all the -- the system development and all that; is that correct?

A. Yes.

Q. From a regulator standpoint, from an enforcement-agency standpoint, is it possible to determine, possible and practical to determine whether the conditions exist which might allow the creation of H_2S?

A. Yes.

Q. And again, asking you to build somewhat on the testimony and not to repeat the testimony that particularly Mr. Cheney has provided, he's talked about maintaining aerobic conditions in the pond; that's necessary. I assume you agree with him; is that --

A. Yes.

Q. -- correct?

A. Yes.

Q. And not allowing the introduction of H_2S into the pond, to prevent its development?

A. That's right.

Q. Now, you spent a lot of time in attempts to determine whether or not this system, as proposed by the Applicant, is adequate to determine -- to prevent the buildup or creation of H_2S; is that correct?

A. Yes.

Q. But you've stated that, if I understand you correctly, that perhaps the most important thing from the regulatory agency standpoint is to be able to determine whether the conditions exist which might result in the creation and buildup of H_2S?

A. That's correct.

Q. And would you describe how you're going to make that determination? What you would recommend as a method to determine?

A. It's simple testing procedures, not only the incoming water but the waters in the ponds.

H_2S is created primarily from sulfate being reduced by anaerobic bacteria. If you keep an oxygen environment in the pond, you're not going to be able to create or have sulfate-reducing bacteria or anaerobic

bacteria, if you will, formed in the pond. The residual dissolved oxygen content will keep a pond aerobic.

If you eliminate the introduction of hydrogen sulfate into the pond and keep anaerobic bacteria out of the pond, then you're not going to create any hydrogen sulfide.

Q. Let's start at the beginning of the system, then, in terms of the way it would actually operate. The fluids in the pond are going to come from trucks which bring it in; is that correct?

A. That's correct.

Q. Do you have a -- You heard Mr. Cheney's testimony with respect to the system and treating, and Mr. Frank's testimony with respect to that. Do you have an opinion as to what level of H_2S -- at what level of H_2S treatment should be taken before the water is allowed to enter the pond?

A. I believe that any measurable amount of H_2S in the water coming in should be treated to eliminate the H_2S in that water.

Q. So no minimum level, just if there's measurable H_2S, take such steps as are necessary to eliminate it; is that correct?

A. That's correct.

Q. Now, you've heard this morning, there was some discussion about the methods of treating the incoming water, and I think the one which is most recent is the proposal by Mr. Cheney this morning of the circulation system, pumping system and mixing system, with the introduction of chlorine into that, to eliminate the H_2S in a closed system. Have you had a chance to evaluate that methodology?

A. I read it this morning, and I do not disagree with the system. I think it seems like a very good system, and it will treat the water before it gets into an open vessel and allow any emissions of H_2S. As long as there is proper mixing and proper circulation of that truck, it will accomplish what it's designed to accomplish.

Q. Okay. So would it be fair to say that your recommendation would be that a closed system such as this is preferable to an open system, as may have been originally proposed --

A. Yes.

Q. -- where it's treated in the open facility?

A. Yes.

Q. Now, with respect -- there was some discussion this morning -- Mr. Horner expressed some concern that the mixing, insure that the mixing and the

admission of chlorine into the system is adequate to kill the H_2S bacteria or eliminate the H_2S, whatever is the appropriate terminology. Is there a way which can satisfactorily determine if that's been accomplished?

A. Yes, prior to discharging contents of the truck into their open separation tank, retest and determine if there's any hydrogen sulfide in the water. If there is, then it needs further mixing or further chemical addition.

Q. So would it be your recommendation, then, that the standard be that no measurable H_2S be permitted to be disposed of in the pit, in the facility?

A. Correct, into the -- No measurable H_2S-laden fluid be permitted to be discharged into the separation tank.

Q. And if that standard is established, it is an enforceable standard because you can determine whether or not they're meeting that --

A. Yes.

Q. -- standard; is that correct?

A. Yes.

Q. And would you recommend, then, that they be required to conduct such tests and treatment as to insure that that standard is met?

A. Yes.

Q. And would -- Do you recommend that it be -- that the treatment be -- take place in a closed system such as --

A. Yes.

Q. -- proposed?

A. Yes.

Q. Does it particularly matter to you about the relationship of the volumes and ratios of H_2- -- of chlorine to H_2S concentrations, as Mr. Cheney talked about?

A. There will be a certain amount of chlorine required to react with the H_2S that is in the water. There is a relationship there, and that will have to be determined by testing of the water, if that's the question you were asking.

Q. Well, I guess my question is that we've talked about -- In defining the standard that must be satisfied in order for this particular phase of the operation to be approved, if it is, is it important that you define the volume of chlorine that's introduced into the system, or is it merely important that you define the end product?

A. I believe it's important that you define zero H_2S in the water going into the separating tank, not

necessarily the amount or the concentration of chlorine being used to accomplish that.

Q. Now, if you were -- If this were in the administrative process and continued through that process, would you not look at the system that is being used to eliminate the H_2S to make sure that it was a realistic and practical system?

A. Yes, yes.

Q. And if this were approved administratively and if, in fact, it is approved by order, do you wish to -- do you recommend that the OCD retain some authority to insure that the standard of zero introduction -- introduction of zero contaminant of H_2S in water be enforced and be an ongoing process?

A. Yes.

Q. And would it -- Is it fair to say that in that result they may change the treatment system, and that would not concern you, so long as they come to that same result?

A. That's correct.

Q. What about maximum levels of concentrations of H_2S in water that they should be allowed to accept and treat? Do you have any feeling about that?

A. Yes, I do, and some of it may be a purely selfish reasoning behind it, but I don't believe that

there is a limit -- there should be an upper limit on any facility that we regulate, as long as it can be treated down to a zero H_2S concentration, purely by the fact that, you know, if somebody comes in with 150 parts per million in their water and it's turned away at this facility, the next facility and every other one, where is it going to end up?

Q. Are you asking the question or are you speculating?

A. Yeah, I'm speculating, where is it going to end up? It's purely selfish reasoning for this, that it may end up in the San Juan River. And I'd rather have it in a facility that can be treated properly and the H_2S eliminated, rather than go somewhere where we don't know where it is.

Q. In other words, if I understand you correctly, what's in that load comes in, and if it is contaminated to any degree you'd rather have that load there on site, being treated on site. And as a practical matter do you agree with -- and I think Mr. Cheney stated this this morning, that really can treat virtually any level of contamination with enough chlorine?

A. Certainly, yes.

Q. All right. So what we're -- what you're

suggesting, then, if I understand, is -- in summary of part one of process, getting water into the facility and into the pits, is that the standards allow the introduction of no measurable H_2S-contamination at all?

A. That's correct.

Q. And that any H_2S-contaminated water which is brought to the facility -- Let me back up a moment. That every load be tested, and if H_2S is found that it be treated in a closed system?

A. That's correct.

Q. And obviously I would assume you would want them to retain test records to show that when the water was introduced into the separator tanks, that it was free of H_2S?

A. Yes.

Q. Now, looking at the next step of the process, the water is then -- this treated water is now placed into an open-top separator tank. Do you have any concerns about that?

A. Not when the H_2S is already off of it. That's -- The separating tank is where the oil and water are separated, and the water goes into the pond from there. If there's no H_2S, there should be no concern.

Q. Is there a need for these separator tanks at

the top before it goes into the pond, do you believe?

A. Yes. Yes, there is.

Q. That is -- I think Mr. Frank talked about -- was separating out oil and being able to visually inspect the fluids; is that correct?

A. That's correct.

Q. Are there any additional measures over what's been proposed in the correspondence which is a matter of record in this case, as far as that -- Now, we've treated the H_2S coming off the truck, and the water is into this separating facility, and I believe they talked about having some skim tanks to get oil off.

A. That's correct.

Q. Are you satisfied with what has been proposed in the correspondence and records as far as preventing oil from building -- getting in the pond, separating it out --

A. Yes.

Q. -- at the tank? Okay.

Now, as water now enters the pond, the testimony has been that what is needed is the introduction of sufficient oxygen into the pond to maintain an aerobic condition which will prevent the development of anaerobic bacteria, which can lead to H_2S; is that correct?

A. That's correct.

Q. Again, as a matter of -- from the enforcement standpoint, whatever design is used to maintain the aerobic conditions, is it possible to determine that in fact those conditions are being maintained?

A. Yes, it is. There is instrumentation available that can be obtained to test the waters for dissolved oxygen.

Q. And do you recommend that any testing be done -- Or I assume you recommend that testing be done of the dissolved oxygen levels in the pond; is that correct?

A. Yes, I would recommend that it be required they test it at the start of each business day and at the end of each business day, if the day is only during, say, daylight hours. If it's on a 24-hour operation, a minimum of twice a day.

Q. And roughly eight to twelve hours between tests; is that -- Would that be correct?

A. Yes.

Q. Is there a residual oxygen level that you would recommend?

A. I have no problem with their suggestion of .5. .1 part per million of residual dissolved oxygen is, you know, all that's needed to keep the pond

aerobic. .5 gives you a certain amount of safety, and I have no problem with the .5. That would be a good safety number to require.

Q. In other words, we can require that the level be -- the residual oxygen, residual dissolved oxygen in the water, be maintained at a level of .5 or greater? .5 parts per million or greater, is that correct?

A. Yes.

Q. Should samples be taken from more than one point, or is it safe to sample just one particular location in the water?

A. I believe that a sample should be taken not at the surface of the pond. It should be determined at some level below the surface, probably pretty close to the bottom, to make sure that that dissolved oxygen is at the bottom of the pond. Generally the dissolved oxygen is -- congregates to the surface. That way we could determine if the pond is being circulated properly and make sure it's not a stratified pond.

Q. But one test per each testing period. You wouldn't have to go, say, to the north end or the south end or east end, west end, whatever. One would be sufficient?

A. I think that would be, you know -- It would vary with each test. You know, you might take in the

north end one time, the south end the next, the middle the next. Just random sampling at the bottom of the pond, or maybe a foot or two above the bottom of the pond.

And that would require a sealable thief to sample the bottom of the pond to make sure that you get the actual in situ conditions.

MR. HORNER: What did you call that?

THE WITNESS: A sealable thief that -- a sampling device that you can put to the bottom of the pond that will seal a sample and will not let extra oxygen contaminate it on the way up or other dissolved oxygen in the water.

MR. HORNER: How do you spell that, if I might ask?

THE WITNESS: Sealable thief, yeah, just like a --

Q. (By Mr. Stovall) Like the person that robs a bank, right?

A. Yeah.

MR. HORNER: Okay, all right.

Q. (By Mr. Stovall) Is that an engineering term, Mr. Anderson?

A. That's an oilfield term. The "thief" is an oilfield term. The "sealable" is just everybody's

term.

Q. In other words, the device you're talking about would be closed, it would be inserted somehow to the bottom of the pond, somehow opened and water allowed to come in, then sealed again so that the water from that point when it's extracted, it doesn't pick up or mix up water from above or pick up air --

A. That's correct.

Q. -- as it comes through the air; is that correct?

Is it a relatively inexpensive, simple process to do this?

A. It depends. It can be complicated to get some of this sealable thief -- The oilfield has all kinds of thiefs that they can run down to the bottom of tanks and everything, but I don't know that I've seen any that are sealable. EPA does use specific --

Q. You're not asking them to use a product that's not available on the market, are you?

A. Oh, no. No, not at all.

Q. They could go -- They can readily purchase this type of --

A. Not this -- They can't go down to the local 7-Eleven and get one; they have to go to a supply store to get one, yes, sir.

Q. Is that a reasonably practical method of testing the water condition? I guess that's my question.

A. Yes, yes, it is.

Q. Okay.

A. There are other ways, if you want to get an electronic meter with a probe and a 15-foot-long cable and put it down at the bottom and measure it actual in situ right there, as long as you have the right depth, and just lower the probe to that level.

Q. Well, what you're interested, again, in defining standards is, you want to know the residual oxygen level in the water at a depth somewhere a foot -- within, say a foot or two feet of the bottom of the bottom of the pond?

A. That's correct.

Q. And if that level drops below .5 parts per million, then it's time to introduce more oxygen or more mixing into the pond, one or the other or both?

A. That's correct.

Q. And then at some point, then, I would assume you would want them to go back and test it again to make sure that that oxygen level is up; is that correct?

A. Correct.

Q. Again, chlorine is also something that could be added to -- Well, let me back up before I make that question -- or ask that question.

If the oxygen -- residual oxygen level were to drop below .5, as I understand Mr. Cheney's testimony, that means that something is making demand upon the oxygen, and it's being used up rather than left in a residual dissolved state in the water; is that correct?

A. That's correct.

Q. So what you've got to do is, in effect, eliminate the demand, or reduce the demand, which can be done by either adding more oxygen or by adding chlorine to get rid of the -- whatever it is that's --

A. Adding more oxygen won't reduce the demand. It will increase the residual oxygen. Adding chlorine can reduce the demand by eliminating what is causing the demand. Adding more oxygen will increase the residual, but the demand will still be there.

There are a couple ways you can do it. You know, they've got enough redundant systems on there, and they've got enough capability that they can add other, additional systems such as ozone generators, if need be, which really puts the oxygen in the water. You know, in emergency situations those kinds of things

could happen. They could put -- introduce gaseous chlorine into the pond, if need be.

Q. In other words, you want a system, then, if I understand it, that is able to maintain the oxygen level that we talked about. And in the event of a need, the demand goes up, to be able to satisfy that demand and then possibly reduce it, if that's the step that must be taken to maintain the residual level?

A. That's correct.

Q. Are you satisfied that as long as that residual level is maintained or that it is returned to within a reasonably short period of time that that maintains that sufficiently aerobic state to prevent the creation of H_2S?

A. If everything is operated the way it's designed to, yes.

Q. But again, back to -- not so much looking at the design itself, but you can go out there and tell them that there's enough oxygen in the water to prevent H_2S buildup --

A. Yes.

Q. -- is that correct?

A. Yes.

Q. And that -- Is that important to you as a regulator --

A. Yes.

Q. -- to know how much there is?

A. Yes.

Q. Is there a preference of one design over another if it accomplishes the same job?

A. I'd rather be able to go out and say, Okay, we've got enough dissolved oxygen and not -- rather than go out and measure the hydrogen sulfide that's coming off it.

Q. Mr. Cheney testified this morning that -- You're familiar with the system that we talked about; it's kind of a four-part system --

A. Yes.

Q. -- that we've talked about? And Mr. Cheney, I believe, testified that it would be his recommendation that that system be evaluated by an engineer to determine that that -- that it was adequate to provide the oxygen levels and the mix; is that -- would you agree with that recommendation?

A. I have no problem with that.

Q. Would you recommend it as a requirement?

A. I really have no problem with a registered engineer certifying plans that are submitted to us.

Q. Now, what we've talked about up to this point is maintaining a condition which does not allow the

creation of H_2S or the introduction of H_2S into the system; is that correct?

A. That's correct.

Q. And that's -- In an overall operational state, that's what you want, is no H_2S being generated or developed?

A. Correct.

Q. And part of the way you're going to insure that is that you're going to make sure there's enough oxygen in the water and that the system is being operated properly, and the OCD is going to oversee that, I assume --

A. I --

Q. -- to a greater or lesser degree?

A. I would recommend that be part of the Order, that there is continuing oversight of the facility.

Q. Is it possible that there could be some temporary conditions that could cause some H_2S to be created and released into the atmosphere?

A. Although not planned for, obviously, and not anticipated, there are always emergencies or some unforeseen circumstance that could make -- that could allow for periodic releases of hydrogen sulfide, yes.

Q. And again, as part of the harm-prevention process, the protection of the environment, if you

will, within the scope of the OCD authority, do you have any recommendations as to what steps should be taken to determine if -- and what measures should be taken -- if H_2S is determined to be present?

A. We have, throughout -- through the correspondence that we had during the administrative portion of this Application, we required certain contingency plans be agreed to.

Sunco did agree to the contingency plans, although I will point out right now in one of the exhibits there is a typographical error in the contingency plan, and everybody that was at the measurement of H_2S at the fenceline, if it reaches a certain point they have to -- they're to notify the OCD, and if it reaches 10 parts per million at the fenceline they have to notify public safety personnel, and they listed those.

The typographical error -- and I apologize; I missed it when I sent the sent the letter out, and they agreed to the typographical error. It was 1 part per million that they notify the OCD. That typographical error should be 0.1 part per million that they notify the OCD.

Q. What's the lowest measurable level of H_2S in the air?

A. With the instrumentation that the OCD has, the lowest we can measure is .1 parts per million, 0.1 parts per million.

Q. Now, do you have a recommendation as to -- let's go back to the measurement -- to determine whether there's any H_2S in the atmosphere. Do you have a recommendation as to how frequently measurements should be taken?

A. Depending on the instrumentation that they use, I would recommend that it be -- to start with -- Well, the pond, if it's approved, and when the pond is newly constructed and starting to receive waters, probably should be measured twice a day to begin with.

Q. And where should it be measured?

A. Around the berm of the pond. And although we require the notification at the fenceline, if it is at the berm of the pond the notification is going to come quicker than it gets to the fenceline, and reaction time will be shorter.

Although we don't anticipate any H_2S, because the object is to keep it out of there in the first place, if there is some mishap at least we'd be notified earlier.

Q. When you say "mishap," you're talking about something that's allowed some H_2S to get into the

system; is that correct?

A. That's correct, yes.

Q. So your recommendation, if I understand you correctly, is that the -- there be some measurement for H_2S taken at the berm of the pond twice daily, at least initially --

A. Right.

Q. -- and if H_2S reaches the level of .1 parts per million, 0.1 parts per million, that OCD be notified; is that correct?

A. Immediately. For two consecutive readings.

Q. Two consecutive readings?

A. Right.

Q. Okay. Now, when you say that, are you saying that, all right, we'll measure once, let's say, in the morning and then go back in the afternoon and measure it again? Or if the first reading determines there is H_2S do you want a reading taken more quickly?

A. If -- the same -- It would probably be the same times as what they're taking the dissolved oxygen content. You go out in the morning at the first -- the beginning of a shift.

If they get an H_2S reading of .1 or higher at that time, I believe they should be required to go out one hour later, or even a half an hour later, you know,

depending on what the reading -- It could depend on the reading and -- you know, probably will depend on the reading, where it was, what the wind conditions are and everything, some short time period later. And if there's another reading, then we should be notified immediately.

Q. And do you recommend any additional steps be taken by the operator at that time to reduce or eliminate the H_2S buildup?

A. Upon getting one reading, the operator should immediately test the water for dissolved oxygen to see if there's enough in that. If there isn't, then they should take steps to treat the pond at that time, to start -- you know, to try and -- to attempt to determine where the H_2S is coming from, and whether that be aeration, chemical addition, chlorine to the pond.

Then if they get the second reading, then we should be notified immediately. And then we'll decide -- We can decide then what to do.

Q. In other words even before they're required to notify OCD, they should take some measures to --

A. Certainly.

Q. -- eliminate the...

What about if the -- What about testing the

water for H_2D -- H_2S in pond? Do you recommend any testing of the water at times at which --

A. Yes, that would be a good idea. Even if there is residual oxygen -- If there's residual oxygen there shouldn't be any H_2S in it.

Q. In other words, I can think of a number of different alternatives.

A. There could be. If there is residual -- Even if there is residual oxygen in there, there could still be H_2S in there, if somehow some H_2S was added to it, to the pond.

Q. In other words, if it slipped by in the tank somehow or something --

A. It's possible.

Q. -- some other source of H_2S...

A. It's possible.

Q. Do you have any recommendations as far as actual testing?

A. They need to take it with the same method that they're using to determine H_2S in the loads coming in. They can determine the H_2S in the pond.

Q. Frequency recommendation?

A. And I believe that they should be doing that on a weekly basis anyway.

Now, if they get H_2S readings from their

meters, then they should start -- they should do that immediately.

Q. In other words, test the water weekly for H_2S --

A. Certainly.

Q. -- as a regular basis. And if there's any atmospheric H_2S determined, then they should test the water immediately to --

A. Immediately.

Q. -- to determine the H_2S content in the water; is that --

A. That's correct.

Q. And then --

A. And treat the pond accordingly.

Q. -- also check the -- Excuse me.

A. And treat the pond accordingly.

Q. And also check -- At the same time, check the residual oxygen level so that you've got multiple tests here showing that there is a problem, the level of the problem, and the level of treatment required; is that correct?

A. That's correct. And where the problem is coming -- where the problem could be coming from, which will give them their method of treatment.

Q. Explain that, if you would, a little bit.

A. Well, if it's -- If there's no dissolved oxygen, if there's residual oxygen, then chances -- then it's possible that it could be created anaerobically, and then they need to add oxygen to the pond. They may need to treat the pond with chlorine to reduce the oxygen demand.

If the dissolved -- if the level of the oxygen, residual oxygen in the pond, is still .5 down at the bottom and at levels on the way -- all the way up to the surface -- then chances are that the H_2S is not being created anaerobically, but it was being introduced somewhere, and that's where the -- Then the check has to go find out where it came from and how it's getting in there.

But the pond still needs to be treated to eliminate the H_2S.

Q. Now, in your opinion, if we impose the kind of standards we're talking about at this point, we're measuring the H_2S, and as soon as it's, in effect, measurable H_2S in the atmosphere, then remedial measures are taken immediately, you're measuring the conditions of the pond periodically, and then again a presence is found more frequently and remedial measures are taken, does this address the major concerns that might be about the creation of H_2S at harmful levels

that would eventually affect anybody who might be in the vicinity of the facility?

A. I believe that with all the testing and the actions that are required, that would be required by the operators, that it would -- it would very quickly prevent the emission of H_2S, and I have no problem.

Q. Now, when you talk about in your correspondence with the operator -- and we're now going to substitute for the purposes of this testimony 0.1 for the 1-part-per-million --

A. Correct.

Q. -- level for reporting -- your original requirement was that that be the level as measured at the fenceline; is that correct?

A. That's correct.

Q. And that's some distance away from the pond?

A. That's correct.

Q. And so now if we go back and measure at the pond and determine that again that level is present, is the level going to be lower at the fenceline at that moment in time?

A. Yes, yes.

Q. Let's assume that we're on the downwind side. Do you have any idea how much lower --

A. I haven't run the air-dispersion calculations

on it, but if you're on the downwind side, because of the dilution of any wind going toward the fenceline, it is going to be somewhat less. I don't know how much less.

Q. Are there any other -- Again, bearing in mind that the purpose of our developing these standards is to prevent the creation and dispersion of the H_2S, are there any other sorts of measurements that you feel need to be taken to protect that facility?

A. I believe that the pH of the pond should be taken on a daily basis, and I would recommend that the pH be kept at 7 or above, rather than the recommended 5 or above.

Q. Why do you say that?

A. Based on the equilibrium diagrams between H_2S, the HS^- ion and the $S^=$ ion. If there is some reason that there is H_2S in that pond, it will be in equilibrium with the HS^- radical at a pH of 7.

The higher the pH you go, the less H_2S that you have. I believe it's at a pH of 10 that you no longer have H_2S or HS; you have the $S^=$ radical in solution.

Q. Well, why would you recommend 7 instead of 10 for the pH?

A. Well, 10 becomes an impractical solution, and

it's also bordering on a little -- quite a high pH, to where you're getting other regulatory problems, when you get up to 10 to 12 pH.

Q. Again, when you go back and look at this system and you're talking about, say -- Let's focus in on the pH issue for the moment. If you maintain a level, a pH level of 7 --

A. Uh-huh.

Q. -- I believe Mr. Cheney talked about a 5 pH level --

A. That's correct.

Q. -- and then you talk about the oxygenation levels that we're talking about. Does that provide any sort of redundancy or margin of error in this?

A. Well, if there is any -- The oxygenation levels aren't going to do anything -- or much -- to get rid of H_2S. The chlorination of that is going to get rid of the H_2S.

But if you keep the pH at 7 or above, and if there is some H_2S present, 50 percent of it's going to be as H_2S; the rest of it's going to be as HS. And -- which makes it easier to treat. And if there happens to be some extra -- some overtreatment of the trucks coming in, you've got a little extra chlorine to help get rid of that H_2S also.

The oxygenation is going to keep any additional H_2S from being created anaerobically.

Q. I guess what I'm saying in all this is, if we meet -- We're talking about a combination of standards, and you can't -- if I'm not mistaken, you can't isolate any one part of the system and say, we'll look at this alone; but rather we look at the total system's purpose. Does it create an element of redundancy which, in fact, can meet contingencies that might come up, for example, something getting into the pond or --

A. Certainly.

Q. So -- Mr. Cheney, for example, talked about the one-pump system, the -- what do you -- I think the gross -- What do you call it? The gross bubble? The large-bubble system?

MR. HORNER: Coarse?

THE WITNESS: Coarse-bubble.

Q. (By Mr. Stovall) Coarse-bubble. "Coarse" is the word I couldn't think of.

The coarse-bubble aeration system is meeting a certain demand, and then we're -- kept the demand down. It sounds to me like there's a rather substantial amount of --

A. In my opinion, there is enough redundancy in the pond design to make it safe.

Q. And I guess, again, focusing back on the issue as a regulator, there is the ability to determine that the conditions necessary to prevent the H_2S from developing -- Are there relatively simple measurements of levels of certain components of the water?

A. That's correct.

Q. And you can -- If you set those standards correctly, as we are attempting to do here, then what you're going to do is, you're going to start treating the water before you reach a situation where H_2S begins to develop in any sort of dangerous levels; is that correct?

A. That's correct.

Q. And so that -- If we set those standards correctly, then we can prevent harmful levels of H_2S from ever escaping the property into neighboring properties; is that correct?

A. That's correct.

Q. Do you believe -- Now, we've talked about, at this point, a .5 residual oxygen level in the water, a pH of 7, and the testing as you've described it. Are there any other standards which should be identi- -- Zero levels of H_2S in the water introduced into the facility, into the pond. Are there any other numbers that should be included in that criteria?

A. You said dissolved sulfides -- or hydrogen sulfide in the water in a weak condition? I don't remember if you just said that or not.

MR. HORNER: No, I don't think he did.

Q. (By Mr. Stovall) No, I'm not talking about the testing, the treatments here, or anything else. I'm talking about the levels that we're -- the target levels we're aiming for -- is a .5 parts per million oxygen, residual oxygen --

A. Okay, right.

Q. -- a 7 -- pH of 7 --

A. Right.

Q. -- a zero parts per million of H_2S in either the water in the pond or in water that's admitted to the pond.

A. Correct.

Q. Are there any other types of measurements and levels of components which should be determined to adequately protect from the buildup of H_2S?

A. Right off of the top of my head, I can't think of any.

Q. There has been some talk and some concern expressed here about the sludge issue. Does that concern you?

A. I'm not sure what all the talk -- I'm not

sure how people are defining sludge. I know what a sludge is, to me.

Q. What is a sludge, to you?

A. A sludge is a gooey, tank-bottom-type substance.

Q. Okay.

A. That would not be a concern to me in this pond, no.

Q. Why is that?

A. I -- there won't -- I don't believe there will be any.

Q. That gooey, tank-bottom -- What's in that gooey, tank-bottom substance?

A. Oil, it's oil.

Q. Oil?

A. Hydrocarbons.

Q. On the bottom?

A. I don't believe there would be any. That's why I say it's not a concern to me in this pond.

Q. What about blow dirt and stuff like that?

A. You may have some sand, you may have some blow sand get in there, you may have some precipitated salts on the bottom.

A pond that we did test, we looked for sludges on the bottom, and it came out a very foggy,

cloudy water, and that was what was determined sludge by somebody. I didn't -- I wouldn't have called it sludge, but that was called sludge.

Q. Well, I think the concern that was expressed here is that whatever we're calling sludge -- and you've now told us what your concept of it is -- is that it's -- the presence of something like that creates conditions more likely to become anaerobic and allow the bacteria to generate. But what you're saying is that you don't believe there's going to be any of that buildup on the bottom to begin with; is that correct?

A. I don't believe there's going to be a viscous enough buildup on the bottom of the pond -- other than blow sand, and blow sand is just, you know, it's not even viscous; it's a solid -- that cannot be circulated or moved or agitated with the redundant systems that are in here to create an anaerobic condition in the bottom of the pond.

Q. Is there any sort of testing or monitoring or measuring of that, that you feel might best be undertaken?

A. I'd have no problem with, you know, seeing a requirement of them after a certain period of time in the life of the pond, say a year, to take a thief that

can collect water, go down to the bottom and scrape -- carefully, without hurting the liner -- scrape the bottom and see what's down there and determine what's down there.

If there is something like a, quote, sludge on the bottom, then I believe that that kind of thing, you now, depending on the depth of it, probably some mechanism at that time would have to be developed to make sure that that does not create an anaerobic environment, whether it be a different type of agitation or a cleanout.

Q. Is that something -- It sounds like we're going to have a gang of thieves here if we're not careful.

Is that something that should be included in the Order approving this facility, assuming there's one issued, or is it something that would be part of the ongoing regulation of the facility?

A. I don't know whether you would want to put it in Order and make it an ongoing maintenance-type regulation, regulation maintenance of it.

If you did want to put it in an Order, it would have to be some future date, and that would depend on the volumes taken in, the volume of the pond at the time, how much water they've evaporated. It

would depend on an awful lot of variables as to when you would want to check for a sludge.

Q. Sounds to me like there are a lot of things dependent upon variables in this situation.

A. The pond -- A lot of the things are based on assumptions that we're recommending for this pond. They will be further refined as the pond -- if it's approved -- as the pond operates, to determine -- And, you know, requirements change, treatments change as we know what the fluids are that are in the pond and how the conditions are being met, how the permit conditions are being met, and if they are being -- and if they can be met.

Some of them -- I assume all of them can be met, or they won't operate. There may be additional conditions as additional information is known about the waters that come into the pond.

Q. Are you saying you'd like the Order to provide for the administrative authority to modify the operating conditions to meet their requirements based upon what actually -- the actual experience, rather than the assumptions that are taken into account at this time?

A. For expediency measures, I think that would be -- that's a good recommendation.

Q. Again, in that process of making these recommendations, the objective again is still to meet -- maintain these standards that are established to prevent the development of harmful substances?

A. That's correct. Those standards -- I'm not going to say they can't -- they shouldn't -- they won't change. If they do change, they'll just go down. That's obvious; nobody ever raises standards.

Q. And they would only go down if it were -- could be shown that they could be down without harm; is that correct?

A. Well, I meant like -- such as if that 10-part-per-million require- -- public emergency reporting requirement may go down to 5 parts per million.

Q. Let's discuss that a minute, because I don't think we covered that. Would you address that?

A. Oh, that's part of the H_2S contingency plan, .1 part per million -- at 10 parts per million at the fenceline they have to notify emergency personnel and evacuate the area within a mile, I believe it was.

Q. Now, are you going to -- We're measuring, now, the .1 part per million at the berm. Do you have any feeling about whether you have a -- this emergency notification, do you want to leave that at the fenceline, or should that go to the berm as well?

A. I think we should leave the emergency -- the requirement at the fenceline. However, if -- Because it would be higher at the berm anyway, if the operator would rather -- or wishes to measure it at the berm and notified at the 10 parts per million at the berm, I have no problem with that, as long as it's -- that the requirement is, as soon as it hits 10 parts per million at the fenceline.

Q. Okay. The requirement is that 10 parts per million at the fenceline, they are required to notify all of the agencies listed, and I believe there is one we talked about -- I don't -- If I remember correctly, it was EID, the Environmental Improvement Division, needed to be added to that list --

A. Yes.

Q. -- but that's in the record, I believe?

A. Yes, that's true. But that's the kind of measurement, I say, that when it -- We can become more stringent on the requirements.

Q. So when you're saying go down, you mean lower the number at which this -- which is the threshold?

A. Become more stringent on our requirements. Nobody ever becomes less stringent anymore.

Q. Okay.

A. We always become more. And with new

technology and the Center for Disease Control would come up and say that, you know, 10 parts per million is hazardous to your health, and we we'd go down to 5, or something like that.

Q. But hopefully we're going to prevent that by not letting it get above .1?

A. That's right. Those are just contingency plans, just in case something unforeseen happens.

Q. Something of a rather major nature, it sounds like to me; is that correct?

A. It could become a major nature if it did happen.

Q. I mean the -- What I'm saying is a system breakdown of a major nature to allow levels like that to --

A. Certainly.

Q. -- not the harmful effect of it, but rather the...

I talked briefly early in this hearing about accumulations of oil in the water. Is that a concern to you?

A. I would recommend that no oil be allowed on the main pond, zero oil whatsoever.

Q. And if any oil is determined, even a sheen, that it be removed immediately?

A. That's correct. The oil in the skimmer ponds, I also recommend that they net those skimmer ponds for the protection of wildlife. If oil does show up in the main pond, I recommend that the main pond be netted.

Q. Or the oil removed immediately, does that satisfy --

A. If the oil can be removed immediately.

Q. And when you're talking about netting, you're talking about in accordance with the Migratory Bird Protection Requirements of the OCD Regulations?

A. That's correct.

Q. So you're suggesting that the skimmer ponds be netted, because you expect to have oil on those?

A. Yes.

MR. DEAN: I'd like to say for the record, we're not going to have -- We've taken that out. There aren't going to be any skimmer ponds --

THE WITNESS: No.

MR. DEAN: -- as I recall.

THE WITNESS: The -- If you're meaning --

Q. (By Mr. Stovall) That's right, we're talking -- You suggested tanks, did you not?

A. I'm talking about these skimmer tanks.

MR. DEAN: Skimmer tanks, okay, if they're

open.

THE WITNESS: If they're open-topped.

Q. (By Mr. Stovall) And greater than 16 feet in diameter, I believe, are the regulations; is that correct?

A. Yeah, that's --

Q. Netted in accordance with OCD requirements, I think, is --

A. That's correct.

Q. -- what we're stating.

There's some discussion also -- We're talking about the aeration system now, and I think we've established that there's going to be a floating aeration system and then a perimeter aeration system -- I mean, excuse me, evaporation system, spray system.

And there again, I think there was some concern expressed about, you know, the effect of wind of that and the carrying of these sprays off on to adjacent properties. Do you have any recommendation with respect to that operation?

A. I would recommend that in the Order, the Order contain the same conditions we require on all other pits that are administratively approved, that the spray system be operated only at times when the facility is manned, and with the assurance that no

spray leaves the confines of the berm itself. Not even fall on the berm; it has to stay in the confines of the lined portion of the pond.

Q. So in other words, if the wind's blowing from the north, you shut off the south-side spray system, and then if the wind is blowing strong enough, you even shut off the north-side spray system so that it doesn't carry across the pond --

A. That's correct.

Q. -- beyond the confines of the pond?

A. That's correct.

Q. Does that concern you with respect to the mixing and oxygenation of the water, now? You've got one system that's having to be shut down and then -- but yet you've indicated that that system is part of another purpose as well. Are there any concerns there?

A. I -- It would take a long -- You know, you'd have to have an awful long windy period to keep the spray system off continuously, I believe, to make any difference in the mixing. You have enough redundant systems in there.

Plus there are methods on the -- the perimeter spray system -- that they can go from a spray to a hose-type configuration where it shoots it out in one stream. And that still continues to circulate, but

it's not sprayed out for evaporation purposes.

Q. It's a heavier stream where there's --

A. Certainly.

Q. -- less surface area?

A. Just take the spray nozzle off the end of it and let it come out the -- it's a regular pipe. And yet you'll still -- You won't get the spray leaving the confines of the berm, but you'll still get the circulation.

Q. And that would be a system that would probably -- what? Be operated when you had the high-wind conditions for several days and you --

A. Certainly.

Q. -- weren't able to operate the sprayers?

And again, you'd be -- Would you make that determination based upon the oxygen levels in the pond, for example?

A. At the bottom of the pond, when they take the dissolved oxygen levels, if it starts falling, then they can -- then that decision would be made at that time.

Q. Again, what you're going to do is, you're going to make a decision that we need to get the oxygen level back up. It's not a matter of how we do it, but the fact that we do it; is that correct?

A. That's correct.

Q. I say "we." I'm referring to the regulatory agency in conjunction with the operator maintaining the levels.

A. That's correct.

Q. Let me back up for one second. One thing I neglected to ask you about with respect to the design of the aeration system, and I don't want to get into that too much because I think that's the results of the design, but Mr. Cheney this morning talked about and used an assumption of, in addition to the .5 residual oxygen, a 1-part-per-million oxygen demand on the system.

Do you have any recommendation as to whether that kind of number, a demand-level number, should be placed on the design criteria?

A. I believe that that is a fair initial assumption, and that would be, you know, taking that to start with.

I believe that the system should be designed in case that isn't the right number, if it could happen to be more, that they have the capability of adding more horsepower to impart more oxygen into the water.

But I think it's a fair assumption to start with, not knowing the condition of the water that's

going to be in that pond yet.

Q. And when you say the ability to add more horsepower to the pump, there's also some discussion that the piping system that gets that -- distributes that air through the system -- has to be big enough to accommodate the additional horsepower; is that correct?

A. That's correct.

Q. And would that be one of the things that, if there was a requirement of engineering review, that the engineer express an opinion as to the ability of that system to --

A. Yes.

Q. -- to be increased, if determined necessary?

A. Yes.

Q. Now, we talked -- There was a little bit of discussion previously about precipitates coming out of the water that's being evaporated through the spray systems. Do those cause you any concern?

A. Over a long period of time, if the pit was going to be in operation for, you know, 30, 40, or 50 years -- I believe the lifespan, the designed life capacity of this, you made it 11 years, I believe. The salt precipitate is not going to cause -- doesn't cause me a concern.

Q. If, in fact, you operate the sprayer system

so that no spray water ever leaves the confines of the pond, is that likely to keep the precipitates within those confines as well?

A. It will, yes.

Q. The part of the contingency plan on the H_2S situation involved maintaining, I think they said, 1000 gallons of chlorine on site and that, chlorine being somewhat unstable, they would put that in the pond and then refill the emergency chlorine supply. Is that correct? Do you understand that to be correct?

A. Yes.

Q. Do you approve of that?

A. Yes.

Q. Do you recommend that that would be an appropriate measure?

A. I think it would be.

Q. There was some discussion about the availability of additional chlorine, should there be any need. Do you have any recommendations as to what would -- what might be necessary or what should be imposed as a requirement?

A. If -- I think they -- I believe that they said they could have 5000 gallons a day -- I don't remember where it came from -- each day delivered to the facility as a backup in the event of emergency.

If the pond -- If each load going into the pond is treated, each time it goes into the pond, if the oxygen level is kept -- dissolved oxygen is kept at a residual of .5 parts per million, there should not be a large enough problem to require more than 5000 gallons to treat any -- the pond at any one time.

Q. There wouldn't be a need for that much at any --

A. There shouldn't be a need for any emergency supply, but 5000 gallons -- If there was an emergency, 5000 gallons should be enough to take care of it.

Q. Some discussion about -- and we've, in fact, got in evidence a résumé of the proposed safety officer. Now, do you have any recommendations with respect to any training that might be required of any personnel operating the facility?

A. I think the people who are operating the instrumentation, testing instruments, should be trained on those instruments to be able to operate them properly and read them properly.

Obviously, the person operating the chlorine injection pump needs to be trained on that for safety reasons. Not just for safety reasons of keeping H_2S out of the pond, but for his own personal safety.

I don't think anything other than that, plus

the normal OSHA requirements, I can't think of anything.

Q. No particular certification or anything of that nature --

A. No.

Q. -- that you think is -- should be maintained by personnel?

A. No.

Q. Let me go back to, again -- Because we're recommending certain standards, the personnel operating the system should be an integral part of this integrated system, and if there's a human failure at some point with the monitoring that's going on, we should be able to determine that before any serious hazard is created; is that correct?

A. Yes.

Q. I'm going to get back a little bit into the water-level issue and concerns, in a different vein. Some discussion about this. It's ultimately designed as a three-pond system, and I believe Mr. Horner raised some concerns about where are we going to go with the water. I think we addressed some of those, and again, with Mr. Olson I'm going to address some additional concerns.

But one of the matters raised was having a

second pond available for some sort of contingency in the event of any leak. Do you have any feeling or recommendation on whether that's necessary?

A. I -- You know, truthfully, I can't recommend that that be a requirement. I don't really see the need for it.

Q. Should they -- Are you saying that there's no point at which they should be required to either line the second pond or build and line the third pond?

A. When their pond is to the freeboard level, the pond that they're disposing into is at freeboard level, it's going to become an economic decision to -- whether to line or not line that pond, because they cannot go above freeboard.

Q. And what is freeboard? What is the level that you're talking about?

A. Freeboard is a foot and a half below the top of the berm.

Q. In other words, they're not allowed to take any water in above that, free water above that?

A. That's right. Once they hit that, they have to stop taking fluid in until it goes down below it. That's an economic incentive to go ahead and line that second pond.

When the finances start drying up because you

can't accept any more fluids, if you want any more fluids you have to line the second pond. And I don't believe that -- you know, even with the enhanced evaporation, that if there was a massive leak in both liners, which I don't -- you know, which is a remote possibility at best, it wouldn't go anywhere. And Mr. Olson will testify to that.

I don't think we should require -- No, that's an economic situation, and I can't get into the economics of the company.

Q. You don't feel it's necessary as a matter of protecting the fresh-water, ground-water situation, that that's --

A. No, I don't think that has any impact on that.

Q. -- necessary to have that reserve facility?

Let me just look through my notes for just a minute here and make sure. I believe I'm just about through with Mr. Anderson.

Oh, one little area I want to touch into, simply because it's been admitted into the record. We had some discussion about the Basin Disposal Facility and the litigation, and we've got a copy of the findings of fact and conclusions of law and judgment in that case. Are you familiar with that case?

A. Yes, I am.

Q. Have you read the findings and conclusions?

A. Yes, I have.

Q. When? When did you first see those?

A. Last Friday.

Q. When they were introduced in this hearing; is that correct?

A. Correction on that. I saw the whole, complete thing last Friday. I saw excerpts from it from Mr. Horner's protest letter when he first filed that.

Q. Is Basin a facility that's permitted by the OCD?

A. Yes, it is.

Q. Do you know when that was permitted?

A. 1985. I was not here when it was permitted.

Q. Let's start out with the initial question. Is there any difference in the legal authority and responsibility of the OCD between that time and today?

A. Oh, yes. Basin Disposal was permitted with only ground water in mind, ground-water protection in mind, period. Nothing else was taken into consideration.

Since that time and since the -- their problem that we investigated, we have tightened up our

regulations and added a lot of new requirements to the facility, plus it's also under -- I believe it's the Solid Waste Act of last year --

Q. I believe that's correct.

A. -- that added health and environment and solid-waste disposal authority for the protection of health and environment to the OCD's jurisdiction.

Q. So in other words, what -- If I understand what you're saying correctly, from your interpretation of the statutory authority, that this addition to the statute, we can look at more factors than merely potential harm to ground water or fresh-water supplies --

A. That's correct.

Q. -- as we permit the facility.

Are you familiar with the Basin operation itself?

A. Yes, I am.

Q. And how have you acquired that information?

A. Through investigation of problems or through compliance inspections of their facility before their H_2S problem and compliance inspections after the final decree.

Q. Is there -- Is this facility the same as Basin, as proposed?

A. The only similarity is that they're both lined ponds, and they both produce -- and they both accept produced water.

Q. And the dissimilarities, the big ones, the ones that really make a difference in terms of the --

A. This has designed in it --

Q. -- health and safety issues?

A. -- a number of redundant systems to eliminate the problems that Basin Disposal had.

Q. Now, have you -- Are some of your evaluations and criteria based upon what you've learned from Basin; is that correct?

A. Yes, I'd say a good portion of them were based on the investigation we conducted back in 1987, 1986 and 1987.

Q. And so the objective here in the standards that we're establishing is to avoid conditions which could result in what happened at Basin; is that correct?

A. That's correct.

Q. And these evaluations and changes and additional criteria, are they based upon the judgment itself and the findings of the court?

A. No, they were not.

Q. What are they based upon?

A. They were based on our education through the investigation of the Basin problem.

Q. The actual facts of what was happening at the scene, not by the fact-finder's determination in the court proceedings?

A. That's correct. The requirements that we now have were made before we saw the judge's decision.

MR. STOVALL: I have no further questions of Mr. Anderson at this time.

EXAMINER STOGNER: Thank you, Mr. Stovall.

Mr. Dean, I'm going to let you cross-examine Mr. Anderson first.

MR. DEAN: I don't think I really have very many questions at all.

EXAMINATION

BY MR. DEAN:

Q. The one thing that seems to be the common thread in your testimony, Mr. Anderson, other than what you've already said in the letters and the very few changes you've made, are that a whole lot of this is going to -- is subject to some modification, based on the actual operating experience in this pond; would that be fair to say?

A. That's correct.

Q. I assume that doesn't apply to H_2S standards.

But for instance, the measuring requirements, twice a day and that kind of thing, would there be something that you could foresee, that once this pond was started up and the testing was going through, that you might lessen those requirements or strengthen those requirements? They seem awfully often on some of them, twice a day and --

A. Some of them could be -- The monitoring requirements could be relaxed. I don't foresee an instance where we would relax the monitoring for the H_2S emission.

Q. Well, I meant to exclude that in the question, so --

A. I could foresee with a full pond with dissolved oxygen content remaining steady for a set period of time at .5 and not fluctuating from that, that, yes, the measurement of dissolved oxygen could be relaxed.

Q. I know it was twice a day, and I assume -- I don't know how fast that dissolved oxygen level changes it, but can it be a rapid change when the pond is half full?

A. It could be a rapid change, and that's why we'd want it twice a day for an initial period of time, to determine if that does change like that, if in this

environment it would change.

Q. Excluding any H_2S monitoring requirements or testing requirements, for instance the pH at 7, Mr. Cheney recommended -- talked about 5. Could there be a situation in the future where that requirement could change either up or down?

A. Yes, there very well could be, very easily could be. I don't see it going down. I could see the requirement possibly going up.

Q. All right. And a lot of that depends on the actual operating conditions?

A. That's correct.

Q. And you would recommend that this Order, if there is an Order allowing the pond under whatever conditions, that the administrative agency be allowed some flexibility in changing some of those standards --

A. Yes, I --

Q. -- or operating conditions?

A. Yes, I would.

Q. I was unclear on the fenceline part of the -- I looked through the test. I can't tell from the letter. Is it your recommendation that they test at the fenceline on a regular basis --

A. I --

Q. -- or just if they get a reading of .1 at the

berm?

A. I believe -- Now, we're getting into a legal interpretation of our authority. I personally would like to see measurements at the berm. That gives more reactive time.

Q. Okay. And I took it that it would be -- to tell me your recommendation if you started to get readings at the berm, that you would want some testing at the fenceline --

A. Certainly, yes.

Q. -- maybe depending on what the readings at the berm would be. That would be something else you might want to implement --

A. Yes.

Q. -- when you hear about it?

A. Yes.

Q. Okay.

A. You get into the legal part of it, as what leaves the fenceline and what you can do on your own property, and I'm not clear on all that.

MR. STOVALL: Well, I believe what Mr. Dean is asking is that -- And I think it's a fair question, if I may restate it, Mr. Dean -- is that -- are you recommending -- If testing is done at the berm on a daily basis as you recommend, do you believe it's

necessary to do testing on a regular basis at the fenceline as well?

THE WITNESS: Not if you don't get any readings at the berm.

MR. STOVALL: And if there's any reading at all at the berm, should you -- If you reach the .1-parts-per-million reading at the berm, then you should begin testing at the fenceline; is that --

THE WITNESS: Then I believe you should begin testing at the fenceline to document what may be leaving your property.

Q. (By Mr. Dean) A lot of these things also depend on the volume of the pond. Obviously -- It seems obvious to me as a lay person that as the pond is filling up, some of these requirements are easier to meet and probably easier to change if they don't meet your standards; is that right? Rather than -- as opposed to being completely full with 6-1/2 million gallons of water?

A. Right. I don't know --

Q. For instance, if the pH goes to 6 and the pond is half full, is it easier to change it then as opposed to the pond being full?

A. Oh, certainly, yes.

Q. Okay.

A. Take less material and less circulation time.

Q. Another time reason that there should be some flexibility in some of these --

A. Yes.

Q. --requirements, the volume in the pond?

A. It's also a lot easier to measure some of these things when the pond is full than it is when it's -- because it's awful slippery sliding down the side of that pond to the fluid level.

MR. DEAN: We need a longer thief.

I don't have any other questions.

EXAMINER STOGNER: Why don't we take about a ten-minute recess before we start with Mr. Horner's cross-examination.

(Thereupon, a recess was taken at 2:50 p.m.)

(The following proceedings had at 3:03 p.m.)

EXAMINER STOGNER: This hearing will come to order.

Mr. Horner?

EXAMINATION

BY MR. HORNER:

Q. Okay, Mr. Anderson, you started testifying about H_2S requirements in OSHA, 20 parts per million, et cetera. Did you take into consideration the State of New Mexico H_2S air-quality standards as set forth by

the EIB?

A. No, I did not.

Q. So are you familiar with the .01-part-per-million standard in Air Quality Control Regulation 201 from the EIB?

A. I know of it, yes.

Q. But you chose not to use it here; is that correct?

A. That's correct.

Q. Why is that?

A. Because we are not authorized to enforce air-quality standards, the State.

Q. Okay, but you're trying to consider what standard is most appropriate to use here, are you not?

A. For the -- not for air quality -- for air pollution, but for human health standards.

Q. Okay. But still, you don't think that EIB Air Quality Control Regulation 201 should be considered with regard to human-health standards?

MR. STOVALL: I'm going to object. You've already testified that the air-quality standards are -- we do not enforce those, and Mr. -- I mean as a matter of practice -- and Mr. Anderson stated that zero is the level we're seeking, which is somewhere below the air-quality standards.

EXAMINER STOGNER: Mr. Horner, do you have a response to Mr. Stovall's objection?

MR. HORNER: Yes, I do. As a matter of fact, we go on here. They try -- They're trying to maintain zero, but then they go on and they don't do anything until they reach 10, which is 1000 times higher than the New Mexico published Air Quality Control Regulations, and it seems to me that if you're looking for numbers to use you should be looking at the EIB numbers that are published and are standards within the State of New Mexico and that you shouldn't be arbitrarily picking a figure that is a thousand times higher than published New Mexico standards.

MR. STOVALL: Mr. Examiner, my response to that is, if there is an EIB issue involved in here, EIB is responsible for enforcing those regulations and we can neither enforce nor authorize abrogation of those standards. If EIB is implicated, then that may be an additional factor.

EXAMINER STOGNER: So be it. Objection sustained.

Mr. Horner?

Q. (By Mr. Horner) Okay. Are you familiar with EIB Air Quality Control Regulation 627 that limits stack emissions in the effluent stream to 10 parts per

million?

MR. STOVALL: Objection, we don't have anything in this that it's a stack emission or --

EXAMINER STOGNER: Sustained.

Q. (By Mr. Horner) Okay. Now, you talked about we should have no measurable level of hydrogen sulfide in the fluids that are discharged in the separation tank, correct?

A. That was my recommendation, that there be no measurable hydrogen sulfide going into the separation tank.

Q. Okay. And then I believe that you testified that the equipment that you are familiar with doesn't measure below .1 part per million; is that correct?

A. No, that's not correct.

Q. Okay, how low does your --

A. We are talking of two different types of equipment. The equipment we have is an air monitor. We're talking about dissolved or suspended H_2S, which can be either meter or titration, depending on what equipment they decide to use.

Q. Okay, titration is what?

A. It can go -- It depends on the equipment that they use.

Q. Well, what is titration?

A. Oh, titration is the addition of another chemical into a known volumetric sample with a color indicator in it, and as soon as that color indicator changes, it can back-calculate to the volumes of H_2S that are in the water.

Q. So what levels can you measure using your titration method?

A. That depends on the equipment that they get. There are varying types of equipment, varying detection limits.

Q. Do you have certain of this equipment on hand now?

A. We do not, no.

Q. Okay. Well, I'm trying to get a feel for, can you measure below .1 part per million with this type of equipment?

A. I'd have to look at the -- go back to the lab-supply catalogs and take a look and see what their measurable limits are. If I remember right, the one I looked at with a Hach kit, you can't. There is a Cole Palmer instrument that you can get below .1 parts per million, yes.

Q. Okay. Can you measure below .01 parts per million?

A. I don't believe there is an instrument in the

world that can measure below .01 parts per million. Yes, there is. I take that back, there is. You can use it with the GCMS, you can get below .01 parts per million.

Q. GCMS, is that a make of equipment?

A. That's a gas chromatograph.

Q. Okay. Now, have been we talking here about equipment that will measure hydrogen sulfide levels in both water and air, or do we have a difference in --

A. They're separate pieces of equipment.

Q. Okay, they're separate pieces of equipment, but are you still constrained by the same limits of your equipment, down to approximately .1?

A. Oh, certainly, yes.

Q. Okay. And so neither can -- are good below .01, to your knowledge, then?

A. I am -- In the air, if you're measuring air concentration, there is not a piece of equipment that can measure -- In fact, I don't even think there's a piece of equipment that can measure the air-quality standards, that I know of.

Q. The air-quality standards?

A. .01 parts per million. I have not found one. But now you're talking about something when you're measuring the dissolved H_2S in the water. That's a

different measurement system.

Q. Okay. Now, I believe -- Well, I'm not sure that we have any recommendation from you yet regarding whether or not we should have an engineer certify that this particular design or any particular design for these types of facilities will meet the recommendations that you've come up with. Is it your opinion that that should be a recommendation?

A. For all facilities that -- or just -- Are we talking about this facility?

Q. For the design of these toxic facilities, specifically with regard to this facility.

A. I'd say that's a two-part question, I would guess, and I think Mr. Cheney as a registered engineer is certifying this facility, so that question is answered with a yes because he's doing it, he's going to do it.

Q. Well, maybe he's going to do it, but that hasn't been a requirement yet, so he may not necessarily do it. Would you recommend that he certify the design of this facility?

A. I may be mistaken; I thought through testimony he just did.

Q. I'm not -- I don't believe he did.

MR. STOVALL: Well, the record will speak for

itself, Mr. Examiner.

MR. HORNER: Okay, what does the record say?

MR. STOVALL: I'm going to have to read the transcript.

MR. HORNER: Can you go back through the record and find out whether Mr. Cheney has --

MR. STOVALL: I'm going to object further to this. The question is whether Mr. Anderson recommends that this be required. I asked that question earlier, and I believe Mr. Anderson's statement was that --

THE WITNESS: -- that I have no problem.

MR. STOVALL: -- you have no problem with saying that.

THE WITNESS: You know, if that's what is determined, I wouldn't complain about having a registered engineer. I'm an engineer, so I don't mind the engineer welfare act.

Q. (By Mr. Horner) So now, do you see a potential problem with this facility regarding algae control?

A. Regarding what?

Q. Algae control?

A. To be perfectly frank, I never thought about it.

Q. Should that be considered?

A. I don't know. Like I said, I never really anticipated, I never considered algae.

Q. Okay. If, in fact, hydrogen sulfide is found in the pond, would it be reasonable to recommend a time limit or time frame in which that hydrogen sulfide is eliminated?

A. I don't know that you can. I believe that it ought to be -- I would recommend that it be eliminated as soon as possible. I'm not sure, you know, what time frame you could put on it. It depends on the concentration of the H_2S that's in the pond. It depends on the emissions.

I understand your question, and I agree with it, but there -- but I'm not sure what time frame you could put on that. You know, there are certain variables that you can't anticipate.

Q. Well, you asked initially that the pond be lowered below a level of a leak within seven days and then come back and say it may take as long as nine months, and so wouldn't it be reasonable to impose some sort of time limit on getting this hydrogen sulfide problem under control?

A. I think a reasonable time, you know, is logical. Nine months would be utterly ridiculous to remove H_2S from the pond. But, you know, I'm not sure

what to propose, whether it be one day or two days or three days. It all depends on the volumes involved and the concentrations of the H_2S and how much is actually being emitted, the concentrations of the H_2S in the pond.

Q. Well, would something on the order of three days be reasonable?

MR. DEAN: I'm going to object. He's asked and answered the question. He doesn't know.

MR. STOVALL: For the sake of addressing an issue which appears to be important here, if you don't mind, Mr. Horner, I'd like to ask another question to follow up yours and get to what you're talking about, because I think it's a valid point.

Rather than recommend a time frame for the elimination of H_2S, do you ever -- would you make a recommendation as to the implementation of measured design to eliminate the H_2S, as to what time frame they should be begun and how long continued, and --

THE WITNESS: I could -- That would probably be a better time requirement to put on it, is the implementation, such as, you know, if they find H_2S in the pond, that they immediately order that backup 5000 gallons of industrial-strength sodium hypochlorite and immediately put it in the pond. I'd say, you know,

what -- But how do you define "immediately"? To me, that's the minute find something, you start working on it.

MR. STOVALL: And again, let me follow up with a question. They're going to require immediate notification or 24-hour notification, at least, to the OCD; is that correct?

THE WITNESS: No. No, sir. No, sir. That's 24-hour notification if they find fluids in the leak-detection sump; it's immediate notification if they find -- if they detect H_2S in the atmosphere.

That immediate notification, to me, means their operator goes out there and he catches a reading, he goes back in, and he calls the headquarters, and they call us immediately, day or night.

MR. STOVALL: So you're going to be involved -- The OCD will be involved in the implementation of an elimination program?

THE WITNESS: We're talking about an hour, no more, once they find H_2S.

MR. STOVALL: All right, I'll let you go from there, Mr. Horner, but I hope that helps to focus on that. I think it's an important issue.

Q. (By Mr. Horner) Well, do you see a problem in that you just told Mr. Coleman that if H_2S is found

in the water he has no time limit in which to eliminate it?

A. No, I don't find a problem with that, because that would be -- That would also be worked on while on site, and at the notification.

As an example, hypothetical situation, he gets his second -- They get their second reading -- They get their first reading, an hour later they take their second reading. Five minutes later our district supervisor is notified of H_2S present. The district supervisor says, you dump your 500 gallons in the pond now. They do that.

They call us, we go up there. The next morning there's still H_2S, they've got their 5000 gallons on the road and we don't think it's going to take it, we're going to tell them right there, you get you another 5000 gallons now.

See, it's going to be on-site control by the OCD. That's my recommendation, on-site -- instantaneous control, or as near instantaneous as possible. Travel time to get up there, and that's about it.

Q. What is your understanding of the holding capacity of bleach on site?

MR. DEAN: I'm going to object; it's in the

record.

EXAMINER STOGNER: Overruled. Mr. Horner, go ahead.

Q. (By Mr. Horner) What is your understanding of the holding capacity of the bleach on site?

A. I thought it was 500 gallons.

Q. 500? I thought you were talking on the order of 5000.

A. That's their contingency from -- that they can get in a day's time.

MR. STOVALL: Mr. Horner, if I may correct Mr. Anderson, I think, if I'm not mistaken, the record says 1000; is that correct, Mr. Anderson?

THE WITNESS: It is 1000.

MR. STOVALL: On site, a storage of 1000 gallons --

THE WITNESS: That's right.

MR. STOVALL: -- and 5000 available --

THE WITNESS: My mistake. It's 1000 on site --

MR. STOVALL: -- on order?

THE WITNESS: -- and that can be dumped in immediately, or whatever's left in it, and the 5000 brought up within 24 hours, I believe it was.

Q. (By Mr. Horner) Okay, with regard to the

readings you're taking on the berm of your hydrogen sulfide, would it be reasonable to require that the location of the reading that was taken be specified and the wind direction and velocity at that particular time?

A. Yes, it would be.

Q. Okay. Now, you've stated that in this particular instance, that there's enough redundancy in the pond design to make it safe. The redundancy that you're talking about, I'm assuming, is the fine coarse -- or the fine bubbler and the coarse bubbler and the spray system?

A. And both spray systems, and the treatment of the fluids before they get into the pond.

Q. Okay. So -- And that would be the -- on the fine bubbler, a pump of approximately 32-horsepower, I believe, is where we are?

A. I wouldn't -- You know, I have no -- That's design characteristics based on the requirements that we're going to have to give them. That would be design characteristics. I believe they didn't state in the record that they were going to put a 32-horsepower motor on that. I don't -- I don't think they said that.

Q. Well, if your statement is that there is

sufficient redundancy, wouldn't that be based on the fact that you have seen or heard information to indicate that there is sufficient redundancy?

A. There is sufficient redundancy in systems, with those systems designed for the conditions of the pond. And if I remember right, I stated that -- such as the coarse bubbler needs to be designed sufficient to where it can be increased if the 1-part-per-million oxygen demand is too low. The fine bubbler would have to be designed to be installed initially at a median of what it might be, say 1 -- It may want to impart an extra 1/2-part-per-million dissolved oxygen, but could be increased if need be.

That's the redundancy I'm talking about, plus the additional ability to hook up other equipment, whether it be gaseous addition to the pond or liquid addition to the pond.

Q. Okay. So if the types of systems are sufficient for redundancy purposes in this instance, is it your understanding that there has been proposed sizing for these systems at this point that can be accepted?

A. I believe that that will be -- I believe they proposed something, and that would be up to the Examiner whether he accepts that or not, or increases

it.

Q. Well, do you have a recommendation as to whether or not what has been proposed is sufficient at this point?

A. I have a recommend- -- and I don't know, I don't remember what the size and the capacity of the piping is that was put in there. I don't remember. But I would say that if it was designed -- say the coarse bubble was designed for 96-horsepower -- that it should be able to carry something larger than that in case it's needed. It's just the addition of making it bigger.

Q. The piping system?

A. The piping systems.

Q. So the piping --

A. The same thing with the fine bubbler.

Q. So that you're stating, then, that the piping system should be designed to have a capacity in excess of what a 96-horsepower pump could put out?

A. In excess of what the initial estimate of what is required for retrofit for larger equipment.

Q. Okay. Do you have an opinion as to whether or not the 96-horsepower pump will be sufficient?

A. No, I don't.

Q. Would you recommend that designs be submitted

and you have the opportunity to review them before a decision is made with regard as to their sufficiency?

MR. DEAN: I'm going to object to the question as vague. Designs of what? I mean, the question is so broad, Mr. Examiner, I'm not sure the witness can answer.

EXAMINER STOGNER: Do you want to restate your question, Mr. Horner?

Q. (By Mr. Horner) Okay, would you recommend that designs be submitted for your review of the aeration systems, piping schemes and motor sizes before those systems be approved by this board?

A. I think they should be submitted at the time of the hearing, and I believe they have been, haven't they?

Q. Have you seen any drawings regarding the aeration system?

A. I saw the aeration system in the initial submittal. I was not here for the first day, so I don't know if those were changed or not.

Q. Do you recall the horsepower size of that motor?

A. I believe it was -- I believe for the main system it was 32-horsepower.

Q. Could it have been 1/3-horsepower?

A. For the coarse-bubbler system? No, I don't believe so. For the fine-bubbler system it may have been.

Q. Could you review your information and see if you can find the design for those systems?

MR. STOVALL: Let me ask an intervening question.

(Off the record)

EXAMINER STOGNER: You were stating, Mr. Stovall?

MR. STOVALL: Oh, well, let me try to remember. It's been a long day.

You -- Mr. Anderson, in the alternative -- and I think I understand, again, where Mr. Horner is going -- do you believe that the Examiner should have at his disposal prior to approving the Application, a review of the system -- a system to review and to determine, make a determination whether it appears to be adequate or not? Is that correct? Is that what you're asking, Mr. Horner? Is that what you're --

MR. HORNER: That's pretty close.

THE WITNESS: I think the Examiner should have all possible information available to him to make a decision.

Now, as far a -- the actual specific design

of an aeration system, the conditions are set out as to what is required for that aeration system. Not the aeration system itself, but the end result of what that aeration system should be, such as the .5 parts per million of dissolved oxygen residual.

And as I stated before, I have no problem with the registered engineer certifying this or designing it or submitting it. I believe that as most practical registered engineers would overdesign a system so that there can be repetitiveness and there can be increases in what's needed because of the unknowns that are involved in there.

MR. STOVALL: Let me ask you a question at this point. Would it be appropriate in your opinion, given the nature of this proceeding, to establish those standards and require prior construction that a design be submitted and approved to meet those standards that are set forth? Because the standard is really the important thing; is that not correct?

THE WITNESS: That's correct.

MR. STOVALL: Would that be appropriate, in your opinion, to set that standard and then again require the review of the system to insure that it meets -- that it's capable of meeting the standard, subsequent to the actual hearing?

THE WITNESS: I think that would be appropriate to do something like that, yes. And that's generally what we do in the administrative process. We are -- It's common to go ahead and approve something, with conditions, and a condition can be that the -- say a -- or another system be installed and approved prior to the beginning of construction.

MR. STOVALL: Okay, that's all I have on that, that question, Mr. Horner, if you want to continue.

Q. (By Mr. Horner) Per your application process, you require that drawings of the ponds and the liner systems be submitted, don't you?

A. Yes, sir.

Q. Based on your guidelines of double-lined ponds or whatever --

A. Yes.

Q. -- correct?

A. Yes.

Q. Wouldn't it be reasonable to assume that designs of your aeration system be required with the application process?

A. Yes.

Q. Or at least --

A. Yes, it would be.

Q. -- at the very least, prior to approval of this --

A. Yes.

Q. -- particular facility? And that technical staff such as yourself review it and decide that it is or is not sufficient?

A. Yes.

Q. Okay. Now, in fact, to date you have not seen designs on the aeration system and the spray system, have you?

A. I've seen -- Not blueprint designs, no.

Q. Okay, so --

A. There was a letter from Cheney analyzing the system.

Q. Okay, sizing a -- one pump at 32-horsepower, correct?

A. Yes, sir, I believe it was.

Q. And since then it's been changed to 96-horsepower, correct?

A. That's correct.

Q. And so with that, you have not seen a piping layout --

A. No.

Q. -- or plan to go with that size pump, have you?

A. No, I have not.

Q. Okay. And you have not seen a design to go with the corresponding fine-bubbler system, have you?

A. No, I haven't.

Q. Have you seen a design to go with the spray system?

A. Not the -- not -- No, I've not seen a drawn design. I have seen the spray system.

Q. Okay, but would you not like to see designs and drawings submitted which have been stamped by a civil engineer to indicate that they do meet the criteria that you are trying to establish?

A. I would like a -- I would like to see a certification that they will meet the criteria. If there are engineering drawings along with it that's better, there's no doubt about that.

Q. Now, since we may have problems running the spray system in wind conditions, would it not be reasonable to require that the aeration system or systems be sufficient to provide the residual and -- oxygen levels and the oxygen demand in the pond itself?

A. Not necessarily. I think the -- If the spray system is going to be used to stir the -- and the spray system is primarily used to stir the pond, and from what I understand and from what I've read, that the

aeration system is going to be sufficient enough to supply the oxygen demand.

As a matter of fact, based on the assumptions that we're going through now, that there's 1-part-per-million demand and then we're going to have 1 -- 1/2-part-per-million residual, that the coarse-bubbler system is sufficient at 96-horsepower to supply that.

The other ones are backup, safeguard-type things. The spray system is -- helps oxygenate it, and it helps the coarse bubbler. The fine bubbler adds to the oxygen also.

So from what I understood from the testimony here, that the coarse bubbler is sufficient, given the assumption of 1-part-per-million demand again, to keep the oxygen level at 1/2-part-per-million residual.

Q. Well, to me we're getting a little bit confused because what you were talking about initially, I believe, was recommendations regarding standards that would give an engineer or an applicant that they could go away and design a system and come back --

A. Uh-huh.

Q. -- and bring you a system that met this criteria.

So in that regard, would it not be reasonable to give the engineer or the applicant a design standard

that the aeration systems be able to stand by themselves in putting into the pond sufficient oxygen to meet the required residual and demand levels?

A. But we don't know the demand levels.

Q. Well, assume demand levels, whatever you should decide based on your best information.

A. And as I understand, that's what this -- the coarse oxygen -- coarse-bubbler oxygen -- bubbler system, aeration system, is designed to do. It was designed to meet the 1-part-per-million demand and the 1/2-part-per-million residual.

MR. STOVALL: Let me -- Let me again, Mr. Horner, and I'm going to try to get to where I hope -- I hope -- I think I'm understanding you right, and what I'm trying to do is finish up this afternoon, so let me go more directly to it.

If we impose a standard that there be maintained a residual demand of, say, 5 parts per million, the design criteria which Mr. Cheney presented assumes in addition to that there is a demand level in the water of 1 part per million; is that correct?

THE WITNESS: That's correct.

MR. STOVALL: Now, whatever system is designed, we're going to require that, assuming that level is met, that the 5-parts-per-million residual be

maintained. And whatever design system, total package system, including the aeration, the bubblers, the whole package -- if it is unable to maintain the level of .5-part-per-million oxygen, residual oxygen, we are going to require additional aeration be placed in the facility to maintain the necessary oxygen level; is that correct?

THE WITNESS: Correct.

MR. STOVALL: So what's -- Again, what's essential here is that in designing -- You're looking at a total system with the objective of reaching the residual oxygen level as we're talking about in this case.

THE WITNESS: Uh-huh.

MR. STOVALL: And so what design is actually submitted here and approved may very well have to be modified based upon future determined demand of oxygen; is that correct?

THE WITNESS: That's correct, on actual experience.

MR. STOVALL: So with respect to writing the permit, it's the standard that's really the critical factor?

THE WITNESS: That's right.

Q. (By Mr. Horner) Well, my question, though,

goes to, wouldn't it be reasonable to require that your standards that you're developing be met without the use of the spray system?

MR. STOVALL: Again, I'm going to object because I've just -- the question that I've just asked is the -- We're talking a total system and meeting a requirement.

MR. HORNER: But my problem is, if you've got problems with the wind and you can't use the spray system, you've got to maintain the oxygen levels, and the only thing you've got to use is the aeration system, so wouldn't it be reasonable to require that the aeration system be able to provide adequate oxygen levels without the use of the spray system?

MR. STOVALL: And the answer -- I believe what Mr. Anderson's saying is, if the system is unable to maintain the residual oxygen level, they're going to have to modify the system in some way, whether it be the aeration system, the addition of additional capacity to that, or you talked about removing the jets from the spray system, whatever. What I'm saying is that the standard is what's got to be met, and whether -- How that total system works to meet that standard is what's important. Is that correct, Mr. Anderson?

THE WITNESS: Yes, yes.

Q. (By Mr. Horner) But now, if hydrogen sulfide is present in the pond, the spray system will strip the hydrogen sulfide and blow it on the neighbors, right?

A. Well, it will strip the hydrogen sulfide.

Q. And it will be airborne and go wherever the wind goes, right?

A. Correct.

Q. So wouldn't it be better if the -- if the system could be designed such that the appropriate amount of oxygen could be put into the pond without the use of the spray system?

A. And from what I understand, that -- from Mr. Cheney's testimony -- that is designed at a 96-horsepower motor to do that.

Q. Okay, and that may be the case. But the OCD requirement to Mr. Cheney should be that that is what we want to achieve, correct? And then maybe Mr. Cheney --

A. Okay.

Q. -- has achieved that.

A. All right, I see where you're getting to. I -- The oxygen, the aeration systems, the combination of the aeration systems, whether there be one or whether there be five different systems in there -- and

I agree -- should be able to impart the required oxygen without any other system for initial design. That's not to say that we can't modify those designs to modify the -- as the need requires.

Q. Right.

A. I agree that, yes, the oxygenation systems, the aeration systems should be sized to impart enough residual oxygen to meet our requirements without the use of a spray system. The spray system is primarily for evaporation. It aids in circulation too.

Q. Thank you, that's what I'm trying to get at.

Now then, in their contingency plan I believe they talk about evacuating people within a quarter mile, and I believe that you had expressed that you thought that the contingency plan talked about evacuating people within one mile. Would you have a recommendation that in fact the -- if -- in the worst-case scenario, if hydrogen-sulfide levels went over 10 parts per million, that people should be evacuated in an area in excess of -- well, in a one-mile-or-greater radius?

And this is -- For the record, this is in the April 17th letter, 1990 -- I don't know the exhibit number -- to Mr. Roger Anderson from Sunco on approximately page 5. It's -- starts off, B, and then

it's in the treatment plan under that.

MR. DEAN: What's the date of the letter?

MR. HORNER: April 17th.

MR. DEAN: Exhibit Number 4.

THE WITNESS: Applicant's 4.

MR. STOVALL: I think -- Your question to Mr. Anderson is, what's the recommended radius for evacuation; is that correct?

Q. (By Mr. Horner) Right. Is a quarter-mile adequate, or should we be greater? I believe you were referring initially to a one-mile --

A. Yes.

Q. -- and that apparently was sufficient in your mind, or --

A. Okay, it's -- I believe what we did, because if you'll notice if it hits 10 parts per million -- and I can't find the rest of that contingency plan in here, but there are a number of public-safety personnel that are notified, to include the San Juan County Fire Department, San Juan County Sheriff, who else? The State Police, I believe, the EID.

If they begin to evacuate within a quarter of a mile, by the time the other public-safety people get on board the evacuation is really out of our hands. It becomes a public-safety problem. And they evacuate the

people. If they need to go to a mile or two miles or five miles, you know they're going to do it.

Q. Well, the Applicant here has, in their treatment plan, their contingency plan has basically talked about evacuating residents and putting them up in temporary housing and providing meals and that sort of thing. So we do get to factors here over and above what the State Police might do. So is it your -- Are you concerned about residents in an area that -- in excess of a radius of a quarter-mile?

A. Am I concerned about them?

Q. Right.

A. Let me put it this way: If there is a release of H_2S from the facility, I would be concerned about anybody near the facility and would want proper -- the proper measures taken to protect human health.

Now, what a radius of evacuation should be, I can't say. I really don't know. I believe on the other facilities we put a quarter-mile on it. I don't remember if we put one mile on one of them or not.

Q. Well, now, we're talking about anytime the hydrogen-sulfide levels exceed 10 parts per million --

A. That's correct.

Q. -- which -- That's pretty open. That can be if hydrogen-sulfide levels reach 300 parts per million

or 500 parts per million, and all we've got here is provisions for evacuation within a quarter of a mile.

A. Uh-huh.

Q. Is there any way we can pin this down a little bit, say, if -- wherever hydrogen-sulfide levels are 10 parts per million or greater, you're going to evacuate the residents, or -- you know, how can we address this problem, other than having simply a one-quarter-mile evacuation when hydrogen levels are basically unlimited?

MR. STOVALL: I'm going to object to that question. I think it's assuming a lot of facts not in evidence.

You start out with the fact that if you start taking measurements out away from the facility, you don't know that the source of the H_2S is the facility. I believe that there is a recommended -- at this point -- I would say that Mr. Anderson, if he feels that the quarter-mile as proposed by Sunco, within the facility, if it's -- 10 parts per million at the fenceline is inadequate, he can make another recommendation.

But there's -- I mean, once you start measuring beyond that point, where is the H_2S coming from, and what levels?

I also point out that what he's talking about is an emergency plan for immediate action, and there's additional remedial measures that are also going to be implemented. And as he has already pointed out, the emergency-response forces, State Police, sheriff's office, et cetera, will also become involved. This is what the Applicant is going to be required to do immediately to eliminate those most in the way of potential harm to be protected until additional response measures can be taken.

So, Mr. Anderson -- I mean, Mr. Examiner, my recommendation is, if he wants to make an additional recommendation in this narrow situation as we've defined, fine. But other -- the other factors of the question are --

Q. (By Mr. Horner) Let me ask a couple of foundational questions here. Are you familiar that in the Basin case they found that there were hydrogen-sulfide levels at the fenceline ranging from .1 to 300 parts per million?

MR. DEAN: I'm going to object. That has nothing to do with this case, and it's irrelevant.

EXAMINER STOGNER: Overruled.

THE WITNESS: I'm aware that that is a finding that was printed by the court.

Q. (By Mr. Horner) Do you have a problem with that finding?

A. I will not make judgment on a court order.

Q. Well --

A. I personally did not and have not seen any evidence to support a 300-part-per-million measurement at the fenceline of Basin Disposal.

Q. Have you, in fact, examined the monitor readings for this particular period of time from the Basin facility?

A. Yes, I have.

Q. And so what did you find?

A. There were no -- There were none that were above 50 parts per million at the fenceline.

Q. This states that Defendants' own expert found in the fall of 1980 that Basin's monitor was incapable of calibration and had been under-recording hydrogen levels, hydrogen-sulfide levels. And then above that, the levels of hydrogen-sulfide gas emitted from Basin have been measured in a range between .1 and --

EXAMINER STOGNER: Is this a question, Mr. Horner?

MR. HORNER: Well, I'm --

EXAMINER STOGNER: It doesn't sound like it.

MR. HORNER: Well, it's about to be.

EXAMINER STOGNER: Let's get to the question, shall we?

Q. (By Mr. Horner) Okay. And so you disagree with the findings of the court in this regard?

A. I --

MR. STOVALL: I object to that.

EXAMINER STOGNER: Mr. Horner, let's move on, shall we?

Q. (By Mr. Horner) Okay. Further, are you aware that in the Basin case that the court found that, in finding number 17 --

MR. STOVALL: I object to any further references of whether he's aware they found or not. The record of the Basin case is, I believe, approximately 50 pages long --

MR. HORNER: I'm just --

MR. STOVALL: -- and it's in the record.

MR. HORNER: I'm just looking at a couple of specific sites here that are talking about radiuses now, that we're talking about the issues of a quarter-mile versus one mile.

He had initially testified regarding a one-mile radius, and now we find in the record that it's only a quarter-mile, and now in the Basin case they found problems up to one-and-a-half miles, and we need

to talk about the appropriate radius of concern.

MR. STOVALL: Perhaps, Mr. Examiner -- I understand. Perhaps if we can ask him for a recommendation, I think that was back to where we might go.

MR. HORNER: Well, let me find out if he's aware of the problems that they found in the Basin case and if he took these into consideration in whatever his recommendation is going to be.

EXAMINER STOGNER: I can finish this off here. If it's in your exhibits, Mr. Horner, then it's already on the record, and so let's move on, shall we?

MR. HORNER: But I'm not sure that --

EXAMINER STOGNER: It's on the exhibit, you just said, Mr. Horner. I'll take his recommendations, I'll take your recommendations. Let's don't beat a dead horse, shall we?

MR. HORNER: One of the things I came to talk about was the problems that can be created from these facilities, based on the findings of the Basin case.

EXAMINER STOGNER: And we appreciate it. You don't have a witness today; you're cross-examining this gentleman. So let's get on with it, shall we?

Before we go any further, I'm going to stop this proceeding at four o'clock, and we'll let

everybody in here decide whether to go for a fourth day and when that fourth day should be.

But until that time, you may proceed with your questioning, Mr. Horner.

Q. Okay. You talked about the -- dumping the bleach into the pond every so often, I assume so you could get fresh bleach?

A. I didn't talk about that.

MR. STOVALL: I believe Mr. Frank stated that they would keep 1000 gallons of bleach on hand and that approximately once a month, because of the quality deterioration, they'd have to get rid of it. And the best place to get rid of it was into the pond, and then they would get a new supply of fresh bleach to keep on hand as a contingency; I think that's the nature of the testimony.

THE WITNESS: That was part of the proposal, yes.

Q. (By Mr. Horner) Okay, well, I thought that was part of your recommendation.

A. No, I didn't --

Q. Well, then, I totally misunderstood you.

MR. STOVALL: Well, I think the context, Mr. Horner, was that I asked him if he was aware of that and if he felt that that was an additional matter -- an

additional protection against the development of H_2S.

But I don't think it was a recommendation on his part. I think that was the Applicant's recommendation, actually.

Q. (By Mr. Horner) Okay. Well, then, do you have any recommendation as to how often that should occur?

A. That depends -- Sodium hypochlorite has a certain shelf-life where it loses its effectiveness, it loses its chlorine content, and based on the shelf-life by the manufacturer's specifications, that's how long it -- that's how frequently it should happen.

Q. Should we have some sort of recommendation with regard to dumping based on the manufacturer's shelf-life?

A. You can -- we -- you know, that's -- That would be the recommendation, based on the manufacturer's shelf-life, because each manufacturer produces a different grade of sodium hypochlorite, and each one may have a different shelf-life.

So to put in a specific time, I think, would defeat the purpose of the manufacturer's specification sheets.

Q. Well, I mean just a recommendation that it should conform to the manufacturer's recommendation?

A. Sure, certainly.

Q. Okay. Now, you talked about the training of the operators here, and I believe you were talking about they should be trained with regard to instruments and safety. I'm assuming you're talking about hydrogen-sulfide problems.

Should they not also be required to have some sort of training regarding the chemical relationships they're going to be dealing with, oxygen levels in the pond, how hydrogen sulfide gets eliminated, so that they have some sort of feel for the chemical reactions going on that they're trying to control?

A. I believe that they're -- the Applicant is going to be required that under the right-to-know law, the new right-to-know, EPA right-to-know law for chemical reactions of all chemicals that they have in their -- at their facility.

Q. But I mean, not only right-to-know. We're asking these operators to control these reactions, are we not?

MR. STOVALL: Mr. Horner, are you asking him whether he recommends that the operator -- that the person on staff, the guy on the shop there, understand the chemical reactions that he's putting into place, or that he merely --

MR. HORNER: Right, that he be trained with regard to those chemical reactions that he's being asked to control.

MR. STOVALL: What do you mean by "trained with regard"? Does he need to know the chemistry of what's happening?

MR. HORNER: At least some sort of short course in why he wants to have a residual oxygen of something and why he's trying to get rid of hydrogen sulfide in the truck and why he's trying to have no hydrogen sulfide go into the --

MR. STOVALL: Why or how?

MR. HORNER: Basically why and how. Some sort of training with regard to this, rather than knowing when it reaches 10 parts per million he's got to put on some sort of breathing apparatus.

MR. STOVALL: Ask Mr. Anderson the why and then the how. I think that would be --

MR. HORNER: I was trying to.

MR. STOVALL: -- my recommendation, Mr. Examiner. I'm objecting to the question as stated.

EXAMINER STOGNER: Do you want to restate your question, Mr. Horner? I believe you already have.

Q. (By Mr. Horner) Okay, would you recommend that the operators of this particular facility be

required to have training regarding the chemical relationships and reactions that they're going to be controlling?

A. I don't believe that an operator at a facility needs a degree in chemistry or chemical engineering to be able to add chlorine into a circulation equipment and be able to operate.

Now, he needs to be trained in the operation of the testing equipment that he's going to be using to determine the amount of chlorine. The actual stoichiometric equations, I don't believe an operator needs that.

Q. Well, I'm not asking this guy to have a chemical-engineering degree, but doesn't he have to -- Or doesn't he need some sort of knowledge about the chemical reactions that are going on that he's controlling?

A. I don't -- I don't -- You know, it's a mechanical-type thing to add, and if the -- a chemical to the water to eliminate the H_2S. If that's already been worked out in a chart form and it's cookbook-type chemistry, I don't think he needs to have to have to know the knowledge of the actual reactions.

Q. Well, aren't there several variables here to be dealt with, one being chlorine to be added, another

being oxygen levels to be maintained, another being something to control the pH levels, others to -- whatever else might be added to this system? Doesn't the operator need to comprehend the relationships of these different things?

A. I don't -- I don't know why.

Q. Well, how does he determine that he should be adding chlorine to the pond rather than turning on an aeration system?

MR. DEAN: I'm going to object. I don't know who Mr. Horner is talking about, Mr. Examiner, who's supposed to know this stuff.

EXAMINER STOGNER: Objection sustained.

MR. DEAN: I wonder if he could identify him.

Q. (By Mr. Horner) Okay, the operator of the facility.

MR. DEAN: All right, same objection.

MR. STOVALL: Are you talking about the fellow that's out in the field, the technician that's out there actually operating the systems; is that what you mean?

Q. That's right, the one turning valves and flipping switches.

A. If -- You know, there will be a certain point if the dissolved oxygen -- I would assume that this

would be in the Order, that an operator himself is not going to sit there, be allowed to sit there and dump 5000 or 1000 gallons of chlorine bleach into the pond, that that's going to have to come from the main office, the determination to do that.

That the operator will have his handy-dandy cookbook chart, and here's this load comes in of fluids. He checks it, it's got 2 parts per million hydrogen sulfide in it, and he has to add 8 parts per million or, according to the chart, 20 gallons of chlorine.

He does this, he circulates it, he puts it into the pond. He runs through, he sees these -- He checks his pond in the morning and it's got a dissolved oxygen residual of .2. He calls the office and says, hey, we're -- our oxygen is down to .2.

Q. Okay, what level of training does the guy in the office need to have in order to be able to say, you need 5000 gallons of bleach in the pond?

A. Okay, that's where the operator has consultants.

Q. Does Sunco need somebody on staff in order to do that, or some level of consultant in order to be able to figure that out?

EXAMINER STOGNER: I'm going to save you

gentlemen time; I'm going to object.

Carry on, Mr. Horner. Let's move on. This questioning is redundant.

Q. (By Mr. Horner) What do you add to the pond to change the pH?

A. A caustic, sodium hydroxide. It could be liquid or powdered. Generally, that's what's happening.

Q. So there's something required other than oxygen or chlorine?

A. Yes.

MR. HORNER: Well, I've got a lot of other stuff I'd like to talk about that you're not going to let me talk about here, apparently. You've already refused to allow me to talk about it. So other than that, that's all I've got.

EXAMINER STOGNER: If there are no other questions of Mr. Anderson, he may be excused.

Mr. Stovall, do you have anything further?

MR. STOVALL: Call Mr. Olson, please.

EXAMINER STOGNER: Has this witness been sworn, Mr. Stovall?

MR. STOVALL: No, he has not. He walked in at the end of the swearing of Mr. Anderson, so --

(Thereupon, the witness was sworn.)

WILLIAM OLSON,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

BY MR. STOVALL:

Q. Mr. Olson, would you state your name, please?

A. Name is William Olson, and I'm a geologist with the New Mexico Oil Conservation Division.

Q. And have you previously testified before the Division or its examiners, had your qualifications accepted as a matter of record?

A. Yes, I have.

Q. And for the information of the parties, would you please describe your educational background?

EXAMINER STOGNER: Before you do so, are there any objections to this man's qualifications?

MR. DEAN: No, I'll stipulate to his qualifications.

EXAMINER STOGNER: Mr. Horner?

MR. HORNER: I'd like to have some idea of what his qualifications are.

MR. STOVALL: And that's the purpose, Mr. Examiner, is to make sure that the parties do know what his ability is and how he's testifying, is the only reason.

EXAMINER STOGNER: This is quite unusual, but I'll go ahead and allow it.

Q. (By Mr. Stovall) Two minutes' worth, Mr. Olson.

A. I have a bachelor's in science in geology and a master's in science in hydrology from the New Mexico Institute of Mining and Technology.

EXAMINER STOGNER: Is his objections -- I mean, I'm sorry, is his qualifications acceptable, Mr. Horner?

MR. HORNER: Yeah, that's fine.

EXAMINER STOGNER: They are. Mr. Stovall?

MR. STOVALL: And I will state, just for Mr. Horner's information, primarily, that Mr. Olson is here to testify about hydrological situation.

Q. (By Mr. Stovall) Are you familiar with this -- with this Application, Mr. Olson?

A. Yes, I am.

Q. And have you been present for the testimony that's occurred in the past three days in this case?

A. Yes.

Q. I'm going to ask you now if you've seen what I've now marked as Exhibit Number 6, which is entitled a Geotechnical Services for Water Disposal Ponds, Farmington, New Mexico, prepared by Western

Technologies, Inc. Are you familiar with this report?

A. Yes, I am.

Q. Again, I believe Exhibit Number 6 is correct, I believe, Mr. Examiner. Is that --

EXAMINER STOGNER: Yes.

MR. STOVALL: I've lost track of my exhibits. Mr. Horner, you've been provided with a copy of this report; is that correct?

MR. HORNER: That's correct.

MR. STOVALL: Mr. Dean, do you have a copy of the report?

MR. DEAN: I've seen it.

Q. (By Mr. Stovall) Have you had a chance to review this report, Mr. Olson?

A. Yes, I have.

Q. And based upon your review of this report, would you just briefly describe what's in the report?

A. There's results of geological borings they've done at the sites showing the lithology underlying the site.

Q. And based upon a review of that report, have you made any evaluation as to what would happen to water getting -- if water from this facility were allowed to enter the soils?

A. Yes, I have.

Q. Let me go back for a minute and ask a couple of other questions. First, where -- Have you made any determination as to where the closest ground water is to this facility?

A. Based on the well log that was submitted with the Application, we've estimated that the closest ground water would be at approximately 80 feet.

That is based on -- The exact location of this well is not able to be determined, as I think the testimony here, earlier by Bob Frank stated, so this was based on taking the highest elevation point in that section, which was the southeast southeast of the section --

Q. That's contained in the report itself?

A. It's contained in the report. We took the highest elevation from that section and took the ground-water elevation from that and then back-calculated to what the difference from that was to the lowest point at the ponds, which was approximately 80 feet.

Q. So the water -- so that's the -- It could be even lower than that; is that what you're saying.

A. It could be quite likely that could be a perch zone up in the -- in the aquifer itself there, which may be one reason why there may not be a well

there to this day.

Q. Do you know how high this facility is above the Animas River?

A. It's approximately 400 feet from the -- as seen on the topo map.

Q. Have you been out to the site and evaluated the site, made some surface -- some observations on site?

A. Yes, I have.

Q. And are you familiar with an arroyo in the area?

A. Yes, there's one nearby. It's approximately 1000 feet or so to the north and northeast.

Q. Now, based upon all of this information, do you have an opinion as to whether -- Let's assume a worst-case scenario, all the water in a pond were to enter the ground. Do you have an opinion how long it would take or if it would get to the ground water or the arroyo or the Animas River or any place where it might constitute a hazard to ground water?

A. Yes, I have.

Q. And what is that opinion?

A. Based on some worst-case calculations, assuming that the entire surface of the pond was essentially exposed to the base of the sandstone there,

which is a first pond from their design drawings on Exhibit 2-B, show that the pond will be basically down to just about the sandstone and then in with the compacted layer.

Assuming pure horizontal saturated movement of ground water through there, I've calculated based on the assumed worst-case gradient of the dip of the beds, and a worst-case hydraulic conductivity for the formation to be approximately 21 years to reach 1000 feet to that arroyo.

Q. And what assumptions do you make in making that worst-case scenario, in your calculations?

A. It would be a worst case of, say, a five-degree dip of the beds, which is probably pretty extreme for that part of the basin right there, a hydraulic conductivity of 1×10^{-4} centimeters per second, which is the upper end of a range for a sandstone, and it is also well in the range of a sandy to silty -- or clayey to silty sand that was listed in the geologic logs -- It falls within the range of both of those -- and an effective porosity around 20 percent.

Q. And what about in the water --

A. That's assuming pure saturated flow. This takes in no consideration of water going into storage

in the matrix of the aquifer either, or in the matrix of the soils, should I say, and the sandstone.

Q. And that assumes that there's a -- Does that assume that there's a constant head on the water as it's going into the soil or --

A. That assumes constant -- constant gradient through the area, based on purely saturated flow. This is going to be under unsaturated conditions, so this is a worst-case assumption.

Q. So in other words, if there were a -- if I'm understanding you right, if there were a leak in the -- in both the primary and secondary liner of the pond and the water were simply allowed to go into the ground --

A. It would immediately --

Q. -- and migrate --

A. Immediately migrate horizontally.

Q. -- then in 21 years it might reach the arroyo; is that what you're saying?

A. Correct.

Q. What about vertically? Is there any vertical movement of that water likely?

A. There's going to be also the vertical movement, but you're probably going to see -- The underlying formation there is a Nacimiento Formation, which is alternating sandstone/shale sequences through

there. So you're going to see -- essentially see water move vertically and encounter a shale layer and move horizontally from that point.

Q. Mr. Anderson testified earlier -- and I believe you were here at the time -- that part of the use of the leak-detection system was to pump water through the sump, and even return it to the pond if necessary, and he testified about taking the head off the water. Does that affect your calculations in any way if that is -- if that's operated in that manner?

A. Sure, if there's no head in the -- in the sump or in between the secondary liner and the primary liner, there's no driving force for water to move past the secondary liner.

Q. Now, let's assume -- I believe Mr. Horner questioned Mr. Anderson with respect to if the leak were big enough, it might allow more water into that space between the primary and secondary liner than the actual detection system, as he recommended it, was capable of handling.

Do you agree with that? Do you think that that's possible, that there could be more water enter that space than the sump system and the pipes could handle?

A. Anything's possible, but it's most likely

that a large system like that with four-inch main pump and two-inch laterals in that, you can conduct quite a bit of water out of that system, and it's going to be -- The controlling factor, then, will be the permeability of the geotextile membrane and the sands of the formation to transmit water to the laterals and ultimately to the sump.

Q. So what you've said, essentially, is that the -- in your opinion, that this four-inch main, two-inch lateral leak-detector system is probably going to handle substantially all, if not all, of the most likely conditions of water entering through a leak in the primary liner?

A. I would expect it's going to be able to pump out as fast as that sand can deliver it to the system, because the -- You've basically got pure flow through the pipes where you've got a -- basically a matrix flow through the sands and the geotextile membranes.

Q. Does that mean that if there were a -- that -- actually, if the secondary liner weren't even there, that you could still get most of the water back in through the sump and just keep running it through and keep it from going into the ground for the most part?

A. I don't think I understand that. Secondary liner's not there?

Q. Well, let me rephrase that. That really doesn't make sense, now that I think about it.

If there were holes in the secondary liner -- Let's say there were some perforations in it, and I won't assume anyplace -- assume -- but you've still got that permeable layer in there, you're going to be able to, as I think Mr. Anderson testified, create -- The line of least resistance is going to be towards that sump that's being -- towards that system that's being drained off and pumped off; is that correct?

A. Correct.

Q. And even if there were holes in the secondary liner, is that going to reduce the amount of water going into the soil from what you used to make your calculations?

A. It would greatly reduce what's going to the soil.

Q. And how is that calculation --

A. My calculations are based on pure fluid contact through the formation under saturated flow conditions. That doesn't take into account unsaturated conditions or storage of water in the matrix.

Q. Let me just ask the final question on that issue, then. In your opinion, is this facility, from the hydrological standpoint and the protection of

ground water, is this facility adequate to protect ground water from the most serious possible adverse contingencies?

A. I believe so.

Q. Are you aware of any other disposal facilities of any sort in the vicinity of this one?

A. Yes, I am.

Q. And what facilities are those?

A. There is the Crouch Mesa Landfill, which has solid-waste disposal and liquid-waste ponds for septage, approximately a mile and a half northeast of the site.

Q. And what does that do in terms of its relation to ground water?

A. Well, the major factor there would be any possible liquid-waste problems that may be associated with the septage ponds and seepage from those ponds.

Q. Excuse me, let me interrupt you. I'm not sure I asked that clearly. Is it closer or further from the ground water than this facility?

A. Oh, it's approximately 90 to 100 feet lower in elevation than the Sunco site.

Q. And the types of -- the types of material that are -- that would be -- that are being taken -- Is this an existing operating site, or is it under

construction or is it --

A. No, this is an existing operating site, permitted by the EID Ground Water Bureau.

Q. How would you compare the types of wastes which would be taken into that site to the types of wastes that are being disposed of in -- that would be disposed of in the Sunco facility if approved?

A. They're liquid wastes, and there is difference in your composition. You're largely dealing with waters at the Sunco site, whereas you've got a highly viscous sludge, essentially, at the septage sites.

Q. Has Mr. Anderson described sludge?

A. I consider that sludge.

Q. In terms of components, are the components more dangerous, less dangerous, potentially, to ground water or atmosphere or anything like that?

A. Potentially very hazardous to ground water from nitrate problems. There's up to 100 to 200 ppm nitrate contained in septage wastes.

Q. Is it -- Is there a potential of creation of H_2S from that facility?

A. Yes.

Q. And it is permitted by EID Ground Water, you've stated?

A. Yes, they've permitted on the basis of protection of ground water similar to OCD Regulations.

Q. Do you know -- Have you had the chance to review either the permitting or the actual construction of the pits and facilities to determine how they're being constructed?

A. Yes, I have.

Q. And what is it? How are they -- How are they built?

A. They're essentially excavated pits which are then disked, have the bottoms disked and mixed with 14 percent bentonite and compacted with a loader.

Q. What does that mean?

A. Approximately -- Well, they are certified to a permeability of approximately 10^{-8}, somewhere in that range.

Q. And is that -- how -- What's the relevance of that number? What does that number mean to a layman like me?

A. Well, it means that essentially it is a low-permeable liner, but it is not impermeable. There's a large difference between that and, say, an impermeable membrane, which was put in at the Sunco site.

And based on this site, EID had determined that these types of pits did not present a threat to

ground water, which is at approximately 65 to 70 feet at the site.

Q. You've reviewed the permit; is that correct?

A. Yes, I have.

Q. And you've seen the facility itself; is that correct?

A. Uh-huh.

Q. And that's what your information is based upon, is both the review of the permit and that --

A. Yes.

Q. -- on-site?

If I understand what you've said correctly, the EID-permitted site said this site is -- poses a comparable hazard to ground water and other conditions to the proposed Sunco site; is that correct?

A. Yes.

Q. And if I understand you correctly, the Sunco site, as proposed with the double-liner system, provides greater protection to the ground water?

A. Yes, because an impermeable membrane.

Q. Does the -- I'll call it the EID-permitted site for lack of a better term, the septage site -- have any sort of aeration system for maintaining the aerobic conditions that we've talked about and all that?

A. None.

Q. Is that a concern? Would that be a concern, do you think?

A. It could be a concern, but they do not anticipate any problems with H_2S generation.

Q. Do you know why?

A. I do not.

Q. If that facility were going through you for permitting, would you have concerns about the H_2S generation?

A. Likely, I would.

Q. Would you say that, in your opinion, is -- if -- Let me back up. Have you ever worked for EID?

A. Yes, I have.

Q. You've been a member over there, and do you understand how they operate; is that correct?

A. Yes, I worked for two years with the Ground Water Bureau, EID.

Q. So you understand their permitting process?

A. Yes, I do.

Q. And to the best of your knowledge, is this facility in compliance with their regulations?

A. Yes, it is.

Q. And are their regulations designed to protect ground water?

A. Yes.

Q. Are they comparable -- are they the WQCC, Water Quality Control Commission, Regulations?

A. Yes, actually the discharge plant requirements of the Water Quality Control Commission Regulations.

Q. Which would be the same regulations the Oil Conservation Division would be responsible for enforcing in different types of operations?

A. Yes, we have authority over exploration, production, up through the refinery process for enforcing the Water Quality Control Commission Regulations.

Q. Do you have an opinion as to whether those regulations are established and designed to -- and whether they would adequately protect the ground-water resources?

MR. HORNER: Objection, we couldn't talk about air quality control regulations from EID, we couldn't talk about the Basin facility, and now we're going on and on talking about EID water quality control regulations.

MR. STOVALL: I'll withdraw the question. I don't have a -- I'll withdraw that. I don't need to ask that question.

EXAMINER STOGNER: Thank you, Mr. Stovall.

Q. (By Mr. Stovall) Is it your opinion that the standards being imposed upon this pit are substantially greater and that the protections offered are higher than those offered by that facility?

A. For protection of ground water, yes.

MR. STOVALL: I have no further questions of this witness.

EXAMINER STOGNER: Mr. Dean, your witness.

MR. DEAN: I don't have any questions.

EXAMINER STOGNER: Mr. Horner?

EXAMINATION

BY MR. HORNER:

Q. Okay. This question Mr. Stovall started asking and backed off of. If you've got such good compaction here and the sump system is so infallible and carries all the water out and --

MR. STOVALL: I object to that. Let's restate that in more accurate terms.

Q. (By Mr. Horner) Okay. Well, let's go straight to the question: Why do you even require a second liner at this site?

A. Why do we require a second liner?

Q. Yes.

A. Protection of ground water.

Q. So there is a potential problem with contamination of ground water from this facility?

A. For containing leaks in the eventuality of a leak in the primary liner.

Q. So if there becomes a leak in the primary liner without a secondary liner, you could have contamination of the ground waters?

A. Sure.

Q. Now, are you familiar with irrigation systems?

A. Somewhat, I guess.

Q. Are you familiar with the fact that the State Engineer gives an irrigator 50-percent credit for water that he puts on his land that is returned through the ground to the river?

MR. DEAN: I'm going to object, unless I -- it could be pointed out to me what the relevance of that could possibly be.

EXAMINER STOGNER: Why don't you restate that, Mr. Horner?

Q. (By Mr. Horner) Okay, in the whole business of water rights, are you familiar with the fact that the State Engineer will give an irrigator credit for 50 percent of the water that he puts on his land because that water is returned back to the river?

MR. DEAN: I guess I would have the same objection unless we could get some explanation of the relevance.

EXAMINER STOGNER: Can you answer that question yes or no, Mr. --

THE WITNESS: I'm not familiar with it.

EXAMINER STOGNER: The question's been asked. Mr. Horner?

MR. HORNER: Nothing further of this witness.

FURTHER EXAMINATION

BY MR. STOVALL:

Q. Let me clarify one thing here, Mr. Olson, just to ensure -- Your statement is that we're requiring the second liner as an additional measure to protect ground water; is that correct?

A. That's correct.

Q. Is that a requirement in all of these types of facilities?

A. In all commercial facilities we have now, that we -- well, with the exception of the SWWD site.

Q. What was the requirement there?

A. The requirement there was that they proposed to put in a clay-lined pond, and they had to demonstrate through hydrogeologic investigations that their facility would not contaminate ground water.

Q. And does that mean that, in effect, that that clay lining would not allow produced water to escape from the bottom of the pond and enter in the ground water; is that what you're saying?

A. It provides that it would limit migration of the fluids over the life of the -- the proposed life of that type of facility.

Q. And has that criteria been established with the -- on the basis that it's the standard that you're trying to meet, and the method of meeting that standard is -- can be adapted on a site basis? Is that a correct statement?

A. Each site is site-specific for the criteria that's required.

Q. Is the design proposed here of the double-lined system with the leak detection the only available design that could meet the criteria here?

A. No, it's not. A clay-lined facility could meet the same criteria --

Q. Does the --

A. -- protection of ground water.

Q. Excuse me. Does the hydrological fact -- analysis that you've testified about -- What's your opinion of that in relationship to this operation?

A. Could you restate that?

Q. Let me try.

What you've testified is that if all of the water were to -- allowed into the ground, that it would not reach a fresh-water supply; is that correct?

A. Correct.

Q. And then -- So theoretically, you could at least fill the pond up one time and let it empty into the ground, and it would not constitute a hazard to fresh water; is that correct?

A. I'd have to do some more calculations on the volume of it. But essentially, looking at 80-foot depth of ground water with alternating sandstone/shale sequences, I would expect it would -- the answer would be, it would not.

Q. But that's not an acceptable level of safety and protection?

A. That's not.

MR. STOVALL: Is -- Never mind, I don't want to ask that question. I'm not sure what it was.

I have no further questions.

EXAMINER STOGNER: Are there any other questions of Mr. Olson?

MR. DEAN: Not from me.

MR. HORNER: None.

EXAMINER STOGNER: He may be excused.

(Off the record)

EXAMINER STOGNER: Gentlemen, I'm going to request that the closing arguments be in written form. In these I'd like such issues considered as the legal issues which were raised, including the applicable EID regulations and conditions which should be imposed if a permit is issued, including any design criteria, monitoring, et cetera, and any other item which a party wishes to raise that's within the scope of this particular hearing.

I'd like these two weeks from today. I don't have a calendar. That would be the Friday after the 4th; is that right?

MR. DEAN: The 6th, it's the 6th.

EXAMINER STOGNER: The 6th? July 6th, unless there's a problem with that time.

MR. DEAN: I don't know of any now. I only know that that week is -- In the middle of it is a holiday and it's also, as an aside, my 20th high school reunion, but -- I don't think I can have any problem -- I think I can get it in by the 6th. That would be my only problem. I'm in charge of it too, so -- I'm going to have to get it done before the 4th.

(Off the record)

MR. HORNER: If we could have one extra week

too, because I know next week is really going to be bad for me.

EXAMINER STOGNER: So be it. Three weeks would be fine. That would be July 13th. Friday the 13th of July.

Gentlemen, if there's nothing further in Case Number 9955 at this time, other than the closing arguments that will be turned in on July -- I'm sorry, closing statements that will be turned in July 13th, then this hearing is adjourned.

Thank you.

(Thereupon, these proceedings were concluded at 4:26 p.m.)

CERTIFICATE OF REPORTER

STATE OF NEW MEXICO)
) ss.
COUNTY OF SANTA FE)

I, Steven T. Brenner, Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I transcribed my notes; and that the foregoing is a true and accurate record of the proceedings.

I FURTHER CERTIFY that I am not a relative or employee of any of the parties or attorneys involved in this matter and that I have no personal interest in the final disposition of this matter.

WITNESS MY HAND AND SEAL July 4, 1990.

STEVEN T. BRENNER
CSR No. 106

My commission expires: October 14, 1990

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9955, heard by me on June 13, 15, and 22 1990.

, Examiner
Oil Conservation Division