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ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PETITION OF CITGO PETROLEUM	)	
CORPORATION AND PDV MIDWEST	)	AS 08-8
REFINING, L.L.C. FOR AN ADJUSTED	)	(Adjusted
STANDARD FROM AMMONIA NITROGEN	)	Standard -
DISCHARGE LEVELS AT 35 ILL. ADM.	)	Water)
CODE 304.122	)	

PROCEEDINGS had in the above-entitled cause on the 20th day of August, 2008, 9:00 a.m.

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PRESENT:

SONNENSCHEIN, NATH & ROSENTHAL, LLP,
7800 Sears Tower
233 South Wacker Drive
Chicago, Illinois 60606-6404
312-876-7934
MR. JEFFREY C. FORT,
MR. ARIEL J. TESHER,
appeared on behalf of the Petitioner,
Citgo Petroleum Corporation;

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY,
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
217-782-5544
MR. JASON R. BOLTZ,
MR. DARIN E. LeCRONE, P.E.,
MR. ROBERT G. MOSHER,
appeared on behalf of the Respondent;

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PRESENT (cont'd.):

ILLINOIS POLLUTION CONTROL BOARD,
100 West Randolph Street
Suite 11-500
Chicago, Illinois 60601

312-814-3956
MR. ANAND RAO,
MS. ALISA LIU, P.E.,
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OFFICE OF THE ATTORNEY GENERAL
STATE OF ILLINOIS,
69 West Washington Street
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Chicago, Illinois 60602
312-814-3374
MR. ZEMEHERET BEREKET-AB,
appeared on behalf of the Attorney General.

REPORTED BY: SHARON BERKERY, C.S.R.
CERTIFICATE NO. 84-4327.

I N D E X

E X H I B I T S

THE HEARING OFFICER: Good morning, everyone. My name is Bradley Halloran, I'm a hearing officer with the Illinois Pollution Control Board.

I'm also assigned to this matter entitled In the Matter of Petition of Citgo Petroleum Corporation and PDV Midwest Refining, LLC for an adjusted standard from ammonia nitrogen discharge levels at 35 Illinois Administrative Code 304.122. It's docketed on our docket as AS08-8. 09:03:23 09:03:37

Today is August 20th, 2008 approximately 9:02 a.m. I do want to note that I don't see any members of the public here not affiliated with any of the parties; is that correct? 09:03:56

MR. FORT: Correct.

THE HEARING OFFICER: Thank you.

We are going to run this hearing pursuant to Section 104, Subpart D and Section 101 Subpart F of the Board's Procedural Rules. I also note for the record that this hearing was properly noticed up. The hearing it intended to develop a record 09:04:04

for Illinois Pollution Control Board.

I won't be making the decision, it will be the four members of the Board who do that. I'm only here to rule on evidentiary matters and make sure that everything is in order. 09:04:28

At this point, I'd like to have the parties introduce themselves. Mr. Fort, Mr. Tesher?

MR. FORT: Jeffrey Fort, Sonnenschein, Nath, and Rosenthal on behalf of the Petitioner, Citgo. And with me is my colleague, Ariel Tesher, also of Sonnenschein. 09:04:35

THE HEARING OFFICER: Thank you, sir. 09:04:45

Mr. Boltz?

MR. BOLTZ: Yes. Jason Boltz, that's B-O-L-T-Z. I am assistant counsel with the Illinois EPA. Accompanying me today is Mr. Darin LeCrone, also of the Agency, as 09:04:53

well as Mr. Bob Mosher. We are here on behalf of the Agency pursuant to its requirements to participate in the hearings. I believe it's 29.1 of the Illinois Environmental Protection Act. Thank you.

THE HEARING OFFICER: Thank you, Mr. Boltz.

I see an Assistant Attorney General here. Sir, would you like to introduce yourself? 09:05:13

MR. BEREKET-AB: Aemeheret Bereket-Ab, on behalf of the people of the Attorney General's Office.

THE HEARING OFFICER: Okay. Thank you, sir. 09:05:21

A brief note, on August 14th, 2008, the petitioner filed a -- it's entitled a Motion to Exclude Unfiled IEPA Testimony.

Mr. Tesher and Mr. Fort, would you like to elaborate on that, please? 09:05:36

MR. FORT: Well, Your Honor, we have a schedule here that calls for prefiled testimony in this matter. We filed our testimony on August 1st, as required. 09:05:47

The Agency did not. And that was countered to our expectations that the parties were going to do so pursuant to your -- we don't know what is going to happen here without having that prefiled testimony.

It was a common courtesy, it was something that, even before it became customary with the Board to do prefiled testimony, that that narrative testimony was prepared and given to the other side a few days ahead of time, at a minimum, so... 09:06:16

THE HEARING OFFICER: Thank you, Mr. Fort.

I do note that the IEPA has not responded, but they did have 14 days, and it's August 14th. Mr. Boltz, would you like to address this motion now? 09:06:25

MR. BOLTZ: Yes, Your Honor. Thank you. 09:06:37

Certainly, Your Honor, the Agency did not respond by way of providing -- prefiling testimony. But if you'll note, and correctly, the July 9th order, by yourself, sir, does not require, necessarily, the issuance of prefiling testimony. 09:06:50

That's an opportunity. It's an opportunity to present evidence not under duress, not under stress, not under having objections being elicited at the time the testimony is offered.

Your Honor, pursuant to 101.626 of the hearing rules, Subsection D, it provides for the allowance of written testimony. Now again, that's an allowance, that's a privilege, it's not, necessarily, a mandatory act, unless the Board says that that is to be the case.

The only requirement pursuant to written testimony is that it's proffered before the hearing so the other side has an opportunity to look at it, to respond, to do what it needs to do to react to it. But otherwise, and as Your Honor has correctly noted, we add here to standards and the rules set forth both in Part 11, Part 104, pursuant to the Rules of Procedure and is allowed for by the rules, as well as the Environmental Protection Act. None of those bases in law, obviously, have been cited through the motion because there is no basis in law to preclude testimony as offered by the Agency in this matter.

As a result, Your Honor, we would ask that the motion be denied. There's no basis in law, there's no basis in your order, there's no basis anywhere to preclude this testimony. Thank you. 09:08:10

THE HEARING OFFICER: Thank you.

Mr. Berekat-Ab, do you have any comment, or are you just here for observation?

MR. BEREKET-AB: I'm just here to observe. 09:08:18

THE HEARING OFFICER: Okay. All right. Thank you.

I think, Mr. Boltz was correct when he said it was an opportunity to respond to Citgo's prefiled testimony. With that said, I'm going to deny the motion filed August 14th by petitioner.

However, if the witness from the IEPA is called, I would -- what I'll have to do is continue this matter on record for two or three weeks down the road. We can address that later, so that Citgo can possibly formulate any cross or follow-up. I think

that's about the only way we can do this.

I realize -- I think your permit is up December 2008, but that would still, it appears, give the Board plenty of time to make a decision on it. 09:09:11

MR. FORT: Well, we will utilize that opportunity if we need to. But, as you pointed out, we've been trying to get to this point for some time and we haven't been

getting a lot of assistance, if you will, in terms of the dialogue with the Agency or them even asking us questions, can you give us more information on this or that. 09:09:23

We will abide by the order.

THE HEARING OFFICER: Understood, Mr. Fort. In the alternative, if I grant your motion, which I did not, the Board could reverse me and we'd be back here in probably two months down the road. So there you go. In any event -- so I denied the motion, and if need be, we will continue this on the record two or three weeks down the road so Citgo can formulate any cross. 09:09:34 09:09:48

I do want to note that I am

honored to introduce Anand Rao and Alisa Liu from our technical unit, they'll be here today and they will probably be asking questions of various witnesses.

With that said, Mr. Fort, would you like to give an opening? 09:10:11

MR. FORT: Yes, thank you. Very briefly.

First of all, I'd like to point out that this proposal that we've advanced, the adjusted standard proposal, is a reduction from what is presently allowed. So we're going in the direction of improving our effluent discharge, and we are making efforts in great strides in that effect. 09:10:17 09:10:34

I would also like to point out that the Agency has proposed a new ammonia nitrogen water quality standard in what we call the Use Attainability Analysis, the UAA rulemaking, pending before the Board, which would establish a new ammonia nitrogen standard in the Chicago Sanitary and Ship Canal into which the refinery discharges. Those waters today, into which we are 09:10:50

discharging today, meet that proposed water quality standard.

So the rhetoric that I've seen and the Agency recommendation about water quality effects or biota, I think is really misplaced. It was very disturbing for us to see that sort of position being taken by the Agency in this proceeding, when, before the Board in a rulemaking proceeding, they are advancing the very water quality standard that we can meet at the mixing zone. 09:11:13 09:11:25

Yet, they say we're doing bad things with what we're proposing in terms of reducing our ammonia discharge. So, basically, we could argue that, based upon the water quality that exists today, that no 09:11:39

further reductions are necessary from those that we've been doing in the past.

But we are proposing to make it tighter. We cannot, though, meet the three milligram per liter, six milligram per liter standard on a consistent basis in the nature of compliance 100 percent of the time. And we think that's unfair for the Agency to put

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us in a position that would put us in not compliance a large portion of the time.

Mr. Huff has done a calculation of the probabilities of where things would be, based upon past performance -- based upon recent past performance over the last five years. And we've set the proposed numbers that we have in our petition at a 95 percent competence level.

09:12:19

What that means is that the refinery is going to have to do better than it has been doing in order to comply, even with the proposed lower standard that we have brought before the Board today. I think it's well known to the Board -- we'll have testimony today that nitrification for an industrial effluent is not easy, it's not the same as municipal treatment plants.

09:12:32

09:12:42

We thought the Agency citations to the 1972 Board proceeding were out of context. That context was clearly the ability to nitrify for sanitary wastewater. And Bob Stein will provide testimony on what USEPA found years later, in terms of the lack

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of technology to achieve the kind of standard that the Board adopted principally based upon a sanitary wastewater discharge.

I also want to note that in the past there's been times that we have been able to achieve nitrification. It may have gone for two to three years at a time. But then, the mix of crude old changes, production changes, some other event occurs and we lose the ability to nitrify on a consistent basis.

09:13:26

09:13:38

You will hear that, again and again today, we are unable to achieve nitrification on a consistent basis. So that brings us to a question, perhaps, of why we're doing an adjusted standard.

09:13:50

We have had site-specific rules in the past. We filed an adjusted standard really at the Agency's suggestion.

The Agency suggested to us that it would be better to do an adjusted standard and a site-specific rule because it simplifies their interactions with USEPA.

09:14:00

And we felt that was a reasonable request to make.

We looked at the time horizon here, we're only asking for five years. You might ask, well, why don't you do a variance? The answer is, we cannot find a guarantee that we're going to be able to consistently comply 100 percent of the time or even 95 percent of the time with the three-six milligram per liter standard. 09:14:18

We will provide more testimony that -- about the other refineries that the Agency has sited. And I think we have just, quite frankly, not gotten the whole picture of what's really occurring at other refineries in Illinois. 09:14:30 09:14:42

We are dealing in a situation now where water quality is probably an important consideration certainly. But we all know about our energy issues, we know about the need to remove our dependency on foreign oil. 09:14:53

The Lemont refinery is certainly doing what it can do to process crude oils that are not as easy to process as those that they've had in the past. We think that's a good thing.

But at the same time, given the tightness of the three milligram per liter number for ammonia nitrogen, we cannot tell the Board or the Agency or the Attorney General in good faith that we can meet that number. So that's why we're here today. 09:15:16

We're trying to make further improvements. We have a lot of projects that we're working on that we think will do better, but today we cannot say, as of December 31, 2008, we're going to be able to nitrify 100 percent of the time. Thank you. 09:15:26

THE HEARING OFFICER: Thank you, Mr. Fort. 09:15:39

Mr. Boltz?

MR. BOLTZ: Thank you, sir.

First, I want to thank the Board for the opportunity to participate in the hearing today. I know that sometimes these things are time consuming and we hate to take away from your time that we already know is very much consumed. And again, we appreciate it. 09:15:44

I wanted to react, obviously, along with presenting an opening statement, to some of the things that Mr. Fort has proffered on behalf of the petitioner. First of all, we wanted to put the context of this 09:16:00

hearing in its appropriate place.
This is not an adversarial proceeding where the Agency is, necessarily, standing in the way or is against or is trying to prove more or less evidence than 09:16:11
petitioner. The petitioner is trying to go after the general applicability of 304.122(b). They're trying to attack and divest and get past those standards that are complied by another refinery in the state of 09:16:26
Illinois.
They are not, necessarily, trying to reproach the Agency or say the Agency -- I mean, the Agency, obviously, has filled a recommendation, very much like a guardianship 09:16:36
hearing, where a third party, a guardian ad litem, would provide to the Court, to the Court's benefit, a third-party perspective of the matter. That's exactly what's going on

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here.
While the Agency is the primary regulator of the environment within the state of Illinois, for the perspective of this hearing, it's about the rule. It's about 09:16:54
Citgo's ability to hear the rule.
That rule of law is what's at issue today. Not with what the Agency has presented or hasn't presented, the Agency is here to ask tough questions, as it should be, 09:17:07
put perspective pursuant to the law, pursuant to the Environmental Protection Act, pursuant to Section 26, 27, 28.
Specifically, I want to correct myself, the Agency is here pursuant to 09:17:21
Section 28.1(d)(3), which requires, again, the Agency to participate. And that's exactly what's going on.
Now, the Agency has provided it's recommendation that Citgo's petition be 09:17:32
denied. And that's because, at this point in time, adequate proof hasn't been presented by the petitioner.
Again, it's not a more likely than

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not, it's not, you know, a certain burden that they're trying to reach. The need is to present 100 percent of the necessary evidence of the adequate proof so the Board can make the decision that they've met that standard, 09:17:52
where there's enough evidence that's been put before you, that's been admitted before the Board and the hearing officer, to make the correct decision whether or not they should be offered -- they should be provided an 09:18:03
adjusted standard differing from the other refineries in the state of Illinois, who,

while they may not all necessarily comply with 304.122(b), they all comply with their general applicability standards moving forward today. All of them. Except for Citgo. That's -- those are the facts.

Now, with respect to the facts. Most of the facts offered by Citgo, aside from some of the conclusory statements, we're not contesting. The Agency isn't contesting many of the underlying facts. They're not contesting, you know, whether or not they've done this or that or spent so much money.

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But the Agency does see problems with a couple of issues -- with a couple of legal issues that haven't -- that we haven't seen that the -- that from the Agency's perspective, haven't been met. We haven't seen 100 percent of that adequate proof yet to meet the standard.

Specifically, Section 27 the Act requires both -- requires a number of factors. But two of the primary factors that the Agency is looking at is technical feasibility and economic reasonableness. Those are two very important factors, as the courts have looked at going through the years.

Those two factors by themselves, if not met, can allow the Board to deny their petition. If they haven't provided you enough evidence, if they haven't submitted enough meat within their submission for that petition, it should be denied.

First of all, with respect to technical feasibility. Again, moving forward today, only petitioner hasn't met their

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standards, which would be a deviation from the general applicability limits. Only they are requesting, you know, whether it be a site specific rule or an adjusted standard, only they are telling you today that because it's so difficult -- because it's so difficult for them to acknowledge why they can't do it, because, you know, whether it be their technology or the way they approach things, they can't get it done. Well, the bottom line is, these other refineries are getting it done. And they will tell you today -- they've already told you in the testimony that they've provided, that the technology that they use is very similar to the technology used by the other refineries in the state of Illinois. So when you think about technical feasibility, when you think about their technical ability to get it done,

they're saying only they can't get it done. Now, the Agency isn't saying that sufficient evidence can't be provide to necessarily overcome that, but we haven't heard that. That's the perspective the

Agency is looking at today. Those are the questions that come into our heads. Now, we're not looking to create the case when petitioner presents its testimony and its evidence today. But those are the questions before us, those are the questions in our minds, those are the issues that need to be looked at and need to be delved into. Secondly, I'd like for one point of clarification to be made within the Agency's recommendation. While the Agency stated that the other three refineries in the state of Illinois are capable of meeting the 304.122(b) standard, we would like to say today that that statement was made too broadly. Okay? While it is true that Marathon Oil and Exxon Oil, two of the other three refineries, do meet that standard, Conoco may be capable, they may in fact be capable, but they do in fact meet their general applicability standards. They have not been before you, they have not sought any sort of

deviation from their general applicability rule. And that should be noted. And -- I won't get into that yet. And secondly, our other issue, again, is economic reasonableness. Again, this is a requirement for the petitioner. The petitioner can't merely throw out a number and say, "Well, you know, it's a lot of money." This is a lot of money so we can't get it done. You know, there is more than that. They need -- I mean, they are not Joe Shmo Oil Company, they're not an oil company that makes $100 a year. They need to present to the Board necessary proof that, from their perspective, from their own company, from the money they make and the money they need to expend, from their perspective, that they can't get it done. Because the adjusted standard they're seeking is specific to them. And that needs to be kept in perspective, as well. So we would -- we would, therefore, present, at this point with the evidence provided, where we are

today is the Agency's current recommendation

that the petition for the adjusted standard be denied.

If the petitioner meets that burden today, certainly the Agency would look to maybe rereview, take a look again at it's recommendation. But today, that requirement -- that 100 percent of the adequate proof requirement hasn't been met. 09:23:02

Thank you. 09:23:14

THE HEARING OFFICER: Thank you, Mr. Boltz.

I do want to note, for the record, if it hasn't been done already, Citgo did file prefiled testimony on August 1st. Is it Brigitte Postel, Mr. Huff and Bob Stein. 09:23:21

And it's been suggested that we swear all the three witness in at once for Citgo. And Mr. Fort or Mr. Tesher can do any direct they wish. The IEPA can do their cross. But, more importantly, for my purpose, our technical personnel will be asking them the questions, as well. 09:23:43

So with that said -- and I assume

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that Citgo will offer that prefiled testimony later in this hearing. But at this time, I would like to swear in the three witnesses who filed the prefiled testimony.

If you can just raise your right hand, Sharon will swear you in. 09:24:08

(WHEREUPON, the witnesses were duly sworn.)

THE HEARING OFFICER: Mr. Fort, how do you want to handle this? Do you just want to... 09:24:22

MR. FORT: Let me do the mechanics of the prefiled testimony and exhibits so we'll get that all behind us.

THE HEARING OFFICER: Okay. 09:24:32

MR. FORT: And then we can go from there.

THE HEARING OFFICER: Okay. Terrific.

MR. FORT: I'll probably go through each one of them a little bit, because each of them have their own exhibits. 09:24:37

THE HEARING OFFICER: Okay.

PREFILED TESTIMONY OF BRIGITTE POSTEL

My name is Brigitte Postel. I

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have been employed by CITGO Petroleum Corporation (“CITGO”) at the Lemont Refinery since October, 2003. At the Lemont Refinery, I have held the position of Environmental Engineer, Water Coordinator.

I received a Bachelor of Science in Chemistry from the University of Illinois, Champaign-Urbana, and a Masters of Science in

Environmental Engineering from Lamar University, Beaumont, Texas. Prior to my time at the Lemont Refinery, I held various environmental positions in the pharmaceutical, chemical, and power industries.

II. Testimony

1. PDV Midwest Refining, L.L.C. ("The Refinery") owns a petroleum refinery located on an 860-acre tract in Will County near Lemont, Illinois. The Refinery was formerly owned and operated by the Union Oil Company of California ("Union") and then operated by the UNO-VEN Company. On May 1, 1997, PDV became the owner of the Refinery and CITGO was contracted to operate the Refinery.

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2. Despite extensive improvements and other efforts, the Refinery is not able to consistently meet the ammonia nitrogen effluent limits contained in Section 304.122(b) of Subpart B of Part 304 of Title 35 of the Illinois Administrative Code (ammonia nitrogen rule). I want to emphasize that "consistently" meeting the rule is the focus of our Petition. The general ammonia nitrogen discharge rule would apply to the Refinery, but for site specific rule changes granted in 1987, 1993 and 1998. Despite steady improvements during the last twenty years, Petitioner and its predecessors have been unable to consistently achieve the effluent limits of the ammonia nitrogen rule. The Refinery has been successful in lowering the ammonia nitrogen concentration in its effluent and has achieved this success even though the plant throughput has increased and wastewater usage has decreased. The Refinery is prepared to continue efforts to reduce its ammonia nitrogen discharge, but it cannot

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commit to continuously meet the general effluent limit in 35 Ill. Admin. Code 304.122(b). Additional information requested by the Board's hearing officer, Bradley Halloran, may be found in Exhibit 1 to this testimony.

3. We have attempted to work with the Agency on this matter and initiated meetings with the Agency last November. As suggested by the Agency then, we agreed to separate the Total Dissolved Solids issues from the ammonia nitrogen issues - and further agreed to use the adjusted standard approach rather than the site-specific rule change - in order

to meet the requirements of U.S.EPA in reviewing Illinois's water quality standards. We are disappointed that the Agency did not engage in any technical discussions on the content of our proposal and filed the Recommendation it has. We disagree with the Agency's statements in its Recommendation, which we believe mis-characterize the Petition and are not based on facts. One

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thing we could agree with is to continue to improve our existing biological treatment processes, solids handling processes, and the desalter. Indeed, as will be shown by other presented testimony, the Refinery is currently discharging, on an average basis, less ammonia nitrogen than is in its raw water supply. Of course, that is because the Refinery is on an "effluent dominated water," the Chicago Sanitary and Ship Canal, as the Agency has testified to in the UAA rulemaking proceeding.

4. The Refinery was constructed during the period 1967 through 1970. It became operational in late fall of 1969. The Refinery employs approximately 530 people.

5. Approximately twenty-five different products are produced at the Refinery, including gasolines, turbine fuels, diesel fuels, furnace oils, petroleum coke and various specialty naphthas which can be manufactured into many intermediate products,

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including antifreeze, dacron, detergent, industrial alcohols, plastics and synthetic rubber. Ninety percent of the Refinery's output goes into making gasolines, diesel fuels, home heating oils and turbine fuels for use in Illinois and throughout the Midwest.

6. The Refinery currently discharges to the Chicago Sanitary and Ship Canal ("Canal") which is a tributary of the Illinois River. The discharge is quickly dispersed in the Canal and assimilated by the receiving stream. The dilution pattern of the effluent is rapid and immediate under the criteria of 35 Ill. Admin. Code Subtitle C, Chapter I, Section 302.102.

7. The primary treatment portion of the current plant consists of four sour water strippers for ammonia and sulfide removal, oil/water separators for free oil removal,

stormwater impoundment, equalization, and emulsified oil removal using organic polymers.

8. The effluent from the primary clarifier flows to the Induced Gas Flotation ("IGF") vessel and then to the secondary treatment portion of the wastewater plant which consists of a single stage activated sludge treatment system. The system includes three aeration basins operated in parallel with a total aeration basin volume of 1.92 million gallons. Aeration is provided by a fine-bubble diffused aeration system. Activated sludge is settled in two 100-ft. Diameter secondary clarifiers. Within the aeration basin, phosphorous is added as a nutrient for biological organisms. During the winter, steam is injected to the equalization tank to maintain operating temperatures at a minimum of 70° F in the aeration basin effluent.

9. The tertiary system consists of a 16 million gallon polishing lagoon. The purpose of the lagoon is to remove any carryover solids from the secondary clarifier. The lagoon also serves as a water supply for fire protection.

10. The Refinery draws from and discharges to the Canal. The Refinery takes approximately 5.0 million gallons of water daily from the Canal, and discharges approximately 4.5 million gallons to the Canal, the difference being cooling tower evaporation and steam losses. The wastewater effluent contains ammonia as nitrogen derived from compounds present in crude oil that are removed from the crude by various Refinery operations, as well as the ammonia already present in the intake water from the Canal.

11. The Refinery operates under a National Pollutant Discharge Elimination System ("NPDES") permit (No. IL 0001589), issued by the Illinois Environmental Protection Agency ("IEPA," or "the Agency"). The most recent NPDES permit was issued as modified June 22, 2007 and expires July 31, 2011. The NPDES permit includes outfall 001 at the Refinery at river mile 296.5 on the Canal (Latitude 41°38'58", Longitude 88°03'31"). The current NPDES permit includes ammonia nitrogen limits

in the existing 35 IAC 304.213.

12. The U.S. EPA has established effluent guidelines for wastewater discharges by industry category. The petroleum refining industry is divided into five subcategories based on the processes utilized and the products produced. The Refinery is classified as a Subcategory-B cracking refinery under the federal regulations. Effluent limits under the federal regulations are based on production and are computed on a pounds-per-day basis.

13. U.S. EPA has promulgated categorical limits on various industries, including the petroleum refining industry. While these regulations, found in 40 CFR 419, do specify limits for ammonia nitrogen, these are less stringent than the limits in the existing

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site-specific rule. The Board has previously found that the wastewater treatment system goes beyond Best Available Technology (“BAT”) requirements.

14. The Board has adopted Title 35, Section 304.122 to control ammonia discharges to the Illinois River System, originally Rule 406, adopted Jan 6, 1972. Rule 304.122(b) limits larger industrial discharges (greater than 100 lbs/day ammonia) to an effluent discharge concentration of 3.0 mg/l NH3-N. Historically, the refinery has achieved compliance with the federal effluent regulations; however, the 3.0 mg/l effluent limit has not been attainable on a consistent basis.

15. From 1977 through 1984, Union operated the Refinery under several variances from the Board for the ammonia nitrogen discharge. In 1982, the Board granted Union a variance, contingent that by May of 1984, Union would submit a program to ensure compliance with

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Rule 304.122 or prepare a proposal for a site specific rule change. In December of 1984, Union petitioned the Board for a site specific rule change. The Board granted Union site specific effluent limits set at the U.S. EPA’s best available technology (BAT) pursuant to 40 CFR 419.23 (1985). This site specific rule change terminated on December 31, 1993. In 1993, UNO-VEN petitioned the Board for a site specific rule change. The Board granted UNO-VEN’s request

and set effluent limits for ammonia nitrogen of 9.4 mg/l monthly average and 26.0 mg/l daily maximum. By final order dated December 17, 1998, the Board made only two changes to the rule as adopted in 1993: A change of the name to reflect the sale to PDV Midwest Refining, LLC, and an extension of the termination date by 9 years to December 31, 2008.

16. The Refinery has improved its performance of ammonia removal despite higher crude throughput and a decrease in wastewater

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volume. Wastewater volumes have decreased since 1984 through the exercise of sound water management practices. Despite these factors that would tend to increase ammonia concentration, the Refinery has maintained and improved its performance in ammonia removal.

17. The limits for ammonia nitrogen proposed here are based on a statistical analysis using the 95th percentile of the standard deviation over historical and representative time periods to calculate the effluent limits. The daily and monthly limit is based on the 95th percentile based on the last five years of effluent data. The limits proposed demonstrate the commitment to improvement in nitrification, a reduction in the daily limit of 59 percent and in the monthly limit of 27 percent. Jim Huff will explain these calculations in his testimony.

18. Over the last several years, Lemont Refinery has been processing an increased

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percentage of heavy crudes and can expect the trend in feedstocks over the course of this petition to continue. The uncertainty associated with this issue justifies the Board choosing to set daily and monthly limits that take into account this uncertainty. Moreover, this analysis indicates that the proposed limits represent a continued emphasis on improvement in wastewater controls and achieving nitrification in the wastewater treatment plant even with more difficult wastewater streams to be treated. Over the last 5 years, on a net basis, the Refinery has exceeded 100 pounds on a monthly daily average for ammonia only 33 percent of the time, and exceeded 200 pounds per day for ammonia only 17 percent of the time.

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20 19. At this point, Petitioner and its
21 predecessors have expended significant
22 resources in improving the wastewater
23 treatment system at the Refinery. Petitioner
24 and its predecessors have spent nearly
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1 $75,000,000 to upgrade and improve the
2 wastewater treatment facilities at the
3 Refinery; approximately $45,000,000 of that
4 was spent just in the last 10 years. While
5 some of that was not done for the specific
6 purpose of improving nitrification,
7 approximately one quarter of that investment
8 had, as a substantial component, improving
9 the ability of the wastewater treatment
10 process to provide nitrification. Even
11 investments that did not primarily target
12 nitrification were done to benefit the
13 nitrification process. For example, the
14 Purge Treatment Unit (“PTU”) that was
15 installed as part of the FCC consent decree
16 was required in large part to ensure
17 consistent ammonia nitrogen removal. The
18 testimony of Bob Stein provides more detail
19 on this matter.
20
21 20. Under the site specific rule change
22 granted in 1987, the Refinery was required to
23 continue its efforts to reduce the
24 concentration of ammonia nitrogen in its
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1 wastewaters. The Refinery met this
2 requirement through continuous upgrades to
3 the wastewater treatment plant. After
4 petitioning for the 1987 site specific rule
5 change, the Refinery: Added a third aeration
6 basin, increasing the total aeration volume
7 from 1.38 million gallons to 1.92 million
8 gallons; Upgraded the aeration system by
9 replacing the existing mechanical surface
10 aerators with a fine-bubble diffused aeration
11 system; and Added the second 100-ft. Diameter
12 secondary clarifier, doubling the secondary
13 clarifier capacity. These improvements were
14 designed to increase ammonia oxidation,
15 increase available dissolved oxygen and
16 increase hydraulic throughput.
17
18 21. While the site specific rule change was
19 granted in 1993, the Refinery continued its
20 efforts to reduce the concentration of
21 ammonia nitrogen in its wastewaters. From
22 1992 until 1998, the Refinery: Installed a
23 new chemical feed facility at the WWTP;
24 Eliminated discharge of process wastewater to
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the stormwater basin and provided tankage for equalization/oil separation of process wastewater; Converted the WWTP control system to new DCS control Modified the sour water stripper charge tanks inlet line for better oil/water separation; Performed a clean closure of the stormwater basin; and Utilized Nalco dried bacteria and conducted nitrifier inhibition testing.

22. Since 1998, the Refinery has continued to make improvements to its wastewater treatment system. Those measures have included: In 2000 installed induced gas flotation system with polymer addition; In 2003, added additional strippers in the sour water system for ammonia removal; Also in 2003, upgraded diffused aerators to improve oxygen transfer; In 2006, upgraded phosphoric acid feed system and the aerators to improve oxygen transfer; In 2007, installed purge treatment unit to treat the discharge from the FCC scrubber; And also in 2007, upgraded diffused aerators to improve

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oxygen transfer. The total cost of these improvements was approximately $45,000,000.

23. While there has been success in reducing the effluent ammonia nitrogen concentration, the Refinery is unaware of proven means to comply with the ammonia nitrogen rule on a continuous basis. The options available to Lemont are 20-68 times more expensive, on a unit cost basis, than other available alternatives for ammonia removal. Therefore, it is possible to spend millions of dollars in an attempt to implement unproven strategies for potential ammonia nitrogen reduction even though:

(a) the present level of wastewater treatment at the Refinery is better than the United States Environmental Protection Agency's ("U.S. EPA") effluent guideline of best available technology ("BAT") economically achievable; and

(b) the ammonia nitrogen discharge for the Refinery has no discernable water quality impact on the receiving stream.

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24. The requested amendment will allow Lemont Refinery to continue to operate without spending millions of dollars on unproven technology in an attempt to accomplish further ammonia nitrogen reductions with little or no environmental

benefit. The Refinery will continue to optimize its treatment facilities, regardless of the outcome of this Petition. Indeed, the daily limit requested here represents a 59 percent reduction, substantially below the level authorized in 1998.

25. The Lemont Refinery has investigated the available information on the performance of other refineries in Illinois to provide nitrification. The conclusions of that investigation are in the 2007 Aware report, but can be summarized as follows:
(a) the other refineries were using similar technological approaches as used by the Lemont refinery design, and none of them were using the technologies investigated by Aware

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as possible additions to the Lemont Refinery;
(b) there are site specific variations in how the wastewater treatment systems are designed and operated, as well as some differences in the crude supply; and
(c) there are some differences in these design specifics which may be worth exploring for potential use and modifications at the Lemont Refinery to further enhance its nitrification capabilities.

26. Based on evaluations and reports that accompany this Petition, the Refinery will continue to investigate improvements to its existing wastewater treatment system. It is believed that focusing on better solids handling from the desalter holds the greatest promise for achieving improved wastewater treatment performance on a consistent basis. The options that will be investigated include: An in situ solid removal system, increased tankage to allow brine segregation; amine management; and adjusting chemical usage to reduce emulsification in the primary

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treatment units.

27. At this point in time, the total ammonia discharge from the Refinery, on an average basis over the last 5 years, is less than the allowable discharge of 3 mg/l, even when about 25 percent of that discharge is due to the ammonia nitrogen levels already in the Canal. Nevertheless, the Refinery will continue to look to improve its treatment for ammonia nitrogen.

28. Through the first six months of 2008, the refinery has removed 29 pounds per day

from the Ship Canal, while adding only 17 pounds per day. To date, the 2008 annual average ammonia concentration is 0.39 mg/L.

29. This concludes my prepared testimony. Jim Huff and Bob Stein will provide further testimony and exhibits in support of the Petition.

BRIGITTE POSTEL,

called as a witness herein, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. FORT:

Q. Ms. Postal, you filed prefiled testimony in this matter; correct? 09:24:45

A. Yes.

Q. And attached to that prefiled testimony, I believe, is Exhibit 1?

A. Right.

Q. And have you reviewed that document that we called Exhibit 1 and are you confident that it's true, accurate and complete? 09:24:52

A. Yes.

PREFILED TESTIMONY OF JAMES E. HUFF.

My name is James E. Huff, and I am Vice President and part owner of Huff & Huff, Inc., an environmental consulting firm founded in 1979. I received a Bachelor of Science in Chemical Engineering in 1970 from Purdue University and was awarded a Masters of Science in Engineering from the Environmental Engineering Department at Purdue University in 1971. I am a registered

Professional Engineer in Illinois. My work experience includes two years with Mobil Oil as an Advanced Environmental Engineer during the construction and start-up of the Joliet Refinery. After leaving Mobil in the fall of 1973, I was employed for three years at IIT Research Institute in the Chemical Engineering Department, working on advanced wastewater treatment projects including catalytic oxidation of cyanide in petroleum wastewaters. I then spent four years with the Armak Company, now called Akzo Nobel Chemicals, where I was the Corporate Manager of Environmental Affairs responsible for regulatory compliance and engineering design of environmental systems at nine manufacturing facilities in the United States and Canada. Three of these chemical plants were fatty amines manufacturers, where ammonia was utilized as a raw material and was a major component in the wastewater.

For the last 28 years at Huff & Huff, Inc., I have been involved in over 40 environmental impact studies associated with the impact of

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wastewater discharges on receiving streams throughout the United States. Many of these studies have involved ammonia nitrogen impacts, including those for the City of Lockport, CITGO Lemont Refinery and its predecessors UNO-VEN and Union Oil, ExxonMobil Oil Corporation, the Galesburg Sanitary District, and Modine Manufacturing. I was Project Manager on a year long Fox River Ammonia Study on behalf of most of the municipal discharges on the Fox River below the Chain-of-Lakes. I was an active participant in the ammonia water quality proceedings (R94-1b), on behalf of six communities and the Indian Refining Corporation. I am currently working on addressing low dissolved oxygen levels on the East Branch of the Du Page River and Salt Creek on behalf of the Du Page River/Salt Creek Work Group. In addition, I have been actively involved in the current UAA proceedings on the Chicago Waterways on behalf of three industrial clients. I have designed nitrification facilities for both

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industrial and municipal wastewater treatment plants. I was retained by CITGO Petroleum Corporation (Lemont Refinery) to evaluate the environmental impact of the ammonia in the Lemont Refinery’s discharge to the Chicago Sanitary & Ship Canal. See 2008 report attached as Exhibit 2. I have directed previous studies relating to the same issue for previous site-specific requests for the Lemont Refinery. See 1992 report attached as Exhibit 3. A copy of my resume is attached as Exhibit 4. In addition, effluent limits were derived based upon existing effluent quality, BAT, and current water quality conditions.

Background

The Lemont Refinery is located southwest of Lemont, Illinois, east of Romeoville, along the east side of the Chicago Sanitary & Ship Canal (Ship Canal), at River Mile 296.5. Water is withdrawn from the Ship Canal for refinery use, and the treated wastewater effluent is discharged to the Ship Canal 5.5 miles upstream of the Lockport Lock and Dam

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and less than one mile upstream of Midwest Generation’s Romeoville Power Plant. The wastewater treatment facilities came on

line in 1969, the same time the refinery began processing crude oil. The treatment plant underwent major changes in 1992, including new process water storage tanks, a new aeration basin, a new clarifier, and fine bubble diffusers. Over the past decade, the Lemont Refinery has expended an additional $45 million on capital projects related to ammonia control and reduction. Over the past five years the processing of heavier crude oils has increased. These heavier crude oils contain more inert solids and create more stable emulsions in the desalter unit. The result has been not only a significant increase in chemical addition to remove oil (break the emulsions) and solids in the process water, but a more variable influent loading on the activated sludge treatment process.
The Ship Canal is classified as Secondary Contact water under Illinois regulations.

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There is no total ammonia water quality standard applicable to the Ship Canal. Un-ionized ammonia, which is a function of the total ammonia, pH, and temperature, is limited by a not-to-exceed value of 0.1 mg/L. This water quality standard is to be achieved at the edge of the mixing zone. The Agency has proposed to amend the ammonia water quality standard on the Secondary Contact Waterways to be the same standard as in the General Use Standards in R08-09, currently before the Board.
Influent and Effluent Quality
The Lemont Refinery water intake is located approximately 175 feet upstream of the outfall and is routinely analyzed for ammonia by the refinery. Ammonia quality in the Ship Canal has steadily improved over the past two decades, from an annual average of 3.77 mg/L in 1987, to 1.28 mg/L in 1996, to 0.56 mg/L in 2007, as depicted in the attached Exhibit 5, Figure 1. This decline is attributed primarily to the reduction in effluent ammonia achieved by the MWRDGC at its

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upstream treatment plants over this period of time.
Effluent ammonia quality from the Lemont Refinery is presented in Exhibit 5, Figure 2. From 1995 until 2005 the annual average ammonia concentration was below 3.0 mg/L. In 2005, with the increase in the processing of the heavier crude oils and resultant higher loading on the treatment facilities, the effluent ammonia increased to an annual

average of 3.63 mg/L. As the Lemont Refinery has improved its ability to process these heavier crude oils, the effluent ammonia levels have continued to improve; to 3.50 mg/L in 2006, 2.45 mg/L in 2007, and through the first six months of 2008 to an all time low 0.39 mg/L. Clearly overall, the Lemont Refinery has made progress on consistently nitrifying.

Finally, Exhibit 5, Figure 3 depicts the mass of ammonia removed from the Ship Canal on an annual average compared to the mass discharged. The net discharge (effluent less influent) over the past decade has averaged

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less than 43 pounds per day, and for 2008 to date, the Lemont Refinery has removed 29 pounds per day from the Ship Canal, while only discharging an average 17 pounds per day.

Receiving Water Way Description

As noted previously, the Lemont Refinery discharges into the Ship Canal 5.5 miles upstream of the Lockport Lock and Dam, at River Mile 296.5. The Ship Canal extends 31.1 miles from its confluence with the Des Plaines River to the Damen Avenue Bridge in Chicago (CDM, 2007). The Ship Canal is typically 200 to 300 ft. Wide with depths ranging from 27 to 50 ft. (CDM, 2007). The construction of the Ship Canal includes vertical walls and steep embankments. The Ship Canal was erected in approximately 1900, to “transport human waste and industrial pollutants away from Lake Michigan” (CDM, 2007). As part of the Use Attainability Analyses (UAA), CDM conducted a recreation and navigation survey for 28 days. No swimming, skiing, tubing, or wading was

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observed. A single canoe, sculling or hand powered boat was observed within the 28 days. From my own experience in conducting benthic surveys on the Ship Canal for both the Lemont Refinery and the MWRDGC, the Ship Canal is not safe for canoes, sculling or other hand powered boating activities. When barges pass, the wake creates literally a wave machine bouncing off the vertical walls. Where two waves cross, the amplitude doubles, and waves get progressively larger reaching wave heights in excess of five feet before gradually subsiding.

The aquatic habitat of the portion of the Ship Canal where the Lemont Refinery is located was rated as “poor to very poor” (IEPA, 2006). Overall stream use is

designated as non-support for fish consumption and aquatic life. The identified causes of impairment were polychlorinated biphenyls (PCBs), irons, oil and grease, D.O., total nitrogen, and total phosphorus. Sources included combined sewer overflows, urban runoff/storm sewers, impacts from

hydrostructure flow regulation/modification, municipal point source discharges, and other unknown sources. Ammonia concentrations were not identified as a source of impairment, due to the monitored results achieving the water quality standard.

In addition to the unique structure, the Ship Canal is home to three coal fired power plants that provide low cost electricity to the City of Chicago, the remainder of the State of Illinois, and elsewhere through the electrical power grid. The Ship Canal is effluent dominated with over 70 percent of its flow on an annual bases from municipal effluents (IEPA, 2008). This included wastewater effluent from the Stickney treatment plant, one of the largest treatment plants in the world. Essential barge traffic also flows along this critical artery to a wide range of industries located along the Ship Canal.

Another unique factor on the Ship Canal is the electric barrier installed near the Lockport Locks. This barrier was installed

to prevent invasive bighead carp from migrating into the Great Lakes. A second electric barrier has been constructed but is yet operational. These electric barriers will not only prevent the invasive fish from migrating, but will also prevent other fish from migrating up or down the Ship Canal at Lockport, normally not a desirable outcome, but certainly necessary in light of the goal to protect the Great Lakes.

The UAA Report (CDM, 2007, page 4-80) notes that habitat ranged from poor to very poor, and identified the following factors as limiting aquatic potential on the Ship Canal:

Silty substrates
Poor substrate material
Little instream cover
Channelization
No sinuosity

There are no backwater areas or tributary mouths along the Ship Canal. The lack of habitat diversity along the Ship Canal clearly limits the diversity of the aquatic biota.

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As noted in Exhibit 5, Figure 1, the total ammonia concentrations in the Ship Canal are generally low, below 1 mg/L. Un-ionized ammonia levels from 2000 to 2002 at four stations along the Ship Canal and Des Plaines River are presented in Table 4-1 of the 2008 report, Exhibit 2. Average un-ionized ammonia concentrations at all four stations have been consistently less than 0.010 mg/L. Not only is the un-ionized ammonia levels in the Ship Canal less than the current water quality standard, the levels also attain the proposed changes in the un-ionized ammonia water quality proposed as part of the Use Attainability Analysis (UAA) in R08-09.
Mixing Zone
In 1992, Huff & Huff, Inc. Conducted a mixing zone study on the Lemont Refinery outfall (see Exhibit 3). The outfall design is unique in that it is a 15-inch diameter pipe, extending vertically downward 15 feet below the surface into the Ship Canal. The result is a turbulent discharge that is strongly buoyant due to the entrained air from the
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effluent flowing over the weir from the Treated Water Basin. The Zone of Initial Dilution (ZID) was measured at 10:1 and only occupies 100 square feet of the Ship Canal. There are only 300 gallons of effluent within the ZID at any one time, with a mean retention time under 7 seconds.
In 1992 the mixing zone achieved a 40:1 dilution within 60 ft. Downstream, occupying only 0.05 acres, compared to the allowable 26 acres. With the lower 7-day, 10-year low flow due to the MWRDGC’s loss of discretionary diversion from Lake Michigan and the slightly higher effluent flow today than in 1992, the mixing zone today achieves a 36.7:1 dilution within the same 0.05 acres.
Historical Relief Sought
In 1987, the Board granted site-specific relief to the Lemont Refinery, allowing the Agency to establish limits based on a reasonable measure of actual production at the Refinery. From that order, the Agency set limits of 749 lb/day ammonia (monthly average) and 1,648 lb/day (daily maximum).
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No concentration limits were imposed in 1987 but at the refinery’s design average flow of 5.79 MGD, these mass limits equate to:
Monthly Average: 15.5 mg/L
Daily Maximum: 34.1 mg/L
The next two rule changes contained the

following concentration limits:
Monthly Average: 9.4 mg/L
Daily Maximum: 26.0 mg/L
The current petition is requesting the
following concentration limits:
Monthly Average1: 6.9 mg/L
Daily Average2: 10.6 mg/L
Clearly, the Lemont Refinery has made
progress in reducing its effluent ammonia
discharged, and the requested relief
continues to make commitments to future
progress. It is important to remember that
this requested relief is for a reduction in
pollutant loading from the current permitted
level.
Receiving Water Impacts
Exhibit 5, Figure 1 and Tables 4-1 and 4-2 of
Exhibit 2 present the historical
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concentrations of total ammonia and
un-ionized ammonia in the Ship Canal. The
total ammonia can be described as relatively
low on an annual basis, and the requested
relief will further lower the Lemont
Refinery’s contribution to the downstream
stations. The permitted monthly average
limit will decline by 27 percent, while the
permitted daily maximum will decline by 59
percent.
The un-ionized ammonia in the Ship Canal on
an annual basis is less than 10 percent of
the un-ionized water quality standard, and is
consistently in compliance with the water
quality standard. This adjusted standard
request will further reduce both the total
and un-ionized ammonia levels downstream over
the existing conditions.
As ammonia is oxidized in the receiving
stream, oxygen is consumed. To the extent
the Lemont Refinery’s ammonia is contributing
to lower dissolved oxygen (D.O.) levels, the
requested relief will only improve D.O. from
the existing levels, with the more
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restrictive ammonia effluent limits proposed.
According to the UAA Study (CDM, 2007), the
MWRDGC has recorded D.O. levels below the 4.0
mg/L minimum water quality standard at all
seven stations on the Ship Canal. At
Romeoville and Lockport, both downstream of
the Lemont Refinery, 19 percent of the time
D.O. levels below 4.0 mg/L were recorded, the
same percentage of time as at the upstream
location at Cicero Avenue.
The Agency’s proposal is to change the
minimum D.O. to 3.5 mg/L in the Ship Canal.
It is my understanding the Ship Canal does

not currently achieve this 3.5 mg/L D.O. level during wet weather combined sewer overflow events.
In 1992, in support of an earlier petition, Huff & Huff used the MWRDGC's QUAL 2E model to predict changes in D.O. from the Lemont Refinery's contribution. At a discharge rate of 744 pounds per day of ammonia from the Lemont Refinery, the maximum D.O. decline was 0.03 mg/L (maximum loading at low flow conditions.) With the current requested

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relief, the maximum reduction in D.O. will be closer to 0.02 mg/L at maximum loading and low flow. The minor level of change in D.O. is less than can be accuracy of the D.O. test method for streams (0.1 mg/L). In essence, no change in D.O. could be measured attributed to the Lemont Refinery.
Illinois EPA Recommendations
the Agency has recommended that the Board deny CITGO's requested Adjusted Standard relief. Some responses to the Agency's technical basis are appropriate.
the Agency cites the Board's 1972 conclusion that a reduction in ammonia is necessary if the Illinois River is to achieve the D.O. Standard.
While the 36 year old opinion held significant meaning at the time, more recent water quality data present different stream conditions. The attached Exhibit 5, Figure 1 shows that since just 1986, ammonia levels in the Ship Canal have declined from over 3.6 mg/L to between 0.47 and 0.81 mg/L. There is no longer an ammonia issue on the Illinois

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River. The Agency also overlooks the fact that the requested relief will further reduce ammonia concentrations over existing levels in the Ship Canal.
At this point, CITGO is the only refinery discharging to the Ship Canal that has yet to meet the ammonia nitrogen standard at 35 III. Adm. Code 304.122(b).
This statement is misleading as the Lemont Refinery is the sole refinery on the Ship Canal. However, the waterway receives effluent from one of the largest municipal wastewater treatment plants in the world, which contributes significantly more ammonia on a pounds per day basis than the Lemont Refinery contributes. Over the past four years, the Ship Canal upstream of the Lemont Refinery has contained an average 0.66 mg/L total ammonia. Even at the 7-day, 10-year low flow, this translates into 4,640 pounds

per day of ammonia passing by the Lemont Refinery. The Lemont Refinery over the past decade has contributed an average 43 pounds per day of ammonia on a net basis, or less

than one percent of the overall ammonia loading under low flow conditions. (The contribution from the Lemont Refinery would be even less at higher Ship Canal flows.) CITGO further claims that the discharge from the refinery doesn't pose any threat to human health or the environment and is not significantly greater than the environmental impact that the Board was trying to control when it adopted the ammonia nitrogen rule. Since Section 304.122(b) is a technology based standard, not a water quality standard, CITGO's assertion is irrelevant to the issue at hand as there exist removal technologies that are economically reasonable and technically feasible.

The economically reasonable and technically feasible determination by the Board was based on treating municipal wastewater. The Agency has supported since the late 1980s, for both the Lemont Refinery and Mobil Oil relief from this rule, in part based on the absence of environmental impact. The Agency's current response addresses environmental impact,

including citing the Board's 1972 opinion on the D.O. concern, yet claims such concerns are "irrelevant". The Lemont Refinery continues to make progress in reducing its ammonia discharge. The requested relief will reduce the permitted daily maximum by 59 percent.

Conoco-Phillips Refinery does not have water quality based limits due to its location on the Mississippi River, however nitrification is known to occur on a regular basis given the ammonia levels measured in the effluent and the results of whole effluent toxicity testing.

This statement is also misleading. The Lemont Refinery nitrifies a high percentage of the time and its effluent also passes the whole effluent toxicity testing. From information in the Agency files, the following could have been provided to the Board by the Agency:

CONOCOPHILLIPS WOOD RIVER AMMONIA EFFLUENT LEVELS

Year

Maximum Monthly Average, mg/L

Daily Maximum,

mg/L
2003
2.0
15.2
2004
7.6
7.6
2005
5.8
10.6
2006
2.3
3.0
2007
4.2
4.2
From 2002 to 2007, the ConocoPhillips Wood River Refinery has discharged an average 67 pounds of ammonia per day. As the intake water is groundwater, this 67 pounds per day can be considered a net discharge, as compared to the Lemont Refinery net 43 pounds

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per day ammonia discharged. It would seem that the Agency's use of this other refinery as an example is totally consistent with the Lemont Refinery's performance.
It is clear Conoco-Phillips does not meet a 3.0 mg/L monthly average or a 6.0 mg/L daily maximum all the time. In fact, the results look very similar to the Lemont Refinery's performance. Simply comparing concentrations discharged from petroleum refineries can be misleading, as water conservation practices vary. The more modern refineries like the Lemont Refinery discharge less water per barrel of crude processed than older refineries.
By seeking relief from Section 304.122 ammonia standard, CITGO is subjecting a portion of the Ship Canal to experience much higher ammonia concentrations, 6.9 mg/L as a monthly average and 10.61 mg/L as a daily maximum.
This statement does not offer an accurate representation of the relief sought. The requested relief will result in lower ammonia

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concentrations in the Ship Canal than result from the existed permitted levels, which the Agency supported in the previous site specific rule change. The Agency also seems to imply that ZIDs and mixing zones are inappropriate. Within the ZID, where a 10:1 dilution occurs within 7 seconds. Assuming the Lemont Refinery is discharging at the requested daily maximum limit of 10.61 mg/L,

the ammonia concentration at the edge of the ZID will be 1.63 mg/L, and at the edge of the mixing zone, the ammonia concentration will be 0.91 mg/L. At the 7-day, 10-year low flow, the increase in ammonia will be from 0.634 mg/L upstream to 0.701 mg/L once complete mixing has occurred when the refinery is discharging at its proposed daily maximum 10.61 mg/L and its design average flow. Again, all of these values are reductions from the current permitted levels. The Lemont Refinery is seeking an adjusted standard from ammonia effluent limits that were adopted by the Board solely because of the elevated ammonia/low dissolved oxygen in

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the Illinois River over 36 years ago. No other large water body in Illinois has effluent ammonia standards. The conditions that lead to these unique Illinois River Basin effluent standards no longer exist today.
The Ship Canal will thus have an area that is effectively unavailable as habitat for sensitive forms of aquatic life.
the Agency should identify which “sensitive forms of aquatic life” it is referring to. The Agency in its pre-filed testimony in R08-09, described the Qualitative Habitat Evaluation Index on the Ship Canal as “generally below 22, which are to be expected in waters with very poor to poor habitual attributions” (R. Sulski, 2007, page 17, emphasis added). If the habitat is controlling the aquatic potential, it is misleading to state sensitive forms would enter into the turbulent ZID and mixing zone. In Adjusted Standard AS96-10, the Board’s opinion noted that the Agency’s opinion was that the costs of installing additional

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cooling “may not be economically reasonable when compared to the likelihood of no improvement in the aquatic community of the UIW.”3 (AS96-10, Opinion and Order at page 7). The Agency’s position in this ammonia proceeding is inconsistent with the position it has taken historically along the waterway as well as its current position on the limitations of habitat in the UAA proceedings.
Adding higher ammonia discharge levels would only further prevent attainment of dissolved oxygen standard (emphasis added).
Again, the Agency is confusing the Lemont Refinery’s request, which is a reduction in ammonia levels over the current permitted

levels. Attainment of the dissolved oxygen standard on the Ship Canal will depend on the elimination of CSO events, not on the Lemont Refinery's minor ammonia contribution.

Cost Effectiveness

As presented in Exhibit 5, Figure 3, the Lemont Refinery has achieved an average annual total ammonia effluent level of 75

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pounds per day over the past decade while the existing Site Specific Rule Change was in effect. The ammonia removed from the Ship Canal by the Lemont Refinery over this same period has averaged 32 pounds per day, so the net contribution has been 43 pounds per day. Assuming that the lowest cost upgrade identified in the Aware Report (February 2008) will remove the 43 pounds per day contributed (the refinery becomes ammonia neutral to the Ship Canal), the annualized cost would be $3,220,000, or a cost of $205 per additional pound removed.

The Lemont Refinery would also increase its carbon footprint from the additional energy consumed with the add-on equipment, should the adjusted standard be denied. The operating horsepower for the added equipment will be 144 HP. Assuming the additional energy consumed is derived from coal, the additional pounds per year of carbon dioxide emitted will be 1,976,000. Or for every additional pound of ammonia oxidized, 126 pounds of carbon dioxide will be emitted.

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Remember, that ammonia oxidation occurs naturally within the receiving stream, without carbon dioxide generation.

The $205 per pound of ammonia removal for the incremental 43 pounds per day can be compared to the cost for ammonia removal at the Calumet Water Reclamation Plant of approximately $3.00 per pound, and the addition of five side-stream aeration systems that provide sufficient oxygen to remove a pound of ammonia at approximately $10.00 per pound.4 The above unit cost is 68-times higher for the Lemont Refinery than the ammonia removal costs required for the Calumet Water Reclamation Plant, and is clearly not cost effective.

Derivation of Effluent Limits

The Lemont Refinery is currently operating under a site-specific rule change that expires on December 31, 2008. The existing limits include both load limits based on Best Available Treatment under the federal categorical limits and concentration limits.

The existing limits are as follows:

Ammonia Concentration
Monthly Average
9.4 mg/L
Daily Maximum
26.0 mg/L
Using five years of effluent data from June 2002 to May 2007, and the U.S. EPA Technical Support Document for Water Quality-based Toxics Control (1985) procedure, at the 95th percentile the calculated ammonia limits are 6.9 mg/L monthly average and 10.6 mg/L daily maximum. As noted previously, these are significant reductions from the current limits, 27 percent on the monthly and 59 percent on the daily maximum. However, Section 304.122(b) only applies to dischargers that discharge more than an average 100 pounds per day on a monthly average, and 200 pounds per day on a daily basis, and the Lemont Refinery is asking that the above concentration limits only apply when these mass limits are exceeded. This is particularly important from a compliance perspective. If nitrification is lost or

inhibited, ammonia concentrations increase, and there is minimal corrective action that can be accomplished in the short term to lower concentrations. However, the Lemont Refinery does have the ability to limit the volume of discharge for a period of time, and could reduce its discharge rate during periods when the nitrification process is upset to stay under the mass limits. From an environmental perspective, this is a good approach to minimizing any increase in ammonia in the Ship Canal, and allows for a proactive method for refinery personnel to respond to upsets without violating an effluent limit.
Summary
The Lemont Refinery has consistently achieved the Best Available Treatment ammonia limits since 1987. The average net ammonia discharged by the refinery to the Ship Canal since 1999 has been 43 lbs/day, and in 2008 through June the refinery has removed 29 pounds per day from the Ship Canal, while adding only 17 pounds per day.

The site-specific relief is not required to achieve the calculated BAT limits, but rather for the unique Illinois River Basin regulations that were based on river conditions that existed in the early 1970s,

but no longer exist today. The Lemont Refinery has been unable to consistently achieve the ammonia effluent limits due to the complex nature of petroleum refining as well as the sensitive nature of the nitrification process itself. The Lemont Refinery has expended over $45,000,000 since 1998, to attempt to further reduce effluent ammonia levels. The increase in the processing of heavier crude oils in 2005 clearly set back the refinery's progress. However, the steady improvement since 2006 and the record low effluent ammonia levels through the first six months of 2008 suggest that the Lemont Refinery is close to achieving the 3/6 mg/L limits, and a five year period to fine tune and demonstrate performance is reasonable. The environment will benefit from the significant reductions

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in ammonia permitted to be discharge while consumers may benefit from less expensive petroleum products in Illinois and a reduced carbon footprint associated with add-on nitrification equipment at the Lemont Refinery.
Given that the proposed effluent limits are lower than the limits determined from the water quality-based derivation, the requested effluent limits will be protective of the Ship Canal's water quality. The overall declining ammonia loading on the Illinois River System and the onset of nitrification within the Ship Canal itself (due to higher dissolved oxygen levels) have virtually eliminated un-ionized ammonia exceedances downstream of the Lemont Refinery. Dramatic improvements in the dissolved oxygen level within the Ship Canal have also occurred over the past twenty years. These factors support the Lemont Refinery's request for site-specific relief, as no environmental impacts from the requested relief have been identified.

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JAMES HUFF,
called as a witness herein, having been first duly sworn, was examined and testified as follows:
DIRECT EXAMINATION
BY MR. FORT: 09:25:02
Q. Mr. Huff, you've also filed prefiled testimony here?
A. Yes, sir.
Q. And that document also has attached to it resumes and calculations and exhibits; does it 09:25:08 not?
A. And data tables.

Q. And the exhibits and attachments to your testimony are true, accurate and complete to the best of your knowledge and belief? 09:25:24

A. Yes, sir.

CORRECTED TESTIMONY OF ROBERT M. STEIN

My name is Robert M. Stein and I am affiliated with AWARE Environmental Inc. (AEI). I have been evaluating the Citgo Lemont Refinery's (Lemont Refinery) wastewater treatment plant with regard to achieving the State of Illinois ammonia nitrogen discharge limitations for over 30

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years. A summary of the AWARE Environmental Inc. Professional capabilities, as well as the vitae for those persons participating in this evaluation are attached and are designated as follows: Description of AWARE Environmental Inc. Exhibit 6 Robert M. Stein Vitae Exhibit 7 George Tyrian Vitae Exhibit 8 I have specialized in the area of industrial water pollution control and I have worked with numerous industries with regard to biological nitrification and nitrogen control. I have consulted on over 10 refinery and 30 nitrogen control projects. A detailed list of projects is included in the attached vitae.

I have been a contributing author to one of the standard texts in the environmental engineering field, have been an adjunct professor at the University of North Carolina-Charlotte, I was appointed by the North Carolina Environmental Management Commission to serve on the Champion/Pigeon River Water Quality Variance Review Committee and I was awarded the TAPPI Roy F. Weston

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award for outstanding contributions in environmental technology. I have authored numerous articles on industrial environmental control. A list of publications is included with my vitae. Several of these were in the area of nitrogen control.

AEI, in addition to extensive experience in refinery and nitrogen removal systems in general, has a detailed understanding of the Lemont Refinery. The refinery produces gasoline, a variety of other fuels, coke, and solvents from crude oil. AEI personnel have been working with the Lemont Refinery treatment system for approximately thirty (30) years.

Process wastewater and stormwater from the refinery are treated in the refinery's wastewater treatment facility. The wastewater facility includes oil and solids

removal, flow equalization, clarification, single-stage activated sludge treatment and final polishing.
The Lemont Refinery has been unable to consistently and reliably meet the State of

Illinois effluent ammonia nitrogen concentration standard of 3.0 mg/L. The Illinois Pollution Control Board granted the refinery a site specific rule change, effective through December 31, 2008, which allows the refinery to meet the U.S. EPA Best Available Technology Economically Achievable (BAT) effluent limitations. The refinery has consistently achieved compliance with the U.S. EPA BAT effluent limitations.
AWARE Environmental Inc. (AEI) of Charlotte, North Carolina was retained by the Lemont Refinery to evaluate current conditions and potential alternatives for upgrading the treatment system to meet a 3 mg/l ammonia nitrogen limit. AEI conducted a conceptual evaluation of the Lemont Refinery wastewater treatment system, and the available alternatives to achieve ammonia removal for a refinery wastewater. The details of this evaluation are presented in our report entitled “Technical Review of Ammonia Treatment at the Wastewater Treatment Plant – Citgo Petroleum Corporation, Lemont

Refinery,” attached to this testimony as Exhibit 9. The primary objectives of this evaluation were to:
1. Determine if the present wastewater treatment system is consistent with U.S. EPA BAT criteria;
2. Determine if the wastewater treatment system operating conditions are conducive to biological nitrification; and
3. Evaluate alternative ammonia removal technologies and the cost of those technologies to determine if changes in the present wastewater treatment system are warranted as part of a program to achieve compliance with the 3 mg/l ammonia nitrogen criteria.
The results of this evaluation indicate that Lemont Refinery has a wastewater treatment system which exceeds BAT criteria and which allows the refinery to comply with U.S. EPA refinery discharge regulations. The long term performance data has demonstrated that the refinery wastewater treatment facility has achieved compliance with the current mass

based limitations for ammonia nitrogen

contained in the NPDES permit, but that the refinery has not been able to consistently meet a 3.0 mg/l ammonia nitrogen limit as per the Illinois regulations.
A review of the wastewater treatment technologies employed at the other Illinois Refineries was conducted. These refineries were Conoco-Phillips, Roxana, IL; Exxon-Mobil, Joliet, IL; and Marathon, Robinson, IL. The wastewater treatment processes employed by these Refineries are very similar to those utilized at the Lemont Refinery.
A review of the activated sludge treatment plant was performed with regard to factors which control the ability of a biological treatment facility to achieve nitrification. These factors include food to microorganisms ratio (F/M), sludge age, dissolved oxygen concentration, temperature, pH, and alkalinity. The review indicates that these parameters have been maintained in the ranges favorable to nitrification. However, in

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spite of this, the refinery treatment facility has been unable to meet the 3.0 mg/l ammonia nitrogen standard on a consistent basis.
We found that Lemont Refinery has maintained an ongoing optimization program and this program has resulted in improved ammonia nitrogen removal. The program has been expanded to address changes in the petroleum refinery industry. The refinery has spent over $45,000,000 over the last ten years on capital projects related to ammonia control and reduction.
As a result of changes in the crude quality, Lemont refinery has experienced a five-fold increase in wastewater treatment chemical addition costs over the last 4 years. Lemont refinery has and is continuing to conduct research which addresses the environmental impacts caused by crude quality fluctuations. Crude quality fluctuations confirm AEI's previous analysis which indicated that the capability of the wastewater treatment system is limited, in large part, due to the

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inherent variability of refinery wastewater.
There are a large number of treatment technologies which can be utilized for ammonia removal. These include biological treatment technologies, land treatment, wetlands polishing, and physical/chemical treatment. As part of my review of treatment alternatives for upgrade of the Lemont

Refinery wastewater treatment plant to achieve increased ammonia removal I considered our experience in design and operation of nitrogen technologies along with a detailed review of published data on technologies for ammonia removal. The most commonly used approach for ammonia nitrogen removal is biological nitrification. Biological nitrification is typically a two step process as follows:

Nitrosomonas

$2\ NH_4 + 3O_2 \rightarrow 2\ NO_2^- + 4H^+ + 2\ H_2O$

Nitrobacter

$2\ NO_2^- + O_2 \rightarrow 2NO_3^-$

Total Reaction

$NH_4^+ + 2O_2 \rightarrow NO_3^- + 2H^+ + H_2O$

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It is in the biological nitrification process where refineries have experienced problems in providing consistent ammonia nitrogen removal. This is because biological nitrification is a very sensitive process. The cell growth rate is much lower for the ammonia nitrogen organisms (nitrifiers) than for carbonaceous degradation (COD) organisms. In a typical activated sludge aeration basin, nitrifies represent only 2-5% of the aeration tank biomass. The nitrification growth rate is more sensitive to temperature changes than carbonaceous organism and nitrifiers are more susceptible to chemicals discharges. This can occur in a number of ways:

1. Inhibition – Nitrifiers continue to grow but at a slower rate
2. Toxicity – Loss of nitrifiers

EPA has published a listing of organics and metals which inhibit the organic activated sludge process and which affect nitrification (EPA-430/9-76-017a). This document indicates there are significantly more compounds which affect nitrification than carbonaceous

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organisms and where a compound affects both it typically affects nitrifiers at a much lower dosage (I.E. phenol affects carbonaceous organisms at 200 mg/l and nitrifiers at 4-10 mg/l).

Because of the sensitivity of the nitrifying organisms in the degradation of refinery wastewaters and the long term variability which has occurred in achieving ammonia removal at the Lemont Refinery, process technologies considerations were based on approaches which could minimize potential upsets and provide the best mechanism for biological nitrogen removal. This included single stage activated sludge (an increase in

the activated sludge aeration basin size or addition of a media to the existing aeration basin to obtain additional biomass). Some of the media applications include Kaldnes, Linpor, Hydroxyl or Agar or the addition of supplemental specialized bacteria to a single stage basin. However, these alternatives were rejected because of the sensitivity of nitrifiers to the refinery wastewater. Since

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the existing treatment plant has been experiencing problems with loss of nitrification and the fixed media type organisms are subject to sluffing, the addition of fixed media or increased retention time does not provide the best alternative to minimize potential upsets. An alternative approach could be providing a fixed bed type system ahead of the activated sludge system as a pretreatment. However, this still presents a problem since the fixed bed bacteria would be more sensitive to upsets and would not do as good as job of removing the carbonous materials. There is a very high probability of sluffing of the organisms which could upset the activated sludge process.
In reviewing alternatives for upgrading a single activated sludge system, we felt that the two most promising alternatives were a single stage activated sludge with a powered activated carbon supplement or a single stage activated sludge membrane bioreactor. The powered activated carbon supplement includes

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the advantage of the plastic type media in that it provides a location where additional bacteria can grow however the powdered activated carbon also adsorbs materials that may be toxic or inhibitory to the nitrifying organisms. This process allows concentration of trace nutrients at the carbon surface and provides bulk addition to improve sludge settling properties.
The membrane bioreactor technology is one of the newest approaches for improving biological nitrification. With the membrane there can be improved solids liquids separation and the treatment plant is able to operate at significantly higher MLSS levels than in a conventional treatment plant (typically twice the normal MLSS levels). Specifically this allows:
1) The retention time of the biomass can be increased to create favorable conditions for normal growth of the nitrifying organisms;
2) Better and more reliable effluent quality

as compared to a conventional processes; and 3) Easier control and operation of the system since the system would not longer need a secondary clarifier.

In addition to considering a single stage system we also considered two stage biological treatment. In a two stage process, carbonaceous removal is achieved in the first stage. This is normally an activated sludge process. The first stage reduces the concentration of toxic and inhibitory materials. There are two basic second stage alternatives. One is to have a 2nd stage activated sludge system and the other is use of a fixed media system for the 2nd stage. The reason for selecting a fixed media system for the 2nd stage is that the nitrifying organisms tend to grow slower than carbonous organisms, they do not settle as well and therefore, if the inhibitory or toxic materials can be reduced in the 1st stage than a 2nd stage fixed film system provides a very good mechanism for biological treatment. The poor settling organisms will attach to the media.

Based on the analysis of all alternatives, four of the most viable alternatives were selected for preliminary process design and budgetary cost estimates. The four alternatives selected include powdered activated carbon addition (PACT), a two stage activated sludge fixed media biological treatment, membrane bioreactors, and breakpoint chlorination. Addition of a fixed media biological reactor would be the most cost-effective alternative. The fixed media system would utilize a rotating biological contractor (RBC) and would have an estimated capital cost of $13,500,000 and an estimated annual operating cost of $1,220,000. The estimated total annualized cost for the addition of the fixed media reactor system over a ten (10) year period at 8 percent interest is $3,220,000/year.

Even with the ammonia removal upgrades, the ability of the treatment system to consistently meet the 3.0 mg/l ammonia nitrogen standard is uncertain. Based on the significant cost of upgrading the system, and the uncertainty that the upgraded system would achieve consistent compliance with the 3.0 mg/l ammonia nitrogen standard, upgrading the treatment system with additional treatment technologies for ammonia removal is

not justified.
Our findings indicate that the Lemont refinery has an approach which is properly directed to improving treatment plant performance, particularly as it relates to ammonia removal. We recommend that Lemont Refinery continue its ongoing research studies and projects designed to optimize the existing wastewater treatment system. These efforts should be directed toward obtaining the maximum possible ammonia removal on a consistent basis. Continued development of operational data under the varying conditions inherent with refinery wastes will help to improve the performance of the system, and will allow the maximum ammonia removal capability of the system to be achieved.
In conjunction with the preparation of testimony I received and reviewed a copy of the June 20, 2008 document entitled

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"Recommendation of the Illinois Environmental Protection Agency" related to the Lemont Refinery ammonia standard request. I offer the following comments to information contained in that document:
1. Item #13 on Page 5. In this section it is indicated that many expenditures which were credited as improvements to the treatment plant were not directly related to ammonia nitrogen. I feel that this is not true since many of the items noted were implemented to improve the overall treatment plant performance and the overall treatment plant performance improvements allowed the treatment plant to provide increased biological nitrification. For example, gas floatation pretreats and removes oils and solids prior to the activated sludge system. Oils can inhibit nitrification and the lower levels of these materials improves biological nitrification. In addition, the cost of the Purge treatment unit "PTU", installed as part of the FCC consent decree, were largely caused by the need to consistently provide

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ammonia nitrogen removal. Before installation of the FCC unit, the Refinery was far below BAT treatment standards. The PTU wastewater treatment processes would likely not have been needed had the ammonia rule - or the ammonia site specific rule - not been in effect.
2. Item #15 on Page 7. There is a discussion that when the board adopted the provisions of the ammonia nitrogen standard there was extensive testimony as to the

availability of methods for reducing ammonia in the effluent and it was determined that nitrification can be satisfactory accomplished for a reasonable price by a second stage of biological treatment. It indicated that the evidence is clear that for too long, oxygen demand exerted by ammonia in DOMESTIC waste has been overlooked. We feel that there is adequate demonstration that domestic wastewater treatment plants can achieve biological nitrification but this is not the case for the treatment of refinery wastewaters. Two documents which justify

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this finding are the “Development Document for Effluent Limitation Guidelines in New Source Performance Standards for the Petroleum Refinery Point Source Category”, April 1974, developed by the US Environmental Protection Agency and the “Develop Document for Effluent Guidelines New Source Performance Standards and Pretreatment Standards for the Petroleum Refinery Point Source Category”, October 1982, developed by the effluent guidelines division of the US Environmental Protection Agency. In both of these documents, there is clear indication that the petroleum refinery industry does not have the technology for economically achieving a 3 mg/l effluent standard on a consistent basis. In 1974, the EPA data showed that an activated sludge system for an petroleum refinery can expect to produce an effluent ammonia of 1 to 100 mg/l and in the 1982 development document the EPA indicated that for direct dischargers in the petroleum refinery industry (Table 6-1) that the current BPT for ammonia nitrogen is 6.8 mg/l.

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These data indicate that although the board may have had extensive testimony on methods of removing ammonia nitrogen in domestic effluents the technology was fundamentally different for ammonia nitrogen in the refining industry.

3. Item #15 on Page 7. It is noted that Citgo is the only refinery discharging to the Ship Canal that has yet to meet the ammonia nitrogen standard in the Illinois administrative code. I am not aware of any other refineries that discharge to the Ship Canal.

4. Items #17 and 18 on Page 8. The Agency quotes an excerpt from a board decision in 1972 out of context. The quote would appear to have the board as specifically stating that nitrification can be satisfactory

accomplished at a reasonable price. We question the use of reasonable price for refineries in light of the specific nitrogen reduction which is proposed to be achieved. Table 3-10 of the AWARE report (Exhibit 9) shows that the average effluent ammonia from

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January 2006 through October 2007 was 122 lbs NH3-N/day. At an average flow of 7.13 MGD and at a 3 mg/l ammonia nitrogen limit, the refinery would be allowed to discharge 178 lbs NH3-N/day. Therefore, the long term ammonia discharge is less than the projected limit. The technical and economic justification to spend an annual cost in excess of 3,000,000 to achieve very little addition nitrogen removal and a level that is not expected to consistently achieve the 3 mg/l standard is questionable.

5. Item #19 on Page 9. This notes that Citgo is the only Illinois refinery not meeting the ammonia limit. Based on a review of the available NPDES data, the Conoco Philips Refinery is only in compliance with the 3 mg/l limit approximately 90% of the time and the Exxon Mobil Refinery has been in compliance only since 2005.

6. Item #20 on Page 9. The report questions if the refinery has adequate retention time to comply with the effluent standards. It should be noted that the retention time at

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the Conoco Philips is 1.31 days and that refinery, as previously noted, has only been in compliance approximately 90% of the time. The F/M as noted in the AEI report at the Citgo Refinery is adequate for biological nitrification and on a long term basis achieves a very low effluent ammonia concentration. One item noted in the EPA development document related to refineries are “the effluent from a properly designed and operated treatment plant changes continually due to the variety of factors. Changes in production mix, production rate, and reaction chemistry influence the composition of raw wasteload and therefore, its treatability. Changes in biological factors influence the efficiency of the treatment process”. Therefore, we feel that there are a number of factors which effect the performance of a refinery treatment plant to achieve nitrification and that these have a direct effect on the ability of the treatment plant to consistently achieve nitrification.

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7. Item #20 on Page 10. It was noted that Citgo did not consider additional aeration basin or additional clarifier to provide longer detention time. It should be noted in the AEI report (in Table 4-6 of Exhibit 9) that the overflow rate in the clarification system is lower than in the Exxon Mobil and Conoco Philips refineries. Therefore additional clarification would not necessarily make any significant improvement. We looked at additional detention time in that one of the processes selected (2-stage biological system where we used a fixed film system as the second stage). This provides additional detention time and also provides what we feel is one of the best cases for providing good treatment in that a 2-stage system provides reduction of toxic and inhibitory materials in the 1st stage and a 2nd stage a fixed film type process provides a very good media for growth of nitrifying organisms.

8. Item #24 on Page 11. The ammonia concentrations in the permit should not

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affect the long term average ammonia discharge. As previously noted the long term ammonia discharge from the refinery in 2006-2007 was 122 lbs/day. This is actually significantly less on a long term basis than the proposed permitting levels. Therefore, we do not feel that there is any significant additional effect on aquatic life. This also applies to Item 25 on Page 12 which questions the additional ammonia effecting DO in the Ship Canal since on a long term average the ammonia discharge is less than would be permitted under the 3 mg/l regulation.

9. Item #37 on Page 16. The other refineries have not been able to consistently achieve the 3 mg/l level. We disagreed, as previously stated, that the additional ammonia removal will be cost effective.

I will now summarize our findings which have resulted in these conclusions:

1. COMPARISON OF LEMONT REFINERY WITH U.S. EPA BAT TECHNOLOGY

a) The U.S. EPA has developed a model plant for sour water strippers. The Lemont

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Refinery has maintained an on-going program with the objective of improving stripper performance. The sour water stripper data from the last ten years shows that ammonia removal efficiencies have been observed in excess of 96.8 percent, and monthly average efficiencies have been observed in excess of

99 percent. This type of performance is indicative of the facility's diligent program of improving performance. This represents performance well exceeding the U.S. EPA model refinery objective and continues to show ongoing improvement.

b) The U.S. EPA developed a BAT model for a refinery wastewater treatment system. Our analysis of the Lemont Refinery wastewater treatment system indicates that it exceeds the BAT technology for refinery wastewater treatment as presented in the 1982 U.S. EPA "Development Document". The BAT criteria used as the basis for the U.S. EPA effluent limitations guidelines are compared with the refinery wastewater treatment system in Table 1. As shown in Table 1 the refinery

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treatment system contains all of the BAT components outlined in the U.S. EPA. In addition to complying with the U.S. EPA model technology, the facility has continually made improvements and upgrades to its wastewater management program to reduce effluent ammonia and improve the overall performance of the treatment system. Based on the continued improvement in effluent quality it appears that these improvements and upgrades have been successful.

c) We have found that the Refinery wastewater treatment system performance is compliant with the U.S. EPA BAT effluent limits for ammonia. The current NPDES ammonia limits are 1005.73 lbs/day average and 2212.65 lbs/day maximum based upon updated production data. An evaluation of the data from January 2006 through October 2007 shows that the effluent ammonia has consistently been less than BAT levels with an average ammonia nitrogen discharge over this period of 122 lbs/day. The refinery produces a better quality effluent ammonia

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and the U.S. EPA BAT ammonia effluent limits are achieved 100 percent of the time, even under extreme and adverse conditions.

2) ANALYSIS OF TREATMENT PROGRAM

A number of parameters have been identified which affect biological nitrification. These parameters are: F/M (food to mass ratio); sludge age, aeration basin pH, aeration basin temperature; and aeration basin dissolved oxygen concentration.

Table 2 presents an analysis of normal requirements for nitrification and the operating levels at the Lemont Refinery. As can be noted, the Lemont Refinery has

consistently provided equal or better capabilities.

TABLE 1

COMPARISON OF BAT GUIDELINES WITH LEMONT REFINERY'S WASTEWATER TREATMENT SYSTEM

BAT Guidelines	Lemont Refinery System
Sour water strippers	Sour water strippers provide in excess 96% average ammonia removal efficiency
Flow equalization	Two (2) 4.6 MG process wastewater storage tanks providing approximately 4.2 day equalization capacity in addition to a 52 MG stormwater capacity which provide 14 days equalization and a 0.25 MG equalization tank
Initial oil and solids removal	CPI separators
Additional oil and solids removal	in the two 4.6 MG process wastewater storage tanks
Additional oil and solids removal	100 ft diameter primary clarifier with polymer addition
Induced gas flotation	
Biological treatment	
Single-stage activated sludge system	
Filtration or other final polishing	16 MG final polishing pond

TABLE 2

TYPICAL OPERATING RANGES FOR NITRIFICATION

Parameter	Optimum Range	Lemont Refinery
Operation(2)		
F/M, lb BOD5/lb MLVSS-day	Less than 0.3	0.056 – 0.287(3)
Sludge Age, days	> 10	13.1 - > 100
D.O., mg/L	2.0(1)	3.3 – 7.0
pH	7.2 – 9.0	7.0 – 8.2
Temperature, ºF	68 – 100	76 - 97

NOTES: (1) Average D.O. should be > 2.0 mg/L. Minimum D.O. should be > 1.5 mg/L.

(2) Based on monthly average data.

(3) F/M exceeded this range in June and July 1994. Overall average F/M over

operating period is approximately 0.150 lb/lb-day.

3)ANALYSIS OF TECHNOLOGIES UTILIZED AT ILLINOIS REFINERIES

In conjunction with the review of alternative technologies to upgrade the Lemont Refinery, a review of the treatment technologies in place at other Illinois refineries was conducted. The refineries included:

Conoco-Phillips Roxana, IL
Exxon-Mobil Joliet, IL
Marathon Robinson, IL

A summary of this analysis is presented in Table 3.

This analysis indicated that the treatment technologies at all the Illinois refineries are very similar. All have preliminary oil separation followed by an additional oil-water separator using a gas flotation process. The biological treatment process is activated sludge. The overflow rates on the secondary clarifiers are similar. The only difference in the treatment systems appears to be the activated sludge retention time. The Conoco-Phillips and Marathon refineries have a longer retention time than the Lemont Refinery. The Exxon-Mobil and Lemont Refinery have similar activated sludge retention times. A review of the effluent data shows that the Conoco-Phillips Refinery has not been in consistent compliance with the 3 mg/l ammonia standard. The Exxon-Mobil Refinery exceeded the 3 mg/l limit prior to 2005.

TABLE 3
COMPARISON OF WASTEWATER TREATMENT AT ILLINOIS REFINERIES
AEI JOB NO. N356-01

Refinery System	Conoco Phillips	Exxon Mobil	Lemont Marathon
Initial Oil and Solids Removal	Oil/Water Separator	API Separator	Two-4.6 MG Process Separation Tanks
			API Separator
Additional Oil and Solids Removal	Dissolved Nitrogen Flotation	Air Flotation	

Induced Gas Flotation
Dissolved Nitrogen Flotation
Biological Treatment
Activated sludge with 1.31 days detention time and 450 gpd/ft2 clarifier overflow
Activated sludge with 10.9 hrs detention time (upgrading to 19.4 hrs). Clarifier overflow 392 gpd/ft2
Activated sludge with 7.7 hrs detention time and 382 gpd/ft2 clarifier overflow
Activated sludge with 1.54 days detention time and 227 gpd/ft2 clarifier overflow
Tertiary Treatment
Polishing ponds 5.4 mg
Polishing pond 4.9 mg
Polishing in treated water basin (polishing pond) 16 mg
Final filtration
4) ADDITIONAL TECHNOLOGIES FOR THE REMOVAL OF AMMONIA
The AEI analysis of the Lemont Refinery

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treatment facility indicated that the refinery has been unable to provide consistent biological nitrification. Consequently alternative treatment technologies or variations of the biological treatment technology were examined to determine the feasibility of achieving the State of Illinois ammonia limitations of 3 mg/L. The alternative technologies which were evaluated included:
1. Biological Treatment Technologies/Adaptations
  a. Single-stage activated sludge.
  b. Single-stage activated sludge with the supplement of specialized bacteria.
  c. Single-stage activated sludge with a powdered activated carbon supplement.
  d. Single-stage activated sludge membrane bioreactor.
  e. Two-stage activated sludge.
  f. Two-stage biological treatment using activated sludge for the first stage and a fixed media system for the second stage.
2. Land Treatment

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3. Wetlands Polishing
4. Physical – Chemical Technologies
  a. Ion exchange.
  b. Air stripping.
  c. Steam stripping.
  d. Breakpoint chlorination.

Based on a review of available literature, previous studies on Lemont Refinery wastewater, and our personal experience with similar wastewaters, this list of

technologies was reduced to the four with the greatest potential for achieving the Illinois 3.0 mg/l ammonia nitrogen standard on a consistent basis. The four technologies selected for consideration at Lemont Refinery are:

1. Activated sludge with powdered activated carbon addition (PACT);
2. Activated sludge with a fixed media system;
3. Activated sludge with membrane bioreactor; and
4. Activated sludge with breakpoint chlorination and dechlorination.

Each technology was subjected to a rigorous and thorough evaluation to evaluate its potential for achieving the objective mentioned above.

Our analysis indicated that the least expensive approach for compliance was a second stage fixed media biological treatment unit. The annualized cost for the fixed media system over 10 years at percent interest is $3,220,000.

Additional ammonia removal may be achievable by upgrading the treatment plant with additional treatment steps such as a fixed media biological treatment unit. However, this would be at significant cost, and it is uncertain that the upgraded system would achieve consistent compliance with the 3 mg/L ammonia nitrogen standard. Therefore, upgrading the treatment system with additional treatment technologies for ammonia removal is not justified at this time.

SUMMARY

In summary, an analysis of the Lemont Refinery wastewater collection and treatment system was conducted to determine if the system continues to be a BAT facility. The results of this analysis indicate that the refinery has a state-of-the-art wastewater treatment system which exceeds BAT criteria and allows compliance with all U.S. EPA refinery discharge regulations and with the current NPDES permit for the facility. The wastewater treatment system has been operated under conditions which are optimum to achieve biological nitrification. There have been significant changes in crude supply and the refinery is processing heavier crudes, the wastewater treatment program has been diligent and has continued to provide excellent performance. However, the system has been unable to consistently achieve

biological nitrification. The data has demonstrated that the wastewater treatment system is not able to consistently provide biological nitrification to meet the 3 mg/L ammonia nitrogen standard as required in the Illinois regulations.

The Lemont Refinery has continued its program

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to optimize its treatment system. This appears to be the proper direction for improving wastewater treatment performance.

Alternative add-on, end-of-pipe treatment technology has been evaluated and will have an annualized cost of $3,220,000. There is no guarantee that installing this technology will result in compliance with the 3 mg/L ammonia nitrogen limitation. Therefore, we recommend that Lemont Refinery continue its ongoing wastewater treatment improvement programs. These efforts should be directed toward obtaining the maximum possible ammonia removal on a consistent basis. Continued development of operational data under the varying conditions inherent with refinery wastes will help to improve the performance of the system, and will allow the maximum ammonia removal capability of the system to be achieved.

ROBERT STEIN,

called as a witness herein, having been first duly sworn, was examined and testified as follows:

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DIRECT EXAMINATION

BY MR. FORT:

Q. Mr. Stein, same questions. You had filed prefiled testimony in this matter; correct?

A. Yes. 09:25:31

Q. And we found that there was a typo or dropped words in your testimony; correct?

A. Yes.

Q. And we now have corrected testimony for you; correct? 09:25:39

A. Yes, that's right.

Q. And the corrected testimony also relies upon the same exhibits that you had in your prefiled testimony?

A. Yes, it does. 09:25:46

Q. And is that information all true, accurate and complete to the best of your knowledge and belief?

A. Yes, it is.

MR. FORT: We have two other exhibits 09:25:58 to add. These are probably more in the nature of -- off the record.

(WHEREUPON, discussion was had off the record.)

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THE HEARING OFFICER: We are back on the record. And Mr. Tesher is going to read the exhibits into the record, so it won't be too confusing down the road.
MR. TESHER: We have the three prefiled testimonies on Exhibit 1 in this document here (indicating). This is Exhibit 2 here (indicating). 09:31:36
Exhibit 3 is in three parts, due to size, it's right here (indicating.) 09:31:49
Exhibits 4 through 8 are in this document here (indicating).
Exhibit 9 is here (indicating). And then, newly filed today, we have Exhibit 10, the corrected testimony of 09:32:00
Bob Stein. Exhibit 11 (indicating), this is a provisional variance from 2005.
And Exhibit 12 (indicating), this is the final order and the first and second notice from the 1998 rulemaking that's 09:32:14
R98-14.
THE HEARING OFFICER: All right. Thank you, Mr. Tesher.
Mr. Boltz, any objection?
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MR. BOLTZ: No objection, Your Honor.
THE HEARING OFFICER: These are entered into evidence.
(WHEREUPON, said documents, previously marked Exhibit 09:32:38
Nos. 1-12, for identification, were offered and received in evidence.)
MR. BOLTZ: Your Honor, one point of clarification, if I may. At some point within their testimony, various individuals 09:32:46
have generally referred on the Agency not meeting necessarily with Citgo, with the petitioner, during the course of the proceedings. The Agency does generally object on the basis of relevancy on that 09:33:00
issue --
THE HEARING OFFICER: Okay. Well --
MR. BOLTZ: -- for your notation.
THE HEARING OFFICER: The Board will so note your observation. 09:33:08
Mr. Fort, how do you want to...
MR. FORT: I have a couple of questions for each of the witnesses --
THE HEARING OFFICER: Okay.
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MR. FORT: -- and then the Agency or the Board or whomever can go ahead.
THE HEARING OFFICER: Go ahead, Mr. Fort. Thank you.
DIRECT EXAMINATION 09:33:24
BY MR. FORT:

Q. Ms. Postel, we've marked as an exhibit, I think it's No. 11, the provisional variance from late 2004.
Were you involved in that proceeding? 09:33:33
A. Yes.
Q. Can you describe to the Board what was going on, why that application was made?
A. We had a process upset and we lost nitrification in our wastewater treatment plant. We didn't feel that we would be able to meet our permanent limits. 09:33:39
So we worked with the Agency, and filed a provisional variance for ammonia. And then, upon receiving a request, we detailed, you know, what the operational issue was and sent that to the Agency. And the provisional variance was granted. 09:34:00
Q. And those kinds of conditions happen other times that you don't even seek a provisional variance?
MR. BOLTZ: Objection. Leading.
THE HEARING OFFICER: Overruled.
BY THE WITNESS: 09:34:25
A. Correct.
THE HEARING OFFICER: You may answer.
BY THE WITNESS:
A. Correct.
THE HEARING OFFICER: We have to keep our voices up. We don't have the mics on. 09:34:31
Maybe at 10:00 we will. Thank you.
BY MR. FORT:
Q. And to the extent there are upsets or other variations, where might we find the data that would reflect that? 09:34:47
A. It would be in Bob and in Jim's data tables, where we would see the ammonia spikes and -- indicating that we were having operational upsets.
Q. Has the refinery had upsets from time to time over the past ten years? 09:35:04
A. Yes.
Q. How consistently is the refinery able to nitrify?
A. If we don't have operational upsets, we can consistently operate the ammonia, you know, less than two parts per million on a routine basis.
Q. What kind of things is the refinery doing in the last 12, 18 months or so in order to improve its nitrification? 09:35:31
A. We began segregating the desalter water from other process wastewaters, we continuously removed solids from the process water tanks, we now do MEA -- well, we're doing amine management through operational checks. We have added an antifoam to the MEA system, which reduces the carryover potential for amine into the 09:35:50

wastewater treatment system.
Q. These are ongoing -- 09:36:18
MS. LIU: May I interject? Would you define MEA, please?
MS. POSTEL: Monoethylene amine.
MS. LIU: Thank you.
BY MR. FORT: 09:36:22
Q. What is MEA?
A. It's used to scrub H2S out of the refinery gases and waters.
THE HEARING OFFICER: Keep our voices up, I'm sorry.
BY MR. FORT:
Q. And even though you've been doing all these things, do you feel confident that the refinery could meet the three milligram per liter, 09:36:44 six milligram per liter standard on a continuous basis?
A. No, I do not.
MR. FORT: Can we enter her testimony as if read? 09:36:57
THE HEARING OFFICER: Sure. I can do that.
For the record, her testimony is entered as if read into evidence. Was that exhibit -- well, it's the prefiled testimony. 09:37:07 Exhibit 1, is it?
MR. FORT: Well, Exhibit 1 is actually the answer to the Board's questions or the Hearing Officer's questions. Her prefiled testimony really is a separate testimony that 09:37:22 we'd like to have entered as if read.
THE HEARING OFFICER: So I don't have that up here?
MR. TESHER: That first document.
THE HEARING OFFICER: Yes.
MR. TESHER: On the back of it.
THE HEARING OFFICER: Mr. Tesher, this is exhibit -- it's a little confusing. It's a little out of my -- the way I like to do 09:37:52 things.
MR. TESHER: The prefiled testimony is the prefiled testimony. And then the exhibits are to the prefiled testimony.
So this is just her testimony at 09:38:00 the front, and then behind it you have Jim's and Bob's testimony. The prefiled testimony as prefiled.
THE HEARING OFFICER: Okay. So we're marking this as Exhibit 1. I don't 09:38:16 understand -- I would like to get all the prefiled testimony as an exhibit.
MR. TESHER: That's not how we had it numbered.
THE HEARING OFFICER: Yes. 09:38:26

MR. TESHER: We didn't --
THE HEARING OFFICER: It's foreign to me.
MR. BOLTZ: It's the only way we can
0122
appropriately refer to it.
THE HEARING OFFICER: Yes.
MR. TESHER: Why don't we call that A?
MR. FORT: Well, how do you want to do it? I think there's only one -- 09:38:38
THE HEARING OFFICER: Tell me, Mr. Fort. Exhibit -- right now --
MR. FORT: Why don't we go off the record.
THE HEARING OFFICER: Let's go off the 09:38:48
record, Sharon.
(WHEREUPON, discussion was had off the record.)
(WHEREUPON, certain documents were marked Petitioner's Exhibit Nos. 13-15, for identification, as of 8/20/08.)
THE HEARING OFFICER: We're back on the record.
What we're going to do is mark 09:41:54
Ms. Postal's prefiled testimony as Exhibit 13, Mr. Huff's prefiled testimony as Exhibit 14, and Mr. Stein's prefiled testimony as Exhibit 15. But he did file a
0123
corrected prefiled testimony and that is marked, I believe, as Exhibit 10.
MR. TESHER: That's correct.
THE HEARING OFFICER: All right.
Thanks for your patience. 09:42:18
All right. Mr. Fort, I think you're still on --
MR. FORT: Thank you, Mr. Hearing Officer, for getting this record in order.
BY MR. FORT: 09:42:30
Q. Mr. Huff, can you elaborate --
MR. FORT: Now, we also have Mr. Huff's testimony as prefiled, as if read?
THE HEARING OFFICER: Correct.
MR. FORT: I'm trying to picture in my 09:42:41
head how the flow is going to look.
MR. BOLTZ: Well, maybe we should slow down here. Do we want to go through each witness one at a time, have a direct, have a
cross and then go to the next? Or -- and 09:42:52
whatever pleases, Your Honor.
THE HEARING OFFICER: Well, what's going to happen, I think -- because our technical personnel will probably ask a
0124
question. Usually it's kind of a tag team, like, Ms. Postal won't know the answer,

Mr. Stein may or Mr. Huff, so...
MR. BOLTZ: Sure.
MR. FORT: From our standpoint -- at least it will be easier if, as the Hearing Officer has said, because the answer to a question might be another witness. So by doing it as a panel, we get substantive answers flowing together in response to a question. 09:43:17 09:43:30
THE HEARING OFFICER: I agree.
MR. RAO: Especially with Mr. Huff and Mr. Stein, if there's overlap in their...
MR. BOLTZ: I'm sorry, I'm just wondering -- I mean, are we evaluating each witness' knowledge or Citgo as a party? Do you see what I'm saying? That's my only concern. 09:43:41
THE HEARING OFFICER: Uh-huh.
MR. BOLTZ: But however -- 09:43:52
THE HEARING OFFICER: Well, I mean, you'll be able to read from the record who says what.

0125

MR. BOLTZ: Okay.
THE HEARING OFFICER: And that's the way I -- just the standards usually go. It's more of an informational thing.
MR. BOLTZ: Well, that's fine. 09:44:04
THE HEARING OFFICER: State your objection, if need be.
R. BOLTZ: Fine.
MR. RAO: And we'll let the Agency go first. Hopefully you'll ask all their questions. 09:44:11
THE HEARING OFFICER: Mr. Fort?
MR. FORT: So we are going to put in the record now -- Ms. Postal's testimony will appear in the transcript as if read. And then Mr. Huff's. 09:44:29
And should I ask a couple clarifying questions for Mr. Huff now before we put in Mr. Stein's as if read?
THE HEARING OFFICER: Sure. If you so choose. 09:44:41
MR. FORT: Just --
THE HEARING OFFICER: And then I can -- Sharon will just write this into the

0126

record.

BY MR. FORT:

Q. Mr. Huff, can you talk a little bit more about your procedure for the 95 percent confluence interval and how you picked those levels? 09:45:05

A. The USEPA has a document called the Technical Support Document. And that document outlines USEPA protocol for deriving effluent limits based on existing effluent quality.

So it's a statistical analysis, it's typically along normal distribution. And the individual daily maximum value is typically derived at 95th percentile of the entire data set. 09:45:30

When you derive the monthly average, that can be either a 95th percentile of value of -- around the mean values or the 99th percentile. The 99th percentile will give you a higher monthly effluent limit. 09:45:51

Key in the USEPA policy is that your -- in this case, ammonia effluent limits are independent from day-to-day, which is clearly not the case when they have an upset. It may last for two days, may last for a week, it may last for a month. 09:46:13

0127

And so the USEPA protocol really underestimates the appropriate monthly limits. And they acknowledge that in the technical support document where you don't have independent from one result to the next stage result. 09:46:38

Q. But, nevertheless, the monthly limits that are being suggested here by Citgo are based upon the 95th percentile?

A. The more conservative 95th percentile, yes, sir. 09:46:54

MR. RAO: May I just interject?

Mr. Huff, will it be possible for you to give us the citation of the USEPA document that you're referring to, if it's not part of the record? 09:47:03

MR. FORT: It is at the end of his prepared testimony.

MR. RAO: Is it? Okay.

BY THE WITNESS:

A. And it's EPA document 440/4-85-032. 09:47:09

BY MR. FORT:

Q. Well, while we're talking about Mr. Huff's references, Mr. Huff, I believe you had five references to your prefiled testimony. And one

0128

of them was the one to the USEPA document you just cited.

I think another one was to your actual water quality report that you prepared in February of '08. What are the other three references that you have? 09:47:35

A. One was the use attainability analysis prepared by McGee and the Chicago area waterways, another was the Illinois EPA statement of reason in the UAA proceedings, which are 08-09. And the other was the prefiled testimony of an IEPA employee Rob Shultky in that same manner. 09:47:53

Q. So large parts of your testimony here are actually using and relying upon testimony that the Agency included in the Use Attainability Rule? 09:48:09

A. Well, some of it is, certainly, yes.

Q. Mr. Huff, you also did a calculation of the amount of horsepower that might be required to put in some of the additional treatment that the -- that Mr. Stein looked at as possible additional things; did you not?
A. Actually, Mr. Stein's office did the horsepower calculation.
Q. Well, describe the horsepower

0129

calculation and how you used it.
A. Well, Mr. Stein's low-cost alternative that was derived, they estimated, 144 horsepower would be required to be added in the way of mechanical equipment. And then I used that to try to go back and calculate how much carbon dioxide that would result in emissions. 09:49:08
Q. And did you come up with a number?
A. Almost two million pounds annually.
Q. Two million pounds annually of carbon dioxide would be added in the efforts to reduce the ammonia? 09:49:22
A. Yes.
Q. Or the effort to maybe reduce the ammonia consistently; correct? 09:49:31
A. Correct.
Q. Mr. Huff, you've also been involved with Citgo in terms of their installation of the purge treatment unit as part of their reduction in air emissions? 09:49:54
A. Yes, sir.
Q. Describe for us briefly what that is, purge treatment unit?
A. Citgo, like a lot of refineries, has

0130

been required to reduce sulphur dioxide emissions from their largest source, which is called the Fluid Catalytic Converter or FCC unit. Citgo, as all refineries, have elected to put in, basically, a wet scrubber. 09:50:21
So they're scrubbing with a solution of -- a mild caustic solution. And the result is they produce sodium sulfite, S-U-L-F-I-T-E. In Citgo's case, that sodium sulfite stream then goes through what's called a purge treatment unit where the catalyst fines are removed and the sulfite is oxidized to the sulphate form. 09:50:40
Q. And in Citgo's situation, do they -- are they taking -- that's now in operation?
A. That's correct. 09:50:56
Q. And is that going into their regular wastewater treatment facility, or not?
A. It is not -- you, basically, have two options. One is you can oxidize in this purge treatment unit and then bypass the biological treatment unit or you can attempt to put the sodium sulfite into the biological unit. 09:51:08
There's a considerable oxygen

demand loading with that, so you have to increase your air supply dramatically in your activated sludge unit. You also have a more dense liquid, if you will, because of the higher dissolved solids. And so your solid separation is not as good in the clarifier.

You have the potential to produce filamentous growth in those clarifiers. So that, in my mind, is a higher risk approach.

Citgo elected to treat that purge in the purge treatment unit and then that stream bypasses their biological treatment unit, goes into the final treated water basin. And then it all goes out through the same outfall.

Q. When you're talking about the high risk of the alternative of sending it through the regular wastewater treatment plant, is there any risk associated with nitrification there?

A. Well, I believe there is. The concerns you would have is with the sodium sulphate or sulfite if you end up with shocks. Say, when you first bring the FCC unit back online or you shut down that FCC unit, you're going to have quite a shift in loading there.

I would worry that it would have a negative impact on your ability to nitrify in the short term. And given the difficulties that we already have in achieving consistent nitrification, that's what I was referring to on a higher risk.

Q. Thank you.

MR. FORT: I have a couple questions for Mr. Stein. So again, we assume Mr. Stein's testimony will be entered as if read at this point in the transcript.

THE HEARING OFFICER: That's correct. And again, to make the record clear, I will give the court reporter Ms. Postel's prefiled testimony, that's Exhibit 13, Mr. Huff's prefiled testimony, Exhibit 14 and Mr. Stein's testimony, the corrected testimony, marked as Exhibit 10. I'll give that to Sharon and she can transcribe it into the transcript as if read.

MR. FORT: Thank you.

THE HEARING OFFICER: Thank you.

BY MR. FORT:

Q. Mr. Stein, I was asking Mr. Huff some questions about the impact of sending this PTU material into a regular -- or into the existing industrial wastewater treatment facility. You heard that testimony?

A. Yes, I did.

Q. Do you generally agree with Mr. Huff's comments?

A. Yes. I'd probably expand.
I would think there's actually a very significant chance of getting filamentous or bulking sludge, which would cause an upset in the treatment plant. I was just involved in a project at a paper mill that had a very similar situation.
They had gone ten years without a problem, and then, because of high temperatures, had some sulfites. And developed sulphur-based filaments and lost control of the system, and lost -- very heavily solids.
What happens is, when you get the filamentous bulking, you cannot settle very well. And, therefore, the solids will go out the effluent and you lose control of your treatment system.
THE HEARING OFFICER: Mr. Stein, can I ask you to keep your voice up. I'm not even sure when 10:00 rolls around we're going to have mics, unless -- if the voices keep
0134
lowering maybe we'll have to put the witnesses up here when the mics are turned on.
Because the testimony keeps going softer. And I'm having a hard time hearing, and I think Sharon is, as well, so...
MR. STEIN: I'm sorry.
THE HEARING OFFICER: Oh, no. If you could just make an extra effort.
MR. STEIN: All right. I'll try.
THE HEARING OFFICER: Thank you, sir.
MR. FORT: Face the court reporter, not me.
MR. STEIN: All right.
BY MR. FORT:
Q. So, Mr. Stein, let me make sure I understand then. You're saying that if a PTU discharge associated with air pollution control efforts, such as an FCC, is sent into an existing industrial wastewater treatment plant, which has achieved nitrification in the past, it may not be able to continue in the future?
A. Yes, that's very true. Because you have, as Mr. Huff stated, one, an additional oxygen
0135
demand on the treatment plant. And nitrifying organisms are very sensitive to oxygen.
As you start getting a DO or dissolved oxygen level less than two milligrams per liter in a biological treatment system, the nitrifiers stop nitrifying and you lose your biological nitrification. Also, with the sulphur-type materials you can have the potential problem of developing certain types of filaments, such as the enulin nicola 3 (phonetic), which would upset the treatment system, and, therefore, lose solids and further reduce the ability to nitrify.

Q. Mr. Stein, you saw the Agency's recommendations concerning other refineries; did you not? 09:56:45

A. Yes, I did.

Q. Let me direct your first to the Mobil refinery. Do you know if they are planning on sending -- if they are under construction still with their PTU, or are they now operational for PTU? 09:56:57

A. It's my understanding that they are under construction on the PTU. And I believe that is going to go into their biological wastewater treatment plant.

0136

Q. So in terms of their discharge that they have had in the past, they're not sure if they're going to be able to handle and achieve nitrification with that PTU discharge going into the regular plant. 09:57:23

A. That would be my opinion, that they very well could experience problems.

And the other thing is, if I can expand on that a little bit, you know, I've been doing this for 30-some-odd years. And in many cases, we have -- with regard to filamentous bulking, we have done laboratory -- extensive laboratory treatability studies on a treatment system where we did not experience filamentous bulking. 09:57:31 09:57:50

But when you get to the full scale system, you have extensive filamentous bulking problems. And that's because, on the small laboratory scale study, when you're testing something out, you can't really demonstrate what's actually happening in the full scale system. 09:58:01

So you can do very good in your preliminary testing, and then when you get your full scale system, find that there are problems.

0137

Q. In terms of that issue, how long a period of time do you think is long enough to know that you have a good handle and can guarantee performance to meet a nitrification requirement that is reflected with the three milligram per liter number? 09:58:34

A. I would say that you need to go through a full MPDS permit cycle, which would be a minimum of five years.

Q. Why do you say five years? 09:58:45

A. Because there's inherent variability in a treatment system. Unless you've got good long-term demonstration, then there's always the, you know, potential problem of upsets.

Q. Now, in terms of the Conoco performance, I believe the Agency seems to be correcting what they said in their recommendation. But you looked into the Conoco performance, how well they were able to achieve nitrification? 09:59:07

A. Yes. I mean, the data -- and I pulled it off the USEPA website, which has the reported data for NPDS permits. And if you look at the data for the Conoco refinery, they get about 90 percent compliance with the three milligram per liter, where 09:59:24

their effluent is less than three milligrams per liter.

But they also have ten percent of the time that they exceed the limits -- the three milligrams per liter limit. And if you look at their data and compare it to Citgo, the performance of the Conoco is very similar to Citgo. 09:59:57

And, you know, the detention time in the activated sludge system is several -- I think, four or five times longer. 10:00:16

Q. So the detention time doesn't equate to a better performance?

A. No, it doesn't. Really, the detention time is -- a better factor is the FM or food to microorganism ratio in the treatment plant. But there's also a number of other factors that can affect the performance of a biological wastewater treatment plant. 10:00:33

Q. Do you know where Conoco gets their water? Is it a well source or is it a river source? 10:00:45

A. I believe it's a well source. But I'm not 100 percent sure.

BY MR. FORT:

Q. Mr. Huff, what's the kind of ammonia in the Sanitary and Ship Canal these days, in testimony?

A. What's the kind?

Q. What levels?

A. Oh, you're consistently below one milligram per liter total ammonia. 10:01:03

Q. But is that a level that is higher or lower than what you'd expect in a well water supply?

A. I would expect the well water to be basically nondetected in ammonia. 10:01:18

Q. So Conoco is having about the same performance, but they probably have a background that's far lower than what Citgo has?

A. Yes.

Q. Because Citgo takes in water from the Ship Canal; correct? 10:01:27

A. Correct.

MR. STEIN: Which is still, I believe, a half to one milligram per liter of ammonia in the Ship Canal. 10:01:35

MR. FORT: Those are all the other questions that I had. Thank you.

THE HEARING OFFICER: Thank you, Mr. Fort.

Mr. Boltz?

MR. BOLTZ: Yes, thank you, Your Honor.
Does it matter which order I take?
THE HEARING OFFICER: Whatever questions -- no, it doesn't. 10:01:55
MR. BOLTZ: Let's start in reverse order.
I'm going to go ahead and proceed with Mr. Stein, from, again, the Illinois EPA's participation. 10:02:06
CROSS-EXAMINATION
BY MR. BOLTZ:
Q. Mr. Stein?
A. Yes. 10:02:12
Q. My name is Jason Boltz. Nice to meet you, sir.
A. Nice meeting you, Mr. Boltz.
Q. Thank you for participating today.
I have had an opportunity to look at your testimony as you presented it before, and I do have some questions for you. 10:02:19
Now, you've already provided some testimony for us regarding Conoco-Phillips; correct?
0141
A. Yes.
Q. And you've also taken the time to evaluate Conoco-Phillips -- their ability to nitrify through their ammonia limits, as reports to USEPA; is that correct? 10:02:43
A. Yes.
Q. Are you aware of what standard Conoco-Phillips needs to comply with regarding ammonia?
A. I understand it's a higher standard than the three milligrams per liter standard. 10:02:53
Q. And when you say higher, do you mean it's less stringent?
A. Yes.
Q. Do they have to comply with 304.122(b)? 10:03:05
A. I do not believe they do.
Q. They don't; do they?
A. No.
Q. Because you've done a comparative analysis and study with Citgo versus the other three refineries. That was part of your job as it relates to Citgo; isn't that correct? 10:03:13
A. Well, part of it was to review, you
0142
know, what the other refineries are doing.
Q. Relative to Citgo for purposes of whether or not the ammonia nitrogen --
MR. FORT: I object to this line of questioning. Because, actually, our applicable standard is the one that's in effect now through the end of the year. 10:03:35
So I'm not sure what inferences

the Agency is trying to draw here when we had a different standard that we were subject to.

MR. BOLTZ: Your Honor, that's not even a legally recognizable objection. I'm having cross-examination.

If he understands the question, I would ask that he answer it. 10:03:56

MR. BOLTZ: That's how I'm responding to his objection. I'm not...

THE HEARING OFFICER: Overruled. 10:04:02

BY THE WITNESS:

A. I would say, and, you know, in the instance of Citgo, and I believe the other refineries, I think -- and I've done a lot of work

0143

with industrial environmental control. But most industries try to operate their treatment plants to get the best possible effluent quality.

And, therefore, in looking at the data, since the Conoco-Phillips normally gets very 10:04:30 low effluent levels and the Citgo refinery also gets very low effluent levels on a long-term basis, I would think that both of them are trying to do a very good job. And when I look at the data, the data shows what I have stated, that there is 10:04:55 inherent variability during -- due to product mix, different variations, temperature that can affect the biological wastewater treatment plant so you see the normal inherent variability.

One of the things -- 10:05:19

BY MR. BOLTZ:

Q. Well, let me ask a question.

MR. FORT: Well, let him answer if there's an answer.

MR. BOLTZ: I think he's entered into 10:05:24 a narrative, Your Honor, so I would ask that I be able to provide a cross-examination here. He's not being responsive to my questions.

0144

THE HEARING OFFICER: Sustained. You can continue, Mr. Boltz.

MR. BOLTZ: Thank, Your Honor.

BY MR. BOLTZ:

Q. So while both of these refineries are 10:05:36 attempting to do a good job, as you stated, Conoco doesn't even need to comply with 304.122(b); isn't that correct?

They don't need to comply with 304.122(b); do they? 10:05:50

MR. FORT: Object. He's arguing, and it's really irrelevant to this proceedings.

MR. BOLTZ: I have not received an answer to my question, and it's very relevant to the technical feasibility aspect of the 10:05:57

argument that the petition needs to present.
MR. FORT: I am going to further object to a lack of foundation. Because he's assuming that you can just go low enough.
MR. BOLTZ: Foundation isn't required under cross-examination. 10:06:06
THE HEARING OFFICER: Mr. Boltz, let Mr. Fort continue.
MR. BOLTZ: I'm sorry.

MR. FORT: When the scientific evidence is that you either nitrify or you don't, you don't just nitrify a little bit and just bump along at a particular level, so -- 10:06:19
MR. BOLTZ: Your Honor --
MR. FORT: -- I object, the foundation of his question is irrelevant.
MR. BOLTZ: Two things, Your Honor. One, he's arguing his case in cross-examination. 10:06:27
Two, he hasn't presented, again, a legally recognizable objection for purpose of cross, because foundation is required under cross-examination. So, again, I'm not quite sure where he's going with this. 10:06:34
THE HEARING OFFICER: I agree with Mr. Boltz. You may continue your course of cross.
MR. BOLTZ: Madam court reporter, could you please read back my question to the witness, please.
THE HEARING OFFICER: You can ask me and then I'll ask Sharon to read it back.

MR. BOLTZ: Could you please, I apologize. Thank you, Your Honor.
(WHEREUPON, the record was read by the reporter.)
BY THE WITNESS: 10:07:11
A. That is true.
But at the same token, I think right now the Citgo refinery doesn't -- I mean, it has an NPDS permit that they have to comply with.
BY MR. BOLTZ: 10:07:24
Q. Well, let me ask you a question then: Have you looked into Conoco-Phillips regulatory requirements?
A. I have not looked at the specific limits. 10:07:35
Q. So you haven't even investigated as to what Conoco needs to do in terms of compliance, relative to their ammonia nitrogen. Is that what you're telling the Board today?
A. I'm saying I've looked at the performance of their treatment plant and also I don't know -- I do not believe they have had a 10:07:47

violation of their limits.
Q. But you're not aware of what their
0147
regulatory requirements are. Is that what you're saying today?
A. Right.
Q. Okay.
And with respect to biological and treatment times, you have already discussed that on direct examination. With respect to ExxonMobil and comparing them to Lemont -- 10:08:04
A. Right.
Q. -- who has a longer detention time? 10:08:20
A. ExxonMobil, I believe, has 11 hours and the Citgo is about eight hours.
Q. You put in your testimony that the activated sludge time for Lemont is 7.7 hours. Does that sound right to you? 10:08:35
A. Yes.
Q. And you stated in the ExxonMobil's, their refinery detention time, that they're upgraded to 19.4 hours; is that correct?
A. That's correct. 10:08:45
Q. How do you know that?
A. Based on receiving reports on what the ExxonMobil changes in their treatment plant.
Q. Did they send you reports?
0148
A. I was provided reports.
Q. Did you ask them for reports?
A. It was received through -- the attorneys were able to obtain reports.
Q. So your attorney provided you with reports as to what these other folks' detention times were going to be? 10:09:04
A. Right.
Q. Okay.
MR. FORT: I think that information came from the construction permit applications. 10:09:13
BY MR. BOLTZ:
Q. Now, with respect to Marathon Oil, who has a longer detention time, Marathon or Lemont? 10:09:27
A. Marathon.
Q. And what is Marathon's detention time?
A. I believe it is about a day and a half.
Q. It's 1.54 days? Does that sound right? 10:09:37
A. Right.
Q. So both Exxon and Marathon have longer detention times than Lemont; correct?
0149
A. Right.
Q. Now, let's step back to Exxon.
Have you evaluated or come to an understanding of what regulatory compliance measures

that they're under? 10:09:55
A. Well, I know they've been under the -- they have had a site-specific variance probably for the last 20-some-odd years.
Q. And to what standards?
A. I believe it's BAT. 10:10:08
Q. Have they -- do you know if they have had to comply with 304.122(b)?
A. They have not -- they have not had to comply with the three and six.
Q. You've stated that they had an 10:10:22 adjusted standard?
A. Right.
Q. That standard was adjusted from what? From what general applicability standard?
A. The three and six. 10:10:30
Q. The 304.122(b) standard?
A. Right.
Q. Do you know if they're going to continue to pursue in just the standard?

A. They have -- it is my understanding that they have not asked to have the adjusted standard renewed.
Q. Do you know if, based upon recent levels of ammonium nitrate for Exxon, whether or not 10:10:51 they have complied with the three and six standard?
A. Do you mean ammonium nitrate or ammonia and nitrogen?
Q. Ammonia and nitrogen.
A. It is my understanding that they are 10:11:06 not -- they have complied the last couple of years with the three and six.
Q. The last couple of years. Do you know in fact how many years they've complied?
A. Roughly -- from the data I have seen, 10:11:21 at least two years.
Q. At least two years. So you're saying from the data you've seen they've only waited two years and now they're not going to seek a continuance of the adjusted standard. Is that what 10:11:33 you're saying today?
A. That's my understanding.
Q. So they're not going to wait the necessary five years, as you stated under your

direct examination; isn't that correct?
A. That is what they're doing, but they're also making major changes with their --
Q. Okay. I'm not asking about the major changes, sir. 10:11:50
MR. FORT: Well, you know, I would like the counsel to be a little more -- developing the record. Because you seem to be cutting him off, routinely, counsel. And I thought you said you wanted information. 10:11:58
THE HEARING OFFICER: You know, I kind

of agree with Mr. Fort. Obviously, Mr. Fort can do a redirect.

But, again, if you'd let the witness finish just a little bit before you cut him off.

MR. BOLTZ: I just want him to answer my question. I thought he was going in an unresponsive direction in his testimony, and I just wanted to be able to continue my line of questioning, Your Honor. 10:12:09 10:12:17

THE HEARING OFFICER: Proceed, Mr. Boltz.

MR. BOLTZ: Thank you, sir. I'm

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sorry, I'm not looking to interrupt or cause any problems with his testimony.

BY MR. BOLTZ:

Q. Are you familiar with the technologies utilized by these other three refineries in the state of Illinois? 10:12:33

A. Yes.

Q. Are they generally different, similar or -- than what happens at Citgo?

A. They're generally similar. 10:12:45

Q. So the way they perceive technology is, again, very similar?

A. Similar as far as activated sludge. But there can be varying significant differences in how they operate their system. 10:13:03

Q. Have you also taken the opportunity to evaluate Marathon Oil in their regulatory standards?

A. No, I haven't. I looked at the levels that they were achieving.

Q. Okay. 10:13:15

A. Very low levels of...

Q. So they've used a similar technology and they have very low levels. Is what you're saying? Of ammonia and nitrogen effluence; is that

0153

right?

A. Yes, they have.

Q. All right.

A. But there are a whole bunch of factors that can come into play. 10:13:33

Q. I don't understand.

MR. FORT: Well, let him answer.

THE HEARING OFFICER: Let Mr. Stein answer, please. Thank you, Mr. Boltz.

BY THE WITNESS: 10:13:40

A. For example, a refinery can use very high levels of water, dilute their effluent and meet a low concentration limit. Where, you know, one of the key factors is, you know, your pounds per day discharge, as compared to the, you know, limits. 10:13:53

BY MR. BOLTZ:

Q. So they're doing things a little bit differently there?

A. Right.
MR. FORT: Excuse me. Are you clarifying that the Agency says delusion is okay? 10:14:03
MR. BOLTZ: I'm asking your witness a question under cross-examination.

MR. FORT: It's just your comment about doing a little bit differently is what intrigued me.
MR. BOLTZ: He said yes.
THE HEARING OFFICER: Your observation is on the record, Mr. Fort. 10:14:18
You may proceed, Mr. Boltz.
MR. BOLTZ: Thank you, Your Honor.
BY MR. BOLTZ:
Q. Have they met the three-six levels? 10:14:24
A. Yes, they have. You're talking about Marathon?
Q. Yes, sir. My line of questioning right now is Marathon. Thank you.
A. Yes. 10:14:33
Q. How long do you know that they have met this three-six standard?
A. At least through 2000 -- I think 2004 through 2006.
Q. Do you know if they're still meeting it today? 10:14:46
A. No, I don't.
Q. You don't know.
But you know through at least 2004 through 2006?
A. Well, I use the EPA database, which is available on the internet --
Q. Right.
A. -- which is about a year and a half behind as far as the -- I believe it's the DMR reports that are submitted by the dischargers, get entered into the EPA database and are relied on the available information from the EPA database on the internet. 10:15:00 10:15:19
Q. So fast forward to today. Moving forward to today, do you know if -- for instance, if Marathon -- are they seeking any sort of adjusted standard?
A. I don't know. 10:15:34
Q. You don't know.
But you do know from the years that you've seen that they've met the three-six standard at least?
A. Yes. 10:15:41
Q. And I'm summarizing here. With respect to Exxon, they're being the three-six standard today, from the most recent information you've been provided?

A. The most recent -- but they've had -- I mean, if you look at the data over the period, percent of violations of the three-six, through the period that I looked at, which was 2004 through the end of 2006, they had a higher percentage of violations because they were consistently above the three and six during 2004. 10:16:04

Q. So during the course of your studies, you have not -- and I'm speaking with respect to your comparative analysis studies of the other refineries in the state of Illinois, you have not taken that extra step to understand what necessarily their regulatory standards would be; is that correct? You just evaluated again their limits of ammonia and nitrogen? 10:16:31 10:16:47

A. Right.

Q. During the course of your other evaluations of Citgo, did you do any sort of economic analysis relative to Citgo's ability to obtain nitrification? 10:17:37

A. Yeah. I mean, they obtained nitrification right now. So the question is the --

Q. They're meeting the three-six standards?

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A. To try -- additional technology to meet the three-six standard. Yes, we did a detailed review of technology and came up with designs of potential treatment options that could meet the three-six. 10:18:01

Q. Was -- part of your investigation, did that include evaluating how much money Citgo makes?

A. No.

Q. Did you do a budgetary analysis of Citgo to see how much money they can spend towards bettering their refinery to lower the limits that they typically -- 10:18:16

MR. FORT: I'm going to object on relevance of how much a company or an entity makes is not relevant to the proceeding here. 10:18:32

THE HEARING OFFICER: Mr. Boltz?

MR. BOLTZ: Your Honor, I would argue it is. The economic reasonableness is a specific component, as articulated through the Act. 10:18:43

MR. FORT: The economic reasonableness under the Act is never meant how much money does a company make. It's always been tied to a cost benefit of the technology,

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availability, and typically, if not almost always, has been a cost effectiveness decision and what's the need, from a technical standpoint, what's the environmental need. 10:19:00

MR. BOLTZ: Your Honor, I would argue that it's relevant. It's relevant, and

relevant evidence, you know, should be admissible for purposes of at least guiding the Board in a full evaluation of whether or not it would have been economically reasonable or not for Citgo to pursue these various options that is presented to the Board.

THE HEARING OFFICER: Yeah, I'm going to overrule Mr. Fort's objection. 10:19:09 10:19:21

You may answer if you're able to, Mr. Stein.

BY THE WITNESS:

A. All right. We did, you know, a couple of things. 10:19:28

We did not look at the profits or balance sheet of Citgo.

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BY MR. BOLTZ:

Q. Okay.

A. But, you know, I have done a lot of work in looking at BAT and the cost applicability of putting in a treatment plant, an additional treatment plant. 10:19:49

For example, if you look at a municipal treatment plant, the cost of nitrogen removal is about one dollar per pound. If you look at -- and so, what you do to do a BAT evaluation of the cost effectiveness of nitrogen removal, is you look at the level of additional nitrogen removal you can achieve with a type of expenditure. 10:20:07

Right now, the Citgo refinery is getting down to an average of -- which I had in the report, which I think was 2006, 2007 -- of 122 pounds per day. Which, if you look at the three milligram per liter standard and their flow limit, they would be allowed to get 177 pounds per day. 10:20:34

So right now pounds-per-daywise, they were less than the standard. So if you look at a cost benefit, if you're going to spend an extra 3. -- I believe it's $3.2 million a year, and you're only going to get, say, ten or 20 pounds per 10:20:56

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day additional nitrogen removal on a long-term basis, you still may not be able to comply with a three and six. Then you're talking about spending $20,000 per pound for additional nitrogen removal as compared to a -- what is typically BAT of one to $3 per pound, that would not be cost effective. 10:21:36

MR. RAO: May I ask a follow-up question?

MR. BOLTZ: Please do.

MR. RAO: Mr. Stein, you just testified about the cost analysis, which references Citgo. Did you do any similar analysis for the other three refineries as to what kind of cost effectiveness their 10:21:58

nitrification plants --
MR. STEIN: No, we didn't.
MR. RAO: -- were achieving?
MR. STEIN: No.
MR. RAO: Thank you.
MR. BOLTZ: I'd like -- I have no further questions for this witness. 10:22:17 10:22:35
MR. RAO: Mr. Boltz, I just have one question for Mr. Stein. It's not a follow-up --

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MR. BOLTZ: Oh, please.
MR. RAO: -- but since he's been answering questions.
Mr. Stein, in your prefiled testimony at Pages 2 and 3, you indicate that the February 2008 AWARE Report contains a review of activated sludge plants with regards to factors which control, I believe you have, biological treatment facility to achieve nitrification. You list these factors as including food to microorganism ratio, sludge age, dissolved oxygen concentration, temperature, pH and alkalinity. 10:22:58 10:23:18
Did you also review the affect of detention time, surface area and clarifier overflow rates as factors that could affect nitrification? Most specifically detention time, because that's been raised by the Agency. 10:23:32 10:23:51
MR. STEIN: Well, I guess I did not look at detention time, because I think a more realistic evaluation is the food to microorganism ratio. Let me explain what the

0162

food to microorganism ratio is.
That's the pounds of BOD applied per pound of MLSS, which is mixed liquor -- mixed liquor suspended solids, which are the actual active biomass in your system. So -- and for a nitrification -- to get biological nitrification, you tend need to have an F to M of less than .3. 10:24:22
So what happens is, you can have a long detention time and have a low mixed liquor suspended solids or you can have a short detention time and have a higher solids. So the detention time is not as critical as the F to M ratio. And that's why I really concentrated on the F to M ratio. 10:24:42 10:25:00
Because that is actually how much food the organisms are receiving. And the F to M ratio at the Lemont refinery runs from about .05 to about .28. Which is in the, you know, the less than .3 range. 10:25:23
And also the other factor is

sludge age, which is the length of time your mixed liquor solids are in the aeration basin. And to get biological nitrification,

you, typically, want a sludge age of greater than ten days.

The sludge age at the Lemont refinery ranges from 13 to greater than a hundred days. 10:25:55

MR. RAO: How do these factors, sludge age and foot to microorganism ratio, for Citgo refinery compare with the other three refineries that you evaluated?

MR. STEIN: I wasn't able to get enough data to evaluate their sludge age and F to M ratio. 10:26:10

MR. RAO: Okay. Thank you.

THE HEARING OFFICER: All right.

Mr. Boltz, do you -- 10:26:23

MR. BOLTZ: Your Honor, I do actually have one more question for this witness.

THE HEARING OFFICER: Okay.

MR. BOLTZ: I'm sorry to back up on you that way. 10:26:29

BY MR. BOLTZ:

Q. Within one of your paragraphs, sir, in your prefiled testimony, you stated that -- and I think this is just a matter of clarification here.

But I know within the Agency's recommendation that it stated that, obviously, there was another refinery on the Ship Canal.

Can you discuss and clarify, if you can or will, the relationship of Citgo in terms of its location on the Ship Canal versus the proximity to Exxon and where they're located in terms of their river body or other water body, if you're not aware? 10:26:54

A. Well, I mean, I haven't done any work with ExxonMobil, but I have done other work for another industry in Channahon. I know they're in Channahon just over the, I believe, the Des Plaines River. And I believe they would discharge into the Des Plaines River. 10:27:11

Jim could probably expand better than I could as far as -- I know the --

Q. The relationship in terms of where they're located?

A. I know where they're located and I know -- I believe -- and I know the Citgo refinery goes into the canal. 10:27:28

Q. The Ship Canal?

A. The Ship Canal. I do not know specifically the tie-in with the Ship Canal and the Des Plaines River. 10:27:40

Q. Do you know if they tie into one

another?
Why don't I go to Mr. Huff, because I think you would feel more comfortable if he answered that question.
MR. BOLTZ: With your permission, Your Honor?
THE HEARING OFFICER: Sure. You may go, Mr. Boltz.
BY MR. BOLTZ:
Q. Mr. Huff, do you want to go ahead and elaborate further, because I think Mr. Stein was wanting you to answer that.
A. Well, the Lemont refinery Citgo is located on the Chicago Sanitary and Ship Canal. The ExxonMobil refinery is located on the Des Plaines River just upstream of the I-55 bridge.
The I-55 bridge is the demarkation between the secondary contact waters and the primary contact waters.
Q. With respect to the Des Plaines River and Ship Canal, do they flow into one another, do
0166
they --
A. Well, the Sanitary and Ship Canal flows to Lockport. There's a lock and damn at Lockport.
And right immediately below that, it merges into the Des Plaines River.
Q. So it is a contiguous waterway with that damn right there in the middle; is that correct?
A. Well --
Q. In between that?
A. I think you're putting words in my mouth.
Q. Well, if I --
A. The Sanitary and Ship Canal enters the Des Plaines River. They are not contiguous in the sense that you have an electric barrier there that prevents that contiguous contact between those water bodies with respect to plant life.
Q. Okay. But they do run into one another?
A. The Sanitary and Ship Canal merges into the Des Plaines River at Lockport.
Q. And then the Des Plaines River will
0167
move along and then eventually you come upon the Exxon refinery?
A. Immediately upstream of the I-55 bridge, yes, sir.
Q. Thank you, sir.
MR. BOLTZ: And that's for the point of clarification for the Board's benefit.
THE HEARING OFFICER: Anybody want to take about an eight-minute break? We are off the record.

(WHEREUPON, a recess was had.)
THE HEARING OFFICER: All right. Back on the record.
Mr. Boltz is still in his cross-examination mode. 10:39:32
MR. BOLTZ: Thank you, sir.
THE HEARING OFFICER: You may proceed.
MR. BOLTZ: Your Honor, we'd actually like to follow-up --
THE HEARING OFFICER: Mr. Rao? 10:39:38
MR. BOLTZ: On Mr. Stein, actually. He provided some information and we want to -- to a limited degree.
THE HEARING OFFICER: Go ahead.

0168

BY MR. BOLTZ:
Q. Previously, Mr. Stein, you testified and you have also been kind enough to provide information within your prefiled testimony on Page 4. Okay. You're discussing the limited 10:39:56 problems or the inhibitions that refinery wastewater causes relative to the nitrifiers.
Do you recall that part of your testimony?
A. Right. 10:40:11
Q. And I think the Board has questions for you regarding the same. Or just --
A. All right.
Q. Really, from the Agency's perspective, we would like to know, I guess, your opinion. If 10:40:22 that detention period increased, you know, at the basin, to allow for the nitrifiers to do their work, because of that refinery wastewater, because the inhibitions it proposes, do you believe that a longer detention time would help? 10:40:41
A. Not necessarily. The problem is you get different types of materials that could be an inhibitory to nitrification. The concentration of those materials, which are not necessarily

0169

biodegradable, will inhibit the nitrifiers, and, therefore -- you know, and that is what I feel is causing the upsets.
And just to clarify, I guess one of the other questions that was raised, I think on 10:41:15 the F to M and detention time, detention time is a factor in F to M. Because the size of the basin does affect the F to M.
But the F to M at the Chicago -- the Lemont refinery, even though they have a shorter 10:41:30 detention time, is a reasonable F to M to get biological nitrification.
Q. Well, if I may follow up on some of the things we discussed, because, again, I would just like to extrapolate and seek clarification. 10:41:41 You discuss some of these other materials that can further complicate the nitrification?

A. Right.
Q. Can you explain what you meant by that a little bit? 10:41:54
A. Well, any type of -- different types of organics. Like I had phenol -- I think I specifically showed phenol in the -- my testimony.
Because phenol is inhibitory to
0170
carbonaceous or BOD removing organisms at about 200 milligrams per liter. The level of four to ten milligrams per liter would be inhibitory to nitrifiers. And there's a long list of metals, organics and stuff that can inhibit nitrifiers at 10:42:28 relatively low levels.
Q. So just like the refinery wastewater, they kind of screw up the process a little bit in term of the nitrification?
A. Right. 10:42:42
Q. But again, wouldn't the longer duration -- wouldn't that longer period of time, wouldn't that help things? I mean, I guess I don't understand how --
MR. FORT: Objecting. Asked and answered. That was his first question, and he's answered it. 10:42:49
MR. BOLTZ: I don't feel like --
THE HEARING OFFICER: I'll allow him to answer. Overruled. 10:42:54
MR. BOLTZ: You can see the discussion, we're getting to it, and I don't want to complicate this at all. He's, obviously, articulated that --
0171
BY THE WITNESS:
A. A longer detention time may not -- may improve it but also may not improve it.
BY MR. BOLTZ:
Q. And why may -- and I'm looking for 10:43:07 exactly why.
A. Because if you've got a concentration of a inhibitory material, that is still going to upset the biomass. Even though you have a longer detention time, if you've got that inhibitory 10:43:19 material into your treatment system, it will inhibit the system.
Q. So when it inhibits the system, how does the system repair itself to get past that inhibition? I mean, does more time help, do you 10:43:35 need a bigger basin?
Is there a solution that you thought of to get past these extra elements that kind of upset what's going on?
A. Well, I think it's because of these -- 10:43:45 what happens is the system -- as you reduce the concentration of inhibitory materials, then the system recovers. That's why you see in data -- if you look at the Conoco data, you look at the Citgo

0172
data, and I've worked on a whole bunch of other nitrifying treatment plants, you see systems that go along very well, then all of a sudden you see a gradual spike of increased nitrogen and you try to control -- you try to control that, sometimes try to 10:44:21 increase your biomass. And then you see that that nitrogen goes down.

I've also seen cases where you completely wipe out the biomass and you have to bring in organisms from other treatment plants to 10:44:36 really reestablish your system. It's -- this variability is the reason we say we cannot consistently meet the three milligram per liter level. And that is why, I believe, an EPA developing BAT for the refining industry, you know, 10:44:54 limits -- the first thing -- their limits are on a pound per day basis.

But they throw in an effluent variability factor in -- if you go back to the development document, which I referred to in my 10:45:10 testimony, they specifically have a variability factor to account for these operations. And you do get variability in a biological wastewater treatment plant.

0173

Q. What you're getting at -- and I see you've been kind enough to provide within your testimony in Table 3, again, within Exhibit No. 15, your prefiled testimony, the various detention times of the other refineries as well as Lemont's. What 10:45:40 is the -- what goes into the decision making, if there is a decision that's made, as to why Marathon chooses 1.54 days, versus Exxon 10.9, versus Lemont's 7.7?

Do you see what I'm saying? How 10:46:01 do these different refineries or how did Citgo come to the decision that -- well, let's set ours at 7.7 hours versus 6 or 9?

A. Well, there's a whole bunch of factors that could come on to your decision making. One is 10:46:13 what type of aeration device do you use?

Are you using course bubble diffusers, fine bubble, or are you using low speed or high speed mechanical areas? Different types of treatment plants cannot maintain as many solids in 10:46:29 suspension -- different types of aeration devices cannot maintain as much solids in suspension, therefore, you need a longer detention time to account for the fact that you're going to be

0174

operating at lower solids levels. So, you know, you're trying to -- the basic factor in doing treatability studies and coming up with a process design is you look at what type of F to M or food to microorganism ratio you need. 10:46:59

You know your pounds of food going

into the system, you know how many pounds of microorganisms you need in your biological treatment plant. To get those pounds of microorganisms, you can either have less microorganisms and a longer, bigger detention time, or you could have more microorganisms and a shorter detention time.
But other factors, such as the site configuration, can you go deeper, can we build a bigger tank, can -- are we going to use coarse bubble diffusers, fine bubble diffusers, low speed aerators, jet aerators -- all have factors in how you would configure the design of your biological treatment plant. 10:47:12 10:47:31
Q. Did you ever recommend to Citgo that they lengthen their detention time within the course of your studies? 10:47:49
A. It was one of the things that we, obviously, looked at in the -- in our evaluation.

But our feeling was that they had an adequate detention time -- that they actually had the -- using fine bubble diffusers, which is actually a much better approach to get good oxygen transfer and a better operating treatment plant. 10:48:19
MR. BOLTZ: That's all the questions I have of Mr. Stein.
THE HEARING OFFICER: Thank you, Mr. Boltz. Do you want to move on to Mr. Huff? 10:48:31
MR. BOLTZ: Yeah, let's go to Mr. Huff.
THE HEARING OFFICER: Okay.
CROSS-EXAMINATION
BY MR. BOLTZ: 10:48:36
Q. Good morning, Mr. Huff. I'm going to ask you some similar questions I think, because I think a lot of this hones in on, hopefully, your level of expertise, especially with respect to technological feasibility aspect that the Agency's concerned about, as relates to some of the other refineries in the state of Illinois. 10:48:50
Did you have an opportunity to evaluate Marathon Oil, their operations within the state of Illinois, or was that not part of your study?
A. No, sir. It was not part of my study.
Q. So you did not evaluate what Marathon Oil was doing? 10:49:14
A. Right.
Q. Did you evaluate ExxonMobil?
A. With respect to this project?
Q. Yeah, with respect to meeting the 304.122(b) standard or alternatively meeting the three-six levels or attempting to meet the three-six levels? 10:49:23
A. With respect to this project? No,

sir.
Q. All right. 10:49:34
A. Now, Exxon is an active client of mine. My first job was at that refinery building, that wastewater treatment plant. So I have intimate knowledge of their treatment plant.
Q. Independently of what you did for 10:49:45 Citgo?
A. That's correct.
Q. During the course of your studies at Citgo, did you take affirmative steps to instruct or

0177

advise Citgo relative to what goes on at Mobil for purpose of improvements, concerning the effluent levels of ammonia and nitrogen at Citgo?
MR. FORT: I'm going to object, because I don't know what the issue there is. 10:50:31 But I think you're running into some dangerous grounds if you talk about nonpublic information.
Can you rephrase the question?
MR. BOLTZ: No, I think that I'm 10:50:39 asking regarding his personal knowledge.
He's already testified, Your Honor, that he has intimate knowledge of what goes on at Exxon. You know, I would ask for that comparison. 10:50:50
I'm looking to see whether or not he drew upon his experience while he was at Exxon to help Citgo out.
THE HEARING OFFICER: Right now, Mr. Fort, I'll overrule it. But object when 10:50:58 you feel that we're getting closer to dangerous waters.
MR. FORT: Yes.
MR. BOLTZ: I mean, it's not dangerous

0178

waters for me. I mean, if he has, you know, confidentiality --
MR. FORT: Can we go off the record for a minute?
THE HEARING OFFICER: Off the record. 10:51:14
(WHEREUPON, discussion was had off the record.)
THE HEARING OFFICER: We're back on the record.
Mr. Boltz? 10:51:52
MR. BOLTZ: Yes. I'll move off of that question, Your Honor.
BY MR. BOLTZ:
Q. Did you use your experiences at Exxon, specifically relative to ammonia and nitrogen 10:52:00 treatment, in your work at Citgo?
A. I think you're misunderstanding my role at Citgo. My charge at Citgo was to look at the environmental impact of the discharge.
Now it would be in the treatment 10:52:16

with Mr. Stein's responsibility. So the answer is no.
Q. Okay. Then that's easy enough.
Do you have an understanding of
0179
what affects ammonia has on water quality standards?
A. Yes.
Q. What are they?
A. Well, it has some toxicity --
MR. FORT: I'm going to object to asking a basic question that was done in basic rulemaking about ammonia nitrogen and why we have ammonia and nitrogen water quality standards. I hope we're not going to have to build this whole proceeding from ground zero, which is the feeling that I'm getting. 10:52:39 10:52:50
THE HEARING OFFICER: Mr. Boltz?
MR. BOLTZ: I think, again, that environmental impact, another component to this adjusted standards process -- I'm not looking to build from ground up anything. I'm looking for answers so the Board can make an appropriate decision to address whether or not to grant this petition. 10:52:56 10:53:09
THE HEARING OFFICER: I'm going to overrule it.
Mr. Boltz, you may ask a question.
0180
BY MR. BOLTZ:
Q. Again, only relative to ammonia and nitrogen and whatever its impact is on water quality standards. Can you address that at all?
A. Water quality standards or water quality impact? 10:53:24
Q. Just water quality impact.
A. Okay.
Q. Specifically relative to, let's say, aquatic life. 10:53:31
A. Well, it would be three-fold. One, there's a toxicity component on the total ammonia, there's a toxicity component from the unionized ammonia, both chronic and acute.
And then there is an impact on -- there are three parts to the question on water quality impact. One is on the total ammonia and it has some toxicity component. 10:53:45
The second is on the unionized fraction of the ammonia that has both a chronic and acute toxicity component. And the third component is its impact on the consumption of dissolved oxygen as the ammonia is oxidized in the stream. 10:54:24
Q. And I do have questions specifically
0181
relative to that oxygen component that you just articulated. What are the effects on the oxygen

levels in water when ammonia and nitrogen gets into that water?
A. If we're talking in general terms, it is oxidizing -- the ammonia is oxidized as it travels downstream. And as part of that oxidation, it consumes dissolved oxygen that's in the waterway. 10:54:55
Q. So it lessens the amount of oxygen in the waterway, generally speaking? 10:55:14
A. I don't think I would agree with that statement.
Q. Well, what does it do to the oxygen, it consumes it?
A. Yes, it consumes it. But every time you consume the dissolved oxygen, you have an increase in the amount of oxygen that comes in from reiteration from the surface. 10:55:22
So it's a function of how fast that ammonia is oxidized and how significant the reaeration factor is. 10:55:36
Q. I'm not really looking at the reaeration, I guess I'm only looking at what happens within that water. Is there a corresponding

0182

relationship, then, between the amount of ammonia and nitrogen introduced into the water and the amount of oxygen in the water?
A. The answer is no, because you can't ignore the reaeration. I think what you're asking is, is there a relationship -- if I oxidize a pound of ammonia, can I tell you how much oxygen is consumed? I can answer that question. 10:56:04
Q. Well, please do.
A. It's 4.57 pounds of oxygen per pound of ammonia is oxidized. 10:56:17
Q. Thank you.
Well, isn't it true that aquatic life -- dependent upon the species. Because obviously species may require different amounts of oxygen. 10:56:30
It does require varying amounts of objection, though, in that water?
A. In which water?
Q. In -- generally speaking. 10:56:40
A. Yes.
Q. So again, while the proposed effluent limits pursuant to this petition that are being sought are less than the presently adjusted

0183

standard, and you understand how they're looking to lower it?
A. Yes, sir.
Q. They are still, though, greater than the standard rate, as generally stated in 304.122(b)? 10:57:07
A. The requested relief are higher than the three milligram per liter and six milligram per liter number, yes. Otherwise we wouldn't be here

today. 10:57:21
Q. Right. We just want to get that clarified, because you did make the point several times in your testimony.
A. I think that was the question I was responding to the Agency's -- 10:57:31
Q. I understand.
MR. BOLTZ: No further questions.
THE HEARING OFFICER: Thank you.
Mr. Rao, Ms. Liu, do you have any questions of Mr. Huff? 10:57:51
MR. RAO: We'll wait until they're done.
THE HEARING OFFICER: Okay. You were interjecting before.

MR. RAO: The line of thought is not...
THE HEARING OFFICER: All right. Do you want to move onto Ms. Postal?
MR. BOLTZ: Yes, sir. 10:58:09
THE HEARING OFFICER: Thank you.
CROSS-EXAMINATION
BY MR. BOLTZ:
Q. Ms. Postel, I just want to get, I guess, an understanding of your role. I probably 10:58:14 should have started off with that from Mr. Huff initially.
Did your role include a comparable analysis between the Lemont refinery and the other three refineries in the state of Illinois? 10:58:26
A. It did not.
Q. You would agree, though, and you state as much in your testimony, that all four refineries have a very similar technology? Share the same --
A. Based on the review that Bob Stein 10:58:42 did.
Q. And again, I'm only reciting your testimony. Is that correct?
A. Based on the review that Bob Stein

performed. I did not perform a study.
Q. Okay.
THE HEARING OFFICER: Ms. Postel, could you keep your voice up please? Thank you. 10:59:03
BY MR. BOLTZ:
Q. Was part of your inclusion in this process, for purpose of the adjusted standard, did it include in the evaluation of -- to use Mr. Stein's terminology -- a budgetary or an 10:59:15 analysis of Citgo for the purpose of pursuing further technological advancements to address the ammonia and nitrogen effluence?
A. No, that was Bob Stein's role.
MR. BOLTZ: No questions, Your Honor. 10:59:38
THE HEARING OFFICER: Thank you.

Mr. Fort, redirect, I guess, and then we'll have the technical personnel, I guess, address their questions.

MR. FORT: Thank you. 10:59:49

REDIRECT EXAMINATION

BY MR. FORT:

Q. Ms. Postel, with respect to this last question that counsel inquired about you in terms of

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doing your role with technological things. You were thinking primarily of the add-on treatment costs?

A. Correct.

Q. And you are involved, though, on a day-to-day basis in terms of the refinery doing 11:00:06 things?

A. On the compliance end, not -- yes.

Q. So you are involved in implementing projects that reduce ammonia and nitrogen discharge?

A. I am involved in implementation and 11:00:21 development of projects.

BY MR. FORT:

Q. Mr. Huff, a couple of clarifying questions. Counsel asked you a series of questions about the ammonia nitrogen conditions. Do you 11:00:42 recall those questions? And you gave an answer that there are three factors with ammonia and nitrogen?

A. With respect to water quality impact, yes, sir.

Q. And with respect to water quality 11:00:53 impact in the Sanitary and Ship Canal of ammonia, what additional comments would you have concerning the current conditions of ammonia and nitrogen in the Ship Canal and the discharge from Citgo?

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A. Well, the current ammonia levels, total ammonia levels, Mr. Stein indicated, are quite low. They are less than one part per million, consistently, all year long.

Q. Excuse me. And the Agency's proposed 11:01:20 total ammonia standard is what?

A. Fifteen milligrams per liter, which is significantly higher than what we are asking for here in the way of a site-specific daily maximum and a monthly limit. They are below what the total 11:01:34 ammonia water quality proposed is under the UAA's proceedings.

Q. And what is your understanding of the basis for the Agency suggesting 15 milligrams per liter to be an appropriate water quality standard? 11:01:46

A. I believe that's related to some toxicity issue at a total ammonia level of 15 milligrams per liter.

Q. You had a second one, the unionized ammonia? 11:01:57

A. Yes, sir.

Q. And how does the conditions in the Ship Canal near the refinery, the Lemont refinery,

compare?
0188
A. Well, the current unionized standard is 0.1 milligrams per liter. What has been proposed in the UAA would be equivalent to what the general use ammonia standards are, which varies with seasons, but is lower. But the Ship Canal at -- 11:02:23
where the Citgo refinery is, consistently meets the 0.1 milligrams per liter unionized and it consistently meets the proposed limit, as well, is my understanding.
Q. So even with the discharge levels that 11:02:43
Citgo has had over the past several years, those two components, the total ammonia and the unionized ammonia, are still being met?
A. Yes. On an overall contribution, when
the stream is at low flow condition, Citgo was 11:03:00
contributing about one percent of the ammonia loading on the Ship Canal. And it would be even less at normal flow conditions.
Q. And where's the rest of that coming
from, the other 99 percent plus? 11:03:14
A. Primarily from the three large metropolitan water reclamation district plants. Or, I guess, two in this case, the Cal Sag -- is that -- is the Cal Sag on there already? Yes, all three of
0189
them.
Q. So that just leaves the dissolved oxygen as a possible component; correct?
A. Yes.
Q. And what about the contribution of 11:03:36
dissolved oxygen demanding materials from the upstream source as compared to the Citgo refinery?
A. Well, a multi-pronged answer. Two adjusted standards ago we borrowed the Metropolitan Water Reclamation District QUAL2E model, to predict 11:03:58
dissolved oxygen levels, not only on the Ship Canal and the Des Plaines River but all the way down the Illinois River.
At that time a -- at the level --
the maximum daily load that we were requesting at 11:04:20
low flow, the impact on DO was a maximum of .06 milligrams per liter at the maximum level we're requesting today, that's on the order of .02 milligrams per liter, which is well below what one
is capable of measuring with a dissolved oxygen 11:04:39
meter. So you wouldn't be able to detect that.
Q. So it's a theoretical calculation, it's not something that can be measured?
A. The .02 is a theoretical calculation
0190
and cannot be measured.
Q. Now, Mr. Huff, you have been associated with the Citgo refinery for some time; correct?
A. Yes, sir. 11:05:09

Q. And you have consulted with Ms. Postel about various issues that come up relating to wastewater treatment?
A. Yes, sir.
Q. And you were here earlier today when we talked about the things that she is doing and the refinery is doing to improve their effluent? 11:05:19
A. Yes.
Q. Do you have anything you would recommend that they do beyond the things that she mentioned? 11:05:29
A. No, sir.
MR. FORT: And back to Mr. Stein, a couple of questions.
BY MR. FORT: 11:05:49
Q. Mr. Stein, am I correct in saying that that nitrification either works or it doesn't or can you describe how nitrification works? Can you do it halfway to get a little bit of nitrification, or is it there or not there?
A. You're correct. It's basically an all or nothing. Either you're getting biological nitrification or you're not.
Now, obviously, sometimes if you get an inhibition you can start getting a reduction. But it's, basically, either you're nitrifying or you're not. You can't control it -- operate in a half-way manner. 11:06:14
Q. So if a refinery is subject to -- and, I'm sorry. Withdraw that. 11:06:28
Federal BAT requirements include a requirement for nitrification?
A. You have to have some level of nitrification to be able to meet the ammonia nitrogen limits? 11:06:40
Q. So an entity, such as Conoco, would be subject to a federal BAT requirement?
A. Right.
Q. So if they have to do nitrification, they're going to try to do it to meet the BAT, and it's going to be a good -- a low number or not a low number; correct? 11:06:52
A. Correct.

Q. We had several questions about retention time, but what about surface areas, how does that fit into this whole issue?
A. Yeah, surface area is important in trying to get settling and be able to maintain your biomass. And if you look at the secondary clarifier surface area, I believe the Citgo refinery is larger than two of the other refineries. 11:07:24
Basically, they are much better than Conoco-Phillips and ExxonMobil, that they have -- what happens is, the more surface area you have, the lower the gallons per minute per square 11:07:48

foot overflow. And the lower the overflow, the better chance that solids have to settle your clarifier, be able to recycle back to the treatment plants. The more surface area, the better the performance of the system.

Q. And the data that you're referring to is in Table 3 to your testimony? 11:08:13

A. Yes, it is. 11:08:26

Q. What about the affects of winter, and what do winter conditions, cold temperature conditions, do to nitrification?

A. Winter conditions can wipe out

0193

nitrification. Temperatures less than 68 degrees can inhibit nitrification statistically and lessen, probably about 15 degrees C, which you would probably, you know, lose nitrification.

Q. Thank you. 11:09:04

Going back to the retention issue again and adding more retention time. Will that require more energy be consumed in order to do that?

A. Yeah. Obviously, if you increase the retention time, then you have to add more aeration 11:09:17 to maintain the solids in suspension into that system.

And that was where I was getting that the Citgo refinery with the fine bubble diffusers has a very good system that could allow 11:09:32 operating at a shorter detention time and still be within the reasonable F to M to get biological nitrification.

Q. But if you went to another technology, an add-on technology of some sort, such as the ones 11:09:48 that you looked at here, that would require more horsepower, and hence, more energy consumption?

A. More energy, as I think Mr. Huff alluded to in his looking at the CO2 effect.

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Q. Thank you.

MR. FORT: I have one more for Ms. Postel, I forgot to ask her earlier.

BY MR. FORT:

Q. Ms. Postel, what's the zoning 11:10:16 classification of the refinery?

A. Industrial.

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

THE HEARING OFFICER: Mr. Boltz, 11:10:31 recross?

MR. BOLTZ: Just a couple of small points of clarification for Mr. Stein, sir.

THE HEARING OFFICER: Proceed.

MR. BOLTZ: Thank you, sir. 11:10:41

RECROSS-EXAMINATION

BY MR. BOLTZ:

Q. Within -- do you have your testimony in front of you, sir?

A. Yes. 11:10:45
Q. Within Page 14 of your testimony...
THE HEARING OFFICER: And we're referring to Exhibit 10, is it, the corrected?

MR. BOLTZ: Let me see if I've got an exhibit number.
MR. FORT: It's the same on both.
THE HEARING OFFICER: Oh, okay.
BY MR. BOLTZ: 11:11:03
Q. Do you have that in front of you, sir?
A. Yes.
Q. Just your last statement there where you state the ExxonMobil refinery exceeded three milligrams prior to 2005. 11:11:12
A. Yes.
Q. Is that true and correct?
A. Yes.
Q. So subsequent to that time, they've met that limit? 11:11:18
A. Right. As I said, the data I had was for really 2005, 2006.
Q. And then turning back to Page 8 again of your same testimony, within that document, you referred to a couple of sources that justified, 11:11:38 apparently, your finding that biological nitrification may not be possible for treatment of refinery wastewaters, a document from 1974 and a document from 1982. You did utilize those documents

for purposes of justifying that statement; is that correct?
MR. FORT: Object to the -- mischaracterized what he said.
THE HEARING OFFICER: Mr. Boltz? 11:12:04
MR. BOLTZ: It says right here two documents which justify these findings. Maybe I'll be even more specific with the statement.
MR. FORT: Counsel, it's the way you 11:12:12 said it. You said the possibility of not being able to nitrify.
That wasn't what he was saying there. I was objecting not to your citation of these things but how you asked the 11:12:19 question.
MR. BOLTZ: I'll withdraw the question and --
THE HEARING OFFICER: Thank you, Mr. Boltz. 11:12:24
BY MR. BOLTZ:
Q. Within that paragraph you state that while you feel that there's adequate demonstration that domestic wastewater treatment plants can

achieve biological nitrification, you also state,

"But this is not the case for the treatment of refinery wastewaters."

Do you see where you stated that in your testimony? 11:12:39

A. Yes, I do.

Q. And then, do you see where in your next sentence you state two documents which justify this finding, and you refer to two documents, one from April 1974 and one from October of 1982; is that correct? 11:12:48

A. Yes.

MR. BOLTZ: That's all I have.

THE HEARING OFFICER: Thank you, Mr. Boltz. 11:12:58

Any re-redirect Mr. Fort?

MR. FORT: No.

THE HEARING OFFICER: At this time I'm going to let our technical personnel ask their questions, if any. 11:13:09

MR. RAO: We have a few questions. Some of them relate to this whole issue of detention time and issues raised by the Agency.

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I'll start with the first question. In the Agency's recommendation, the Agency refers to Table 46 of Citgo's technical review document by AWARE Environmental, that compares the detention 11:13:39 times and clarifier overflows of activated sludge treatment processes in different Illinois refineries.

And the Agency notes that Citgo's wastewater treatment plant aeration basins 11:13:53 have the lowest detention time of the four refineries. Further, the Agency refers to the longer detention times of the other refineries and suggests that these longer detention times may be at least partially 11:14:07 responsible for more effective and more consistent nitrification achieved at these facilities.

And my question goes to Ms. Postel. In your testimony on Pages 7 and 11:14:18 8, you list the upgrades to the wastewater treatment plant at Lemont refinery from 1987 to 2007 totaling to $45 million. Between 1987 and 1993 you list the addition of a

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second hundred foot diameter secondary clarifier that doubled the secondary clarifier's capacity at the plant.

Would you please identify any other upgrades that were made at the Lemont 11:14:51 refinery that contributed to an increase in detention time or surface area or a decrease in overflow rates? I direct the question to

you, if any of the other witnesses want to answer, that's fine, too.

MR. FORT: Did you hear the question?

MS. POSTEL: Yes, there has not been any.

MR. RAO: So your testimony pretty much covers all the upgrades that were made at the refinery?

MS. POSTEL: I mean, the only -- to the surface.

MR. HUFF: Well, if I could interject, the reason for the additional clarifier was to allow a higher biomass to be carried in the aeration basins. And if we go back to Mr. Stein's comments, that removal nitrification is a function of retention time and biomass population. Those two terms actually get multiplied together.

So if you want to improve, in theory, removal, you have to increase those two products multiplied together. And so by adding a clarifier in there, allowed the refineries to run at higher mixed liquor suspended solids level, directly intended to try to improve the performance of the nitrification.

MR. RAO: So the additional -- the secondary clarifier, helped in increasing the food to microorganism ratio?

MR. HUFF: Absolutely. Because you can now run at higher biomasses, where you couldn't settle those before any other clarifiers, you had too many solids, on a pounds per gallon per square foot basis.

And so, now the refinery has a very conservative surface overflow rate on a gallons per day per square foot. But that then allows them to run with more biomass in the system that accomplishes the identical thing to retention.

MR. STEIN: One other item that the refinery also switched, I'm not exactly sure of the year, but from surface aerators to fine bubble diffusers, which also allowed to operate at a higher mixed liquor suspended solids level, because you can get much better oxygen transfer. For example, the fine bubbles could get up to twice as many pounds of oxygen per horsepower hour as a surface aerator.

MS. POSTEL: Just to go back to the oxygen transfer.

MS. RAO: Yes.

MS. POSTEL: We have three aeration cells, and in Cell A we upgraded the

diffusers in 2006. In B cell, 2003.
And in C cell we upgraded them in 2001 and did some repairs in 2007.
MR. RAO: And in terms of the overflow rate from the secondary clarifier, would you characterize the overflow rates to be pretty much in the same range of the other refineries, referring to Table 3 of Mr. Stein's testimony? 11:17:54

MR. STEIN: Conoco-Phillips would be higher. It looks like Exxon and Lemont are similar, and Marathon has a much lower overflow rate.
MR. RAO: Okay. 11:18:23
MR. STEIN: But typical for industrial design, you want 500 to 600 gallons per day per square foot. So all four, when you look at industry standards, are good overflow rates. 11:18:39
MR. RAO: And you testified earlier you're familiar with the food to microorganism ratio of the other refineries?
MR. STEIN: Unfortunately, it's hard to get a lot of that information. It's not publicly available. 11:18:52
MR. RAO: Could I ask the Agency if the Agency has this information about -- more specific operational information about the other refineries that could be provided into the record? 11:19:04
THE HEARING OFFICER: Mr. Rao, who are you asking? We probably should swear them in.

MR. RAO: Are they going to testify later?
THE HEARING OFFICER: Yeah. Well, they're going to rest and then the Agency will put on their case. 11:19:19
MR. BOLTZ: Could I --
MR. RAO: Then I can hold off until --
THE HEARING OFFICER: Sure.
MR. BOLTZ: Yeah, maybe I could get a response real quickly, sir, if I may. 11:19:24
Your Honor, if I may provide a response. I'm not going to provide information, I'd like to respond to his inquiry, if I may.
THE HEARING OFFICER: You may. 11:19:45
MR. BOLTZ: Thank you, sir.
The Agency has those very same questions, sir. And that's exactly, in fact, the information we were looking at obtaining for purposes of this petition. 11:19:54
We have not conducted our own independent evaluation or investigation of

the same thing but we see the same issues.
MR. FORT: Does the Agency have the
data available?
MR. BOLTZ: Of the other refineries?
MR. FORT: Yes.
MR. BOLTZ: You know, maybe that's a
trade secret issue. I don't know. 11:20:13
MR. LeCRONE: Do I need to be sworn in
to answer any --
MR. RAO: We can wait.
THE HEARING OFFICER: It would make it
cleaner if Sharon would swear in the witness 11:20:23
and then we can go back.
MR. BOLTZ: Absolutely, Your Honor.
(WHEREUPON, the witness was duly
sworn.)
MR. LeCRONE: We probably do. We 11:20:36
haven't looked for it or evaluated it yet.
We, basically, were hoping that more of that
type of an analysis would have been in this
petition. Conoco and ExxonMobil are both
undergoing some plant changes and upgrades 11:20:55
now, so we probably got better information on
what they're looking to do here soon and in
the future than what we do on the food to
microorganism ratios and the mixed liquor
solids. I don't know if we have any of that,
nothing recent anyway.
We probably had the design
characteristics of it way back when, when the
plants were built but nothing recent other 11:21:19
than probably the design specs on their
recent proposed upgrades. But that's not
information that's routinely, you know, asked
for by us or given to us, unless it's at a
design stage where we're evaluating a design 11:21:37
proposal or something.
MR. RAO: Thank you.
MR. BOLTZ: Thank you, sir.
MS. LIU: Just following up on
Mr. Rao's question earlier. You mentioned 11:21:52
that the addition of that second 100 foot
diameter clarifier helps you to have a higher
biomass for the nitrification. Following
along the philosophy that a little is good
more must be better, would it help if you 11:22:06
added another?
MR. HUFF: Another clarifier?
MR. STEIN: I don't believe so. I
mean, you get down to less than 300 gallons
per day per square foot.
I mean, we're at 370, 380. If you
get -- another clarifier could actually cause
worse performance. And what happens is if

you get too much clarification, you have the solids sitting on the bottom of that clarifier, they can then start going septic and then release sulfites, which could, you know, one, start causing bubbling or gassing in the clarifier, and two, provide food for filamentous organisms. 11:22:36 11:22:58

And I have worked at several industrial biological treatment plants that we've actually -- because of changes in production, the flow rates have gone down -- we've actually had to shut off clarifiers, because the lower overflow rate was causing more problems and a poorer quality effluent. So you can get -- and the same thing, if you get too long a detention time, you could actually start getting a deterioration in the system, that if you look at the relationship between F to M and settle ability, it's short of a U-shaped curve, with the F to M -- if 11:23:17 11:23:37

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you get very low F to M, then you start getting very disbursed organisms and poor settling.

If you get a very high F to M, you get settling problems. So there's sort of an optimum range for operating the treatment plant and the same thing can occur for the clarification. 11:24:09

MS. LIU: In the Agency's recommendation on Page 10, they mention that the ExxonMobil refinery had previously received relief from the four, just as Citgo had. But now they are choosing to forego any further board relief. 11:24:21

They point to the state construction permit issued in March of 2007 that would allow the construction of additional clarifiers to add additional square feet of surface area and increase the detention time. Subsequently, ExxonMobil wrote to the Agency indicating that it will meet the lower limits. 11:24:36 11:24:47

We've talked a lot about this already.

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MR. BOLTZ: Right.

MS. LIE: Somewhere along the line ExxonMobil sees the benefit of the additional clarifiers in the square footage. I'm not sure how it fits into the curve, but perhaps you could relate what Citgo's situation is to how it differs from ExxonMobil and how you wouldn't benefit from necessarily doing the same thing. 11:25:10

MR. HUFF: If I could answer that question. I prepared that construction 11:25:24

permit application.
MR. BOLTZ: Your Honor, if I may interpose an objection. Should the same discussions that we previously had with respect to Mr. Huff's testimony regarding comparables in other refineries, the trade secrets or how they proceed and shouldn't apply here, in terms of what he's going to articulate on behalf of Citgo on the same issue? 11:25:32 11:25:42
MR. HUFF: With all due respect, I'm not going to divulge any trade secrets.
THE HEARING OFFICER: There you go.

Objection overruled.
You may proceed.
MR. HUFF: As I mention in one of the earlier questions, Exxon Mobil has elected to put their wet gas scrubber directly into their aeration basin. The are expanding a clarifier solely because of the more dense water that they -- the settling velocities will be slower. So they had to expand the clarifiers because of how they elected to handle the wet gas scrubber. 11:25:59 11:26:11
You recall in Citgo's case, they elected not to put the wet gas scrubber through the biological treatment system, they have a separate purge treatment unit for the oxidation. And that's the difference. 11:26:27
MS. LIU: Thank you.
MR. RAO: May I ask a follow-up? Since you've testified that you're familiar with the ExxonMobil treatment plant, could you -- if you have the knowledge about the treatment plant as to what changes they have done that made that plant come into compliance? 11:26:45

MR. HUFF: I'm going to answer that question. It's not quite that issue.
As the Agency's well aware, ExxonMobil was proceeding to also get another site specific -- they had met with the Agency approximately after a month after the BP was in the newspaper. ExxonMobil re-evaluated and decided to drop that request. 11:27:16
So that's what changed.
MR. RAO: Okay. Well, do you think the plant can operate within the applicable regulations? 11:27:39
MR. HUFF: My opinion?
MR. RAO: Yes.
MR. HUFF: I agree with Mr. Stein that before I say definitively, I would want five years of performance data. They have approximately two years without the wet gas 11:27:54

scrubber going through that system.
They have no data yet, other than their laboratory pilot test, that says that they will not have any effect. I believe that there is a considerable uncertainty as to the success of that plant when the wet gas scrubber comes online. 11:28:05

MR. RAO: Thank you.

MS. LIU: Just to provide an additional piece of information into the record, on Citgo's petition on Page 16, as well as Exhibit B of the AWARE report, on Pages 40 to 56, you described the four alternatives that were evaluated to the current treatment process. And Mr. Stein mentions in his prefiled testimony that additional detention time would be provided in the two-stage biological systems with the fixed film system as a second stage. 11:28:29 11:28:45

Just for an additional piece of information, how much additional detention time would it provide? 11:29:00

MR. STEIN: I guess the -- in going through a fixed filling system, what you have is the actual -- in other words, suspended growth system, such as activated sludge, you have the microorganisms that are in suspension. In a fixed filling system, you actually have a media that the microorganisms grow on. 11:29:21

So there's a little bit of a difference. But we've got over six million square feet of surface area for the nitrifiers to grow on.

And the reason to go to a two-stage system, instead of longer detention times, is you have a better chance of not having these inhibitory factors in a two-stage system than you do in just a longer detention time in a single stage system. And that's the reason that we thought that was a way to go. 11:29:52 11:30:08

I hope that...

MS. LIU: Yes.

MR. RAO: I have a question for Ms. Postel. 11:30:28

In your prefiled testimony at Page 10, you said that the refinery will continue to investigate improvements to it's existing wastewater treatment systems. And you say that focusing on better solids handling from the desalter holds the greatest promise for achieving improved wastewater treatment performance on a consistent basis. 11:30:42

Further, the options that will be investigated include in-situ solid removal system, increase tankage to allow brine segregation, amine management and a distant chemical usage to reduce emulsification in primary treatment units. The propose of this standard language includes a sunset provision limiting relief to a five-year period.

Does Citgo believe it will take five years to investigate the options listed in your testimony? Also would you please provide a proposed timetable for investigating these options. 11:31:13 11:31:29

MS. POSTEL: Well, for the in-situ solid removal, there is a group of refineries across the country that are working on various technologies. This has been ongoing for about two years. 11:31:45

The timetable for that, I don't know. I don't even think the refineries that are involved and the technical people involved in that analysis have any timetable that they could follow. 11:31:58

MR. FORT: Mr. Rao, let me say this,

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that we would certainly be amenable and willing to put forth such a proposal. I actually had hoped we were going to get the Agency engaged in that kind of a dialogue and investigation plan.

And we can't control it all because there's third parties that we can't control their schedule, but I think we could propose a schedule of action over the next five years. 11:32:28 11:32:38

MR. RAO: That would be helpful. Because you have proposed a sunset provision, and it could be helpful for the Board to see what activities that Citgo would be undertaking during this period of time. 11:32:47

MR. FORT: Okay.

MR. RAO: That's all we have. Thank you very much.

THE HEARING OFFICER: Thank you.

Mr. Fort, do you rest? 11:33:03

MR. FORT: We're resting.

THE HEARING OFFICER: Let's go off the record for a second.

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(WHEREUPON, discussion was had off the record.)

(WHEREUPON, a recess was had.)

THE HEARING OFFICER: We are back on the record. 11:55:34

Once again, Citgo has rested their case in chief. Mr. Boltz from the IEPA has

got the floor.
MR. BOLTZ: Yes, sir. We would like to call Darin LeCrone. 11:55:45
THE HEARING OFFICER: He's already previously been sworn in.
DARIN LeCRONE,
called as a witness herein, having been previously duly sworn and having testified, was examined and testified further as follows:
DIRECT EXAMINATION
BY MR. BOLTZ:
Q. Would you go ahead and state your name for the record and spell your last name. 11:55:51
A. My name is Darin LeCrone, L-e-C-R-O-N-E.
Q. And where are you employed, sir?
A. Illinois EPA.

Q. And what do you do at the Illinois EPA?
A. I'm in the industrial unit of the permit section. I'm currently the acting unit manager. 11:56:06
Q. And as part of your job duties, do you have access to various oil refineries in the state of Illinois, specifically their effluent limits?
A. The reported data, yeah, the DMR data.
Q. Have you had the opportunity to -- or have you ever had the opportunity to look at the reported data relative to ExxonMobil in the state of Illinois? 11:56:27
A. Yes.
(WHEREUPON, a certain document was marked Respondent Exhibit No. 1 for identification, as of 8/20/08.) 11:56:38
BY MR. BOLTZ:
Q. I'm going to hand you what I just marked Exhibit No. 1. 11:56:38
THE HEARING OFFICER: Your Honor, if I may approach the bench and provide additional copies?

THE HEARING OFFICER: You may.
MR. BOLTZ: Thank you.
MR. FORT: Excuse me, what is the number?
THE HEARING OFFICER: IEPA Exhibit No. 1. 11:56:59
BY MR. BOLTZ:
Q. Can you go ahead and identify this document for the Board?
A. It's kind of a condensed printout of the submitted DNR data for ExxonMobil for ammonia and nitrogen for April of '03 to March of '08. 11:57:05
Q. And how do you know that?
A. The dates, the left-hand column is the

year, the month and the day. This table is condensed now, I took out some of the columns. 11:57:32

It's -- the DMR system used to be called PCS, now it's ISIS or something. The USEPA DMR data entry system is what this came out of.

We just pulled -- had our compliance section pull just the ammonia nitrogen data, both concentration and load -- reported load -- mass loadings. And it also gives the -- like this one in particular, gives the reported 11:57:52

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monthly average concentration, the monthly average limit, the daily maximum reported concentration, the daily maximum limit, and then the average maximum mass loadings and limitations as well.

Q. Can you go ahead and -- when you said that in order, can you describe which column that's in, just so the record can be clear? 11:58:19

A. Yeah. My description was from left to right. The first column is the date, the DMR date.

The second column is the reported monthly average concentration. The next column is the monthly average limits. And then the -- and then there's units, obviously. 11:58:31

Then the daily max reported concentration, the daily max limit. Then the monthly average reported mass loading. And then it kind of jumps -- jumped two pages to get to the end columns on that. 11:58:45

And the -- it should be the -- yeah, the mass. The monthly average reported mass loading, monthly average mass employment. The daily maximum mass loading and daily max mass limit. 11:59:01

And that's from left to right across this table.

0219

Q. And that spreads over several pages, because --

A. Yes. That was as condensed down as I could get it. As close to fitting on one page as it would go. 11:59:22

Q. Does this appear to be a true and correct version of those numbers, which are available in the normal ordinary course of your job duties?

A. Yes. 11:59:34

Q. During the course of -- let me withdraw the question.

Pursuant to the petition that's being sought here under 304.122(b), there's been a common utilization of the term "three-six"? 11:59:47

A. Uh-huh.

Q. How does the three-six -- what is that, first of all?

A. It's a state effluent standard that applies to the Illinois river system. It's a three milligrams per liter monthly average limit of six 11:59:57

milligrams daily maximum.
Q. And where would that fit on this Exhibit 1?

A. Well, the three-six doesn't -- because those limits didn't apply to this facility at that time, it would be the nine and the 23 -- the nine and the 20 theory or the average maximum limits. The three and the six didn't apply at this time, so they're not on this table. 12:00:24

Q. With the knowledge that you have today, will they apply in the future?

A. It's anticipated, yes. ExxonMobil has, apparently, decided not to seek a renewal, or whatever you phrase it, of their standard site-specific rule. And so the three and six limits would apply to them. That's being proposed at this point. 12:00:37

The permit is still under review. It's not even been public noticed yet. So there isn't even an official draft at this point, but that is the route we are heading. 12:00:53

Q. Thank you.

(WHEREUPON, a certain document was marked Respondent's Deposition Exhibit No. 2 for identification, as of 8/20/08.) 12:01:05

BY MR. BOLTZ:

Q. I hand you what's marked as Exhibit No. 2.

MR. BOLTZ: I'm going to hand out copies to the folks here.

MR. FORT: Thank you. 12:01:14

BY MR. BOLTZ:

Q. I'm going to hand you what's been marked as Exhibit No. 2. Can you identify this document? 12:01:35

A. Yeah, it's similar data for Marathon Robinson refinery.

Q. And previously during this hearing I referred to Marathon Oil; is that the same?

A. Yes. That is this facility, correct. 12:01:52

Q. Now, you were kind enough to go through the columns before and extrapolating or clarifying exactly what they mean. Could you do the same thing for the record today, please?

A. Yeah, on this one it's a little different in that at the time the Marathon facility did not have concentration limits, so there's not columns for concentration limits on the table. They're currently still operating under this permit, 12:02:09

which is from '89.

There is a public notice draft of changes. But this one has the date -- the DMR date

in the left-hand column, and this one is just the monthly average reported concentration limit. And then the reported mass loading and limits kind of across -- it's missing something.

This is just the reported data, and no limits are on this.

Q. If we were to apply the three-six standards for Marathon, where would the three and the six be situated on this chart? 12:02:38 12:02:55

A. Well, it would be -- there's not a column -- a direct column on this one for that. Because this one is set different. 12:03:08

Why this data came up different out of the same system, I'm not really sure. The limits didn't come out on it.

But there's no concentration limits that applied at Marathon at this time. So there wouldn't be a concentration limit column on it. Once a new permit is issued, there would be. 12:03:19

Q. Is there an effluent level that was articulated that would match up with the three?

0223

A. That would be the concentration column, which is the second column.

Q. And then the six?

A. Well, there isn't a maximum -- this is actually reported as max on here, but I don't think it is. 12:03:45

Q. Okay.

A. It's listed as the maximum and not the average. But I think, for some reason, the compliant system spit it out in the wrong column. 12:03:55

Because they're not required to report average and maximum on the concentration anyway. It's a concentration that corresponded to the mass limit.

Q. All right. 12:04:08

MR. BOLTZ: One final one here. I'm going to mark this as Exhibit No. 3, Your Honor.

(WHEREUPON, a certain document was marked Respondent's Exhibit No. 3 for identification, as of 8/20/08.)

BY MR. BOLTZ:

Q. I hand you what's been marked Exhibit

0224

No. 3. Can you go ahead and identify this document?

A. This is the reported DMR data for ammonia for Citgo Petroleum Lemont refinery.

Q. And if you could go through the process of describing what each column means? 12:05:20

A. The -- from left to right in the left-hand column is the DMR date. In the next column is the reported monthly average concentration. The monthly average concentration limit, the reported daily maximum, daily maximum 12:05:33

limit and in the mass loadings, reported average limit. Reported max and the maximum limit.

Q. And just for clarification, as we go through each one of these exhibits, just very briefly for the benefit of the Board and the Hearing Officer, do you know the regulatory standard that, say, Exhibit No. 1 Exxon, has to meet? 12:05:59

A. The concentration limits or mass loading, mass limit?

Q. Relative specifically to ammonia. 12:06:20

A. This data was based on their current permit with their adjusted standard of nine and 23, for average and maximum concentration limits.

Q. And again, that's stated right on

0225

Exhibit No. 1?

A. Correct.

Q. Now, with respect to Marathon Oil, do you know the regulatory standard that they would have to meet or they've met previously? 12:06:44

A. Previously, it was just based on the federal BAT categorical standard. The current draft permit that has been public noticed has water quality based effluent limits.

Q. And again, we already know Citgo, so... 12:07:02

With respect to Conoco-Phillips, and you'll notice, obviously, the absence of that information, which has already been articulated to some degree, in the prefiling testimony, do you know the regulatory standard that they had to previously meet pursuant to this hearing? 12:07:13

A. They are meeting the mass limits -- the federal BAT mass limits. They do not -- they aren't subject to the three and six standard because they're not on the Illinois River system, they're on the Mississippi River. 12:07:28

So they have slightly different limits or expectations, or applicable standards

0226

even. So they are subject currently to water quality base effluent limits for ammonia. Most likely due to the enormous amount of mixing available in the Mississippi River.

So they are just subject to the federal BAT categorical mass limits. 12:07:55

MR. BOLTZ: I have no further questions.

THE HEARING OFFICER: Thank you, Mr. Boltz. 12:08:04

Mr. Fort, cross?

MR. FORT: I just saw this data. I think I heard that one of the exhibits was incomplete or there was an inaccuracy somewhere in one of the tables. 12:08:14

THE HEARING OFFICER: Is that the Conoco one?

MR. FORT: Yeah.
MR. BOLTZ: No, it's Marathon.
THE HEARING OFFICER: Marathon? 12:08:20
MR. FORT: Conoco is not even here.
MR. BOLTZ: Right. It's not here.
MR. FORT: It is condensed data, it's not even full data from which it's

0227

extrapolated. I'd have to reserve asking questions later.
And I can ask a few questions now, I believe, but I want to reserve the ability to actually look at the data and form some 12:08:37 reasonable questions that don't waste everybody's time while I plow around and try to figure out what's behind this.
THE HEARING OFFICER: Will this data ever be available? 12:08:48
MR. BOLTZ: I'm sorry?
THE HEARING OFFICER: This incomplete data from Marathon and then --
MR. BOLTZ: Well, Your Honor, at your pleasure, we can look at the data again. You 12:08:57 know, we've only looked to provide the data that is relative to the ammonia and nitrogen, obviously, petitioned today.
We can take a look at the data again and make sure that we have all that we 12:09:07 need.
MR. LeCRONE: Yeah. The issue for me with the Marathon data is it's reported on here as a daily max concentration. I don't

0228

really -- I think it might be the average and not the max.
But I need to verify that this is how it came out of the compliance system. But other than that, there's nothing else 12:09:28 emitted from it. I think that max should be an average is the only difference.
MR. BOLTZ: Just that verbiage that says the max?
MR. LeCRONE: Yes. I suspect that may 12:09:39 be the case. I need to verify that with compliance, I wasn't able to do so.
THE HEARING OFFICER: All right. Thank you.
MR. BOLTZ: We just want to get the 12:09:45 information.
MR. FORT: Well, counsel, I really appreciate your willingness to do that, but we did ask the Agency for this six months ago. 12:09:53
MR. BOLTZ: Your Honor, you know --
MR. FORT: We were told, "See what you can find out from public available channels."
THE HEARING OFFICER: Okay. We've

0229
been over that.
Mr. Fort?
MR. FORT: As long as I can reserve asking more questions.
THE HEARING OFFICER: Well, yes, I guess, asking more questions when we continue on the record. 12:10:03
MR. FORT: Yes.
THE HEARING OFFICER: We're looking at right now September 18th from 9:00 to 10:00, but I still have to clear it with the coordinator here. 12:10:09
MR. FORT: I'm going to give it my best shot here of asking questions, but...
THE HEARING OFFICER: Okay. 12:10:19
MR. FORT: My technical people haven't had a chance to read this very thoroughly.
THE HEARING OFFICER: Fair enough.
CROSS-EXAMINATION
BY MR. FORT: 12:10:26
Q. Let's start with the Marathon Ashland data on this.
Why is there so little data here in comparison to everything else? We've got four
0230
pages of data on Citgo and a page and a half?
A. Well, the reason is because of the way -- there's not as many columns for Marathon because they don't have two columns for reported concentrations and two columns of reported 12:10:48
concentration limits. So condensing it down, it fit on the two pages, taking all the blank columns out of the spreadsheet.
Where the other two, because they have more columns that -- there's like -- I think 12:11:02
they are four pages apiece. The first two have the concentration columns and part of the mass loading. The last two pages are at the end of the spreadsheet that got bumped to the next two pages.
So it's a fact they're not having 12:11:17
as many columns in the spreadsheet.
Q. Well, I'm looking at this and I see one data point a month?
A. Right.
Q. Is that all that they're sampling? 12:11:25
A. This is what was reported on the DMR. So they're -- you know, they're reporting an average, which is why I wanted to see if -- I need to verify this is an average or a max.
0231
Q. Well, it wouldn't be -- surely, they are only not --
A. Well, it's reported --
Q. Let me ask a question.
Surely they're taking more than 12:11:44
one sample a month; aren't they?

A. Probably.
Q. Or is the Agency --
A. I think at least two a week --
MR. LeCRONE: Isn't it? 12:11:50
BY MR. FORT:
Q. Well, two a week is what Citgo does. But --
A. Two a week.
Q. They are collecting two a week? 12:11:57
A. Right.
Q. So that within these -- these are average numbers then, you think?
MR. BOLTZ: We need to verify that the -- the one piece we need to verify. 12:12:05
MR. FORT: It's your exhibit.
MR. BOLTZ: This is how it came out.
THE HEARING OFFICER: One at a time please, gentlemen.

0232

BY MR. FORT:
Q. Let me direct your attention to the -- there's -- the second page for 2080331. So, I assume, that's March of 2008.
A. Yes. 12:12:24
Q. There's an entry at the bottom that's blank. There's an entry of maybe eight lines up that says 3.35 milligrams per liter.
A. Uh-huh.
Q. And there's an entry above that for 2.68 milligrams per liter. All the data is of March 31, 2008. 12:12:35
Do you see those three?
A. Yes.
Q. Why is that? 12:12:45
A. I do not know.
This -- we asked for the DMR data back from '04, essentially, and this is what the compliant system gave us.
Q. Okay. 12:12:56
A. Now, they -- one issue may be that they switched from the old PCS system to a new USEPA compliance data system. I don't know if it had something to do with the database switchover.

0233

This is what it spit out for us, and I put it in the most reasonably usable format we could.
Q. Do you know if Marathon is discharging all their wastewater through their NPS permanent outfall, or are they hauling some of that wastewater offsite? 12:13:21
A. I believe they have been hauling some offsite out of state.
Q. And do you know how much they are hauling off offsite? 12:13:33
A. Volumewise, I don't know. I --
Q. Do you know if they're hauling the

purge treatment unit material offsite and out of state?

A. I believe it is a waste treatment associated with a scrubber operation. But I don't know for sure.

Q. So it's an operation that had a lot of ammonia in it; correct? 12:13:51

A. Well, normal -- no more than normal refinery wastewater. I mean, it's like the scrubber discharge from Citgo -- from what I understand, that the waste stream -- instead of treating it onsite,

0234

they're hauling it offsite.

Q. And you know that Citgo had to put in extra treatment --

A. Yes.

Q. -- specifically for ammonia for their purge treatment; correct? 12:14:09

A. Right.

Q. So this doesn't even include all that water, which isn't even reflected in this data?

A. Correct. 12:14:20

Q. And you don't know if they were worried about the effect of their purge treatment unit water on their regular wastewater treatment plant and what that would do to the nitrification of the regular waste treatment? 12:14:36

MR. BOLTZ: Objection. Calls for speculation. He asked for state of mind of another individual.

THE HEARING OFFICER: Overruled. He can answer, if he's able. 12:14:41

BY THE WITNESS:

A. I don't know if that was the reason or not, honestly. I don't think it had to do with ammonia. I think it had to do with another

0235

parameter.

But I am not 100 percent sure on that.

BY MR. FORT:

Q. Do you know if they do any treatment for ammonia from the purge treatment unit process? 12:14:53

A. Off the top of my head, no, I don't know.

Q. I'm sorry, why is there no Conoco data? 12:15:33

A. It failed in trying to generate some. I don't know what's available, honestly. I didn't get any.

Q. Going back to Marathon, it appears that Marathon has had an exceedance of three on a monthly average within the last year? 12:15:53

A. It would have been an exceedance if they were subject to the three and six standard, correct. But they weren't subject to a concentration limit at that point. 12:16:06

Q. Do you know what their mass limit is?
A. The current permit that's in effect, which is dated 1989, it was -- average mass limit of 763 pounds a day of ammonia and a daily max of 1,679.
Q. And that would have been before the purge treatment unit water; correct? Because they weren't doing the controls at that point?
A. Yes. 12:16:50
Q. Mr. LeCrone, you're just being offered by the Agency to present data on other refineries; is that right?
A. Yes.
Q. You have no other role in this hearing 12:17:08 other than presenting the data?
A. Not directly, I guess. I don't know what -- I'm not sure what you mean exactly.
Q. You're not intending to testify to any of the subjects here, other than the data you just 12:17:24 presented?
A. No.
Q. Do you consider yourself an expert in the treatment of ammonia and nitrogen in an industrial setting? 12:17:36
A. I don't know that I'd call myself an expert, but it's my job to review signed proposals by dischargers and --
Q. Well, has anybody asked you for advice on how to get to a particular effluent concentration?
MR. BOLTZ: I'm going to object. Beyond the scope of direct examination. Your Honor, he's only -- and I 12:17:58 think it's been clarified perfectly by the petitioner that he's only here to proffer this data. He's done that. If his cross-examination relative to the data is being proffered, then, 12:18:08 obviously, I have no problem. But if he's going into these other outer boundaries to discuss apples and oranges, I'm not sure that's appropriate.
THE HEARING OFFICER: Mr. Fort? 12:18:17
MR. FORT: Well, I'm trying to clarify what he is going to testify, and there's not something else to be, you know, brought in orally later.
THE HEARING OFFICER: I think he just 12:18:25 answered, he was going to be brought in to testify to these charts, graphs. So objection sustained.
MR. BOLTZ: Thank you.

BY MR. FORT:
Q. And you're not being called to testify

to contradict any of the testimony that Mr. Stein has offered today?
A. No. 12:19:03
Q. Or Mr. Huff?
A. No.
Q. Or Ms. Postel?
A. No.
Q. Thank you. 12:19:08
THE HEARING OFFICER: I'm sorry, sir. Mr. -- if I can ask a question of Mr. LeCrone. Did you help prepare the recommendation? 12:19:18
MR. LeCRONE: I did.
THE HEARING OFFICER: Okay.
BY MR. FORT:
Q. So let me make sure I understand. I'm looking at Agency Exhibit 1, which I believe is the Exxon data. Do you have it? 12:19:53
MR. BOLTZ: We have it before us.
BY MR. FORT:
Q. Does the witness have it?

0239

A. Yes.
Q. Thank you. I'm just going in the far left-hand column --
A. Uh-huh.
Q. -- with number -- the first number at the top of that column is 1.1 milligrams per liter? 12:20:15
A. Yes.
Q. That is a monthly average?
A. It should be the reported monthly average concentration. 12:20:26
Q. Okay. And going down I see -- it looks like April 30, '04, a 10.7 milligram per liter monthly average; correct?
A. Yes.
Q. And that was higher then their site-specific rule? 12:20:38
A. Correct.
Q. And the next month, May 31, of '04, a 12.1 milligram perfect liter?
A. Yes. 12:20:47
Q. And again, that's higher than what they had in their authorized rule?
A. That's correct.
Q. And again, in December of '04,

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3.9 milligram per liter, which was less than the rule but above the three milligram per liter rule we've been talking about?
A. I'm sorry, which one was that? Yes. 12:21:16
Q. And you don't have an opinion of whether or not the Exxon Mobil strategy of taking their purge treatment unit or wet gas scrubber water into their existing ammonia nitrogen system will

adversely affect their ammonia nitrogen performance; do you?

MR. BOLTZ: I'm going to object to this line of questioning. I think we've already gone over this.

My objection has been sustained, that we shouldn't extend our testimony beyond the limits of direct examination.

MR. FORT: Well, Mr. Hearing Officer, he said he reviewed permit applications. So I guess I could ask him the foundation question did you review the ExxonMobil permit application, but...

BY THE WITNESS:

A. I didn't review the ExxonMobil.

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THE HEARING OFFICER: Objection overruled.

You can answer.

MR. FORT: Can you read back the question for him?

MR. BOLTZ: I think he already answered the question.

THE HEARING OFFICER: He did answer the question.

MR. FORT: I apologize.

MR. BOLTZ: He said no.

BY THE WITNESS:

A. No, I did not review the Exxon Mobil application.

MR. FORT: The next question -- the question before that is the one that I was asking to be read back.

THE HEARING OFFICER: Can you read that back?

(WHEREUPON, the record was read by the reporter.)

BY THE WITNESS:

A. I don't -- at this point, I didn't review the specifics of their design or their

0242

proposed treatment plant expansion. I don't know what their design parameters were exactly, what they were shooting for.

So I can't -- I don't have an opinion one way or the other on it, because I wasn't involved in reviewing the specifics of their design.

BY MR. FORT:

Q. But you heard Mr. Huff's testimony about his consideration of the potential risk and adverse impact on --

A. Yes.

Q. Do you disagree with his testimony?

A. No, I don't disagree with it.

Q. Thank you.

So, in a real sense, ExxonMobil doesn't yet have a permit that requires them to meet

three and six milligrams per liter; correct?
A. That's correct.
Q. And they are still acting under a site-specific rule; correct? 12:23:31
A. That's correct.
Q. What the Agency has said is that so far ExxonMobil doesn't think they need to have further relief?

A. Correct.
Q. And they are making some sort of a bet, if you will, on how good their finished scale workup is, in terms of how it effects the ammonia and nitrogen; correct? 12:23:51
MR. BOLTZ: Objection to the characterization of bet. It, again, calls for speculation of what Exxon is doing in relationship to a bet.
Object to the form of the question. 12:23:56
THE HEARING OFFICER: Yeah.
Mr. Fort?
MR. FORT: Well, let me rephrase the question then. 12:24:02
THE HEARING OFFICER: Yeah, that would be -- try doing it that way. Thanks.
BY MR. FORT:
Q. So at this point in time, all you have is a statement from ExxonMobil that they're not intending to extend their site-specific rule? 12:24:09
A. That's my understanding, yes. I haven't read or seen a letter, statement from them, but that's my understanding, correct.

Q. And at this point, do you know if they are not -- that they are not discharging from their PTU or wet gas scrubber unit into their ammonia nitrogen treatment facility?
A. I don't believe that they are. I believe it's still under construction. 12:24:34
Q. And so you don't know what the result is going to be when they let loose of that water into their ammonia and nitrogen treatment facilities? 12:24:43
A. No.
Q. And you're not in a position to predict that they will be able to comply with the three-six after they turn on their wet gas scrubber or purge treatment? 12:24:54
A. Not with a hundred percent certainty, no.
Q. Do you know what their schedule is?
A. I do not.
Q. Were you involved with the discussions of the overall schedule that ExxonMobil had to do the wastewater treatment improvement? 12:25:04
MR. BOLTZ: I'm going to, again,

objection. Beyond the scope of direct examination.

We're just on a fishing expedition at this point.

THE HEARING OFFICER: Sharon, can you read that back, please? 12:25:24

(WHEREUPON, the record was read by the reporter.)

THE HEARING OFFICER: Yeah. I'm going to sustain that.

Mr. Fort, would you like to respond to Mr. Boltz' -- 12:25:37

MR. FORT: Well, the point here is that we had very -- the Agency keeps trying to say they ought to be the same. And one of the things that happened here is that the settlement agreement, that Citgo had with USEPA and the State of Illinois, had a much faster schedule. 12:25:49

And the Board will recall that we had to come in and do a variance under expedited situations to get the TDS relief to get the permit to get ourselves started. So we did a design of a wastewater treatment system that was very expedited. 12:26:01

For whatever reason, ExxonMobil had a more -- I could say orderly process, but that might be taken in the wrong way -- it had more time in their schedule. We even had time to do a site-specific rule change and still have them on schedule. 12:26:22

So just trying to point out that they're not the same.

THE HEARING OFFICER: Yeah. And you know what, and it is on record, and I'm looking at Section 101.626. It's, "The Hearing Officer may admit evidence that is material, relevant and would be relied upon by a prudent person in the course of conduct." The conduct of serious affairs. 12:26:30 12:26:42

And I'd have to agree with Mr. Fort. So I'm going to overrule Mr. Boltz' objection.

MR. BOLTZ: Thank you, Your Honor.

THE HEARING OFFICER: Thank you. 12:26:53

I'm not sure if you can answer it, Mr. LeCrone.

MR. LeCRONE: I think I remember the question.

BY THE WITNESS:

A. I was not involved with Exxon's scheduling permitwise or related to a content order with the USEPA or anything like that. I have not been a permit reviewer for ExxonMobil, and I've 12:27:09

only, basically, taken on any role in their permitting whatsoever now, in my acting manager position, with the unit, so...

MR. FORT: Okay. That's what I -- all I have for the moment. But I would like to reserve being able to look at the data.

I'd like to request that the other information that is used to come up with this, maybe this will come out as you do the QC on the Marathon data. You know, the other information that led to these documents (indicating). 12:27:25 12:27:41

THE HEARING OFFICER: We'll talk a little bit more about that off record and then bring it on record. And I'm just looking -- well, we can go off record and talk about that. 12:27:51

But, Sharon, for now, we'll go on record.

0248

Redirect, Mr. Boltz?

MR. BOLTZ: I have known, Your Honor.

THE HEARING OFFICER. Okay.

MR. BOLTZ: I would just reserve the opportunity to clarify that Marathon max versus average verbiage within the charts, just so we can all be on the same page and the Board can have the correct information. 12:28:04

THE HEARING OFFICER: Okay. Terrific. Thank you, sir. 12:28:15

Mr. Rao, Ms. Liu?

BY MR. RAO:

Q. The Agency's recommendations -- before I ask the question...

THE HEARING OFFICER: We can go off the record. 12:28:51

(WHEREUPON, discussion was had off the record.)

THE HEARING OFFICER: Back on the record. 12:29:23

MR. RAO: ExxonMobil's construction permit issued on March 19th, 2007, not only includes the construction of additional clarifiers, but also specifies the addition

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of a purge treatment unit, consisting of combined reactor/clarifier and heat exchanger, as well as the addition of an integrated biological system consisting of anoxic and outer aeration zone with recirculation and a de-aeration transition flocculation chamber. This from the Agency's recommendation Attachment 1. 12:29:52

Why did the Agency single out the addition of clarifiers and increase surface area as a part of ExxonMobil's upgrade potentially responsible for allowing the 12:30:05

refinery to meet the applicable ammonia limits?

MR. LeCRONE: It's basically just an example of something we'd like to see Citgo explore. You know, and it's kind of been -- our theme through this is it has as many open-ended questions as it conclusions that we've reached. 12:30:21 12:30:38

And that if Exxon thinks they can meet three-six through whatever upgrades their doing in addition to adding scrubber water, okay, will a similar approach, you

0250

know, loadings, operationalwise or whatever work for them. And so, that's kind of why we brought that up as an example of something we'd like to see considered or at least explained why something like that wouldn't work for them. 12:31:03

MR. RAO: So these two factors that -- you know, you talk about the detention time and additional surface area. The ones that you didn't see Citgo focus on in their addition; is that what you're saying? 12:31:30

MR. LeCRONE: Yeah. It was mentioned in there and brought up as, you know, in comparing the differences and similarities between, you know, the treatment systems of the various sights. And it seemed to stop there and not further explain, okay, well, here's one difference, but why -- you know, why they didn't evaluate those differences -- 12:31:42

MR. RAO: Okay. 12:31:57

MR. LeCRONE: -- you know.

We know that they're all using, essentially, similar treatment technologies. I mean, that's no big secret.

0251

And it's expected within these -- you know, areas, such as -- you know, surface loading rates and detention times.

MR. RAO: Yeah.

MR. LeCRONE: Where there is a difference, there didn't seem to be enough of an explanation as to how that might affect one facility versus another. There may very be a very simple explanation for it, but I'm not aware of what it would be and I was kind of hoping that they could clue me in on it. 12:32:10 12:32:22

MR. RAO: Okay. Thank you.

MS. LIU: One last question. Could you please clarify which water bodies ExxonMobile and Marathon discharge to? 12:32:37

MR. LeCRONE: Marathon discharges to, is it Marathon Creek -- Robinson Creek? And Exxon is to the Des Plaines River, Citgo is to the Sanitary and Ship Canal, and Conoco to

the Mississippi River.
MS. LIU: Thank you.
THE HEARING OFFICER: Is that it?
Let's go off the record for a minute, Sharon.

(WHEREUPON, discussion was had off the record.)
THE HEARING OFFICER: Back on the record now.
We're going to take a short lunch break until 1:20. Citgo is going to take a look at these exhibits to see if they need to talk about it anymore, and we may have to reconvene around September 4th or 5th.
But with that said, I'll see you back at 1:20. Thanks.
(WHEREUPON, a recess was had.)
THE HEARING OFFICER: We are back on the record. It'd approximately 1:22.
The Agency has rested. We are moving back now to the Petitioner, Citgo, I believe rebuttal. And Mr. Fort represented he has one or two redirect questions.
MR. FORT: Yes. Thank, Your Honor.
The question we had -- we had quite a few questions today about retention time and things of that nature. And I'd like to ask both Mr. Stein and Mr. Huff to talk about what happens if you do certain things with a design for increased retention time, some of the other issues of that comes up, particularly with respect to cold temperature conditions.

REDIRECT EXAMINATION

BY MR. FORT:
Q. So, Mr. Stein, do you want to --
A. One thing is that, as you increase the detention time, you have more surface area for cooling. So you lose heat from the treatment plant, so you actually get colder temperature. And if you get too long a detention time and too cool a temperature, you can have a -- lose your biological nitrification.
So, you know, increasing in the detention time can actually cause problems with regard to temperature. Because we can lose temperature, and, therefore, in about -- I think I had said earlier 68 degrees after 20 degrees C, seems to be the break point between having good nitrification and starting to have problems.
And I think in the Citgo refinery, in the table that I presented, I think we show a low temperature of about 73 degrees F. So increasing detention time could decrease

temperature.
Q. And, Mr. Stein, when you're talking about the 68 degrees being a key temperature, that is -- is that based upon information from Illinois or general information or... 13:24:57
A. Well, it's general information. But also, I guess one of the things we did actually with Illinois, is we actually did a two-year treatment efficiency evaluation for the GE classics treatment plant in Ottawa, Illinois, where the State of Illinois actually wrote into the regulations. 13:25:10
After doing a two-year study, we found that they had problems meeting the three milligrams per liter temperatures of less than 68 degrees Farenheit. So they actually wrote into their permit that temperatures less than 68 would be covered in malfunction of upset, and, therefore, not be considered a violation. 13:25:27
But the literature on biological nitrification also shows 20 degrees C seems to be the break point. 13:25:44
Q. Thank you.
Mr. Huff, anything you wanted to add?
A. I just would point out that the longer retention time, you have those like with aerated lagoons, it's kind of another alternative. And there's a long history in Illinois where aerated lagoons do not nitrify in the winters for the reasons that Mr. Stein just alluded to. 13:26:03
MR. FORT: That's it. Thank you.
THE HEARING OFFICER: Okay. Mr. Fort? Mr. Boltz? 13:26:18
MR. BOLTZ: Just one question.
THE HEARING OFFICER: Sure.
RECROSS EXAMINATION
BY MR. BOLTZ:
Q. So the issue relative to the colder temperature, the decrease in temperature that could occur through the longer detention times, that issue, is that an issue that ExxonMobil and Marathon Oil, as well as Conoco, would they be -- would they be mindful of that issue as well, with respect to detention times they implement? 13:26:24 13:26:40
A. I guess I don't know what into the thinking of those refineries. I mean, it would apply to their treatment plants, if it gets -- and I haven't seen aeration base in temperatures, but it would -- the same technical kinetic considerations apply to those systems, but...
Q. The same scientific sort of issues that you address? 13:27:07
A. Correct.
MR. HUFF: I would just point out that both Conoco, Phillips and Marathon are

closer to Southern Illinois, and there is a fairly significant difference in those cold temperatures than Northern Illinois. Certainly ExxonMobil has the exact same issue, yes.

Q. Okay.

MR. BOLTZ: Nothing further, sir. 13:27:23

THE HEARING OFFICER: Mr. Fort?

MR. FORT: No, sir.

THE HEARING OFFICER: Ms. Liu?

MS. LIU: No, thank you.

THE HEARING OFFICER: All right. 13:27:28

We're going to go off the record.

(WHEREUPON, discussion was had off the record.)

THE HEARING OFFICER: Back on the record.

We've been talking about a number of things, including the posthearing briefing schedule. But first, I do want to say, at least for the time being, that any -- I don't 13:36:07 find any credibility issues with the witnesses that testified here today.

We have set a telephone status conference in this matter for August 28th, and that would be at 10:00, to discuss a 13:36:22 number of things. Because what we're going to do today is continue this hearing on record to September 5th, 2008, from 9:00 a.m. to 11:00 a.m., if need be. Hopefully, by August 28th we'll find out if that's 13:36:43 needed.

Also on August 28th, we hope to address the Agency's Exhibits 1, 2 and 3, and whether or not Mr. Boltz will submit those into evidence and any objections that may 13:36:57 follow. Between now and August 28th, the Agency is going to, hopefully, supply the petitioner with any added documents that they could --

MR. BOLTZ: I appreciate that.

THE HEARING OFFICER: And you will supply, as well?

MR. BOLTZ: Absolutely.

THE HEARING OFFICER: Okay. 13:37:21

So, what we did -- for the posthearing briefing schedule, as it stands now, if in fact we don't have to come back here, we've had Citgo's opening brief due September 22nd, the Agency's brief due 13:37:34 October 10th and then Citgo's reply, if anything, October 24th.

And the mailbox rule will not apply. And if you do file electronically, I would ask that it be filed by 4:30, those due 13:37:50

dates.
Anything else?
All right. This matter is continued on record until September 5th at 9:00 a.m. 13:38:01
However, it may not be needed. And if it's not needed, I'll get a written order out canceling it.
Thank you so much for all your professionalism.
MR. FORT: Thank you.
MR. BOLTZ: Thank you.
(WHICH WERE ALL THE MATTERS HEARD IN THE ABOVE-ENTITLED MATTER THIS DATE.)

STATE OF ILLINOIS)
) SS:
COUNTY OF COOK)

I, SHARON BERKERY, a Certified Shorthand Reporter of the State of Illinois, do hereby certify that I reported in shorthand the proceedings had at the hearing aforesaid, and that the foregoing is a true, complete and correct transcript of the proceedings of said hearing as appears from my stenographic notes so taken and transcribed under my personal direction.

IN WITNESS WHEREOF, I do hereunto set my hand at Chicago, Illinois, this 1st day of September, 2008.

Certified Shorthand Reporter

C.S.R. Certificate No. 84-4327.