IN THE MATTER OF AN ARBITRATION BEFORE A TRIBUNAL CONSTITUTED IN ACCORDANCE WITH THE TRADE PROMOTION AGREEMENT BETWEEN THE REPUBLIC OF PERÚ AND THE UNITED STATES OF AMERICA AND THE UNCITRAL RBITRATION RULES 2013

PCA Case No. 2019-46

In the Matter of Arbitration Between:	
THE RENCO GROUP, INC.,	
Claimants,	
and	
THE REPUBLIC OF PERÚ,	
Respondent.	
	Vol. 6

- AND -

IN THE MATTER OF AN ARBITRATION BEFORE A TRIBUNAL CONSTITUTED IN ACCORDANCE WITH THE CONTRACT OF STOCK TRANSFER BETWEEN EMPRESA MINERA DEL CENTRO DEL PERU S.A. AND DOE RUN PERU S.R. LTDA, DOE RUN RESOURCES, AND RENCO, DATED 23 OCTOBER 1997, AND THE GUARANTY AGREEMENT BETWEEN PERU AND DOE RUN PERU S.R. LTDA, DATED 21 NOVEMBER 1997 AND THE UNCITRAL ARBITRATION RULES 2013

PCA Case No. 2019-47

In the Matter of Arbitration Between:	
THE RENCO GROUP, INC, AND DOE RUN RESOURCES CORP.,	
Claimants,	
and	
THE REPUBLIC OF PERÚ AND ACTIVOS MINEROS S.A.C.,	
Respondents.	
	Vol. 6

(Continued)

HEARING ON JURISDICTION AND LIABILITY

Tuesday, March 12, 2024

The World Bank Group
1225 Connecticut Avenue, N.W.
C Building
Conference Room C1 450
Washington, D.C. 20036

The hearing in the above-entitled matter came on at 9:30 a.m. before:

JUDGE BRUNO SIMMA, President of the Tribunal

DR. HORACIO GRIGERA NAÓN, Co Arbitrator

MR. J. CHRISTOPHER THOMAS KC, Co Arbitrator

ALSO PRESENT:

Registry, Permanent Court of Arbitration:

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Deputy Secretary General and Principal Legal Counsel

MR. JAVIER COMPARINI CUETTO
Assistant Legal Counsel

MS. MAGDALENA LEGRIS
Case Manager (remotely)

Assistant to the Tribunal:

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C O N T E N T S

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P R O C E E D I N G S

ROSALIND SCHOOF, CLAIMANTS' WITNESS, CALLED (Continuing)

PRESIDENT SIMMA: Good morning, everybody. Good morning, Ms. Schoof. Welcome back.

I open Day 6 of the Hearing in the Renco Case, and we continue the examination of Ms. Schoof, and I think we have reached a stage of questions, but before I do so, let me -- you wanted to say something about -- let me get rid of this issue.

The deadline for your views on applicable law is now set on Thursday, 4:00 p.m., and you are -- you please send your views only to Martin, Mr. Doe, and he will then, of course, do the necessary, like -- so that secures the -- let's say equal, that the things reach us at the same moment and no advantage for anybody except us.

SECRETARY DOE: Yeah. This would be treated as a formal simultaneous submission; so I'd wait until I've received the submissions from both sides before circulating them out to everybody.

PRESIDENT SIMMA: Okay. Then there was some other.

Mr. Fogler, you wanted to make...

MR. FOGLER: I didn't want you to deprive me of my redirect of Dr. Schoof; so if you have questions, certainly you can speak at any time.

PRESIDENT SIMMA: Oh, yeah, I mentioned that there would be questions. Mr. Fogler, this -- it's not my intent. I'm sure it will be the usual pleasure to just listen to the answers in particular also.

Okay. So it's redirect.

Mr. Fogler, you have the floor.

MR. FOGLER: Thank you, Mr. President.

REDIRECT EXAMINATION

BY MR. FOGLER:

Q. Dr. Schoof, I have three subjects I want to cover with you this morning. Topic 1 is whether DRP reduced emissions. And Ms. Gaela Gehring Flores yesterday asked you about a figure from your Report in this Arbitration, and I want to show you the number that she was asking you about in context.

It's in your Report at Page 17, and if we could take a look at this, she was asking you about the 30 percent decrease in particulate emissions, but let's read the relevant part. I'm going to start in the middle of the Paragraph.

You say: "As such, we were not tasked with defining the broad extent of contamination resulting from the historical operation of the smelter, or on determining the relative contribution of historical and current emissions to the exposures." And I think you mentioned

this in response to her questions yesterday.

Was your focus more on current emissions?

A. Well, it was on current -- as I said, it was on current conditions; so including current emissions, but also historical releases as they may have affected the current exposure setting.

Q. Were you attempting to quantify the percentage impact as between the two?

A. No.

Q. Okay. So you go on to say: "We also did not review in any detail the reductions in emissions from The Complex achieved by DRP after acquiring the smelter in late 1997."

And here's the number that she asked you about: "By 2002, substantial improvements to the smelter operations by DRP had resulted in decreases in both stack and fugitive emissions, with a resulting 30 percent decrease in air particulate emissions."

Yesterday, she asked you whether the 30 percent number was just stack and not fugitive emissions. Does this refresh your memory about what your Report says?

A. Yes. It's pretty clear that I was referring to both stack and fugitive emissions.

Q. And just to be clear, I mean, were these numbers that you developed yourself, or were they provided to you

when you arrived?

A. I'm not sure when I arrived where, you mean. But they -- I would have referred to a reference from somebody else. I wouldn't have derived emissions estimates myself.

Q. Let's go, now, to the 2005 Integral Report that we've looked at, C-60, at Pages 161 and 162. And there's a Paragraph that you start at the bottom of 161, and were you advised when you were there about planned future Projects that DRP was undertaking?

A. Yes. We had to have -- "we" meaning the team that included George McVehil, who was doing the air modeling, the whole team, we had to have that information to project into the future.

Q. Where did you get the percentages that we see in this paragraph? And it goes on to the next page as well, but the expected declines in emissions that we see?

A. Those would have been provided by DRP personnel.

Q. Okay. And was that -- how did that relate to your efforts to predict what the blood-lead levels would be when you returned?

A. Well, that was a crucial input to the air modeling and our predictions of what the decline in the concentrations and the outdoor dust and the other media might be.

Q. Can we go to the next page, where the paragraph

continues. Your Report from 2005 says: "We understand that Doe Run Perú is developing plans to construct some of the sulfur dioxide reduction equipment by 2008, but those plans are not considered in this risk assessment. Doe Run Perú estimates that by the end of 2008, equipment installed in the lead circuit will reduce the sulfur dioxide about 30 percent from the 2007 levels."

And so tell us what you meant by this.

A. Well, 19 years later, I imagine what we meant was that we were -- that there were -- you know, we were projecting out through to 2007, and we were just talking about additional reductions that would occur by the end of 2008. Again, based on what we were told.

Q. Were the expected reductions applicable to more than just lead?

A. Oh, absolutely. It would certainly affect the other metals, and here we're talking specifically about sulfur dioxide, but if you're -- well, this is sulfur dioxide we're talking about in this paragraph; so it's really the particulate emissions reductions that would affect the metals.

Q. Now, let's look at your 2008 Report and see how these predictions actually played out. In C-139 at Page 28. And let's look at this first paragraph.

We're now three years later, you say: "At The

Complex, numerous technological and operational changes have already been implemented to reduce stack and fugitive emissions of sulfur dioxide and metals. Future-planned changes include construction of Sulfuric Acid Plants for the lead and copper circuits to be completed in September 2008 and October of 2009, respectively."

Now, did you learn later about whether any of these Plants had been constructed?

A. Well, I noticed when I was rereading my 2008 Report, I had a bit of a disconnect between whether -- which circuits had been implemented by 2008. So in one place I said lead and copper, and then maybe it was zinc and copper that hadn't been done yet, and lead had been completed. So just fair warning, there may be -- I'm not sure if this is the paragraph where I noticed that what I think is an error in the Report about in terms of just timing of which circuit got done first.

And now I've talked myself into kind of forgetting your question. Sorry.

Q. But were any of them actually done, to your knowledge?

A. One of the three, I believe, was completed by the time we came back and did the complementary risk assessment.

Q. Your paragraph continues by saying: "With the

completion of these changes, our recommendations from 2005 for changes in facility operations will have been fully implemented."

So how did Doe Run do, then, in connection with the recommendations that your team had made back in 2005?

A. They were all the things that they had anticipated, they could complete by the end of 2007 had been completed.

Q. So let's look at a list that you have in this Report at Page 36. Your Report has a section on updates to the Complex. It says: "In the last three years, Doe Run Perú has improved the efficiency of the smelter, reduced stack emissions and increased industrial safety for its workers. The following specific emission reduction Projects have been completed since 2005," and then you have a list with maybe eight or 10 bullet points here of specific items.

The next paragraph says: "Technology improvements at the Complex have led to notable declines in both stack and fugitive emissions, ultimately reducing concentrations of metals in the air and dust surrounding the smelter."

So as a result of your recommendations and findings, did Doe Run Purdue -- Purdue -- Perú reduce emissions from both stack and fugitives?

A. Yes.

Q. Okay. Topic Number 2. I want to talk to you about historical contamination. And, again, let's go back to your Report to a section that Ms. Gehring Flores was asking you about. She read the first sentence of one of the bullet points from your summary. She read the part that said: "Any environmental exposure that occurred between 1997 and the present cannot be exclusively attributed to DRP."

You remember her reading that to you?

A. Yes.

Q. Well, here's the rest of it. It says: "Historical contamination of soil and settled dust by prior Cerro de Pasco and Centromín operations continues to contribute substantially to exposures of La Oroya residents." At the time that you were there in 2005 and in 2008, and when you wrote this Report in 2021, was this Statement still true about historical contamination?

A. Well, the historical contamination was certainly still present, then likely would have contributed a similar -- made a similar contribution to blood-lead levels and exposures, but it's relative -- the relative amount would decline as the stack emissions and fugitive emissions were controlled, meaning that by the time those were controlled, you would be left with a very large

contribution from the historical operations.

Q. And, in fact, did you in your Reports in 2005 and 2008, attempt to predict what that historical contamination would be left in terms of the blood-lead levels once the emissions were under control?

A. I wouldn't say we were attempting to predict so much the contribution of the historical emissions, as we were attempting to predict what blood-lead levels and risks and exposures would remain after the Acid Plants were installed. It -- so it may be the similar outcome, but just the perspective was we were focused on predicting the blood-lead levels, and we had to understand what the residual contamination would contribute in order to make that prediction about the future.

Q. I want to go back to what you said in your Report. So the first one, again, C-60, you have some parts in the conclusion here at Page 183.

A. Is this -- I'm sorry, the --

(Overlapping speakers.)

Q. This is your 2005 Report?

A. '05. Okay.

Q. You say: "Many actions have already been undertaken by the community, the Ministry of Health and by Doe Run Perú, to reduce both lead exposures and releases of sulfur dioxide. Many additional actions are planned for

the future." That's what we have been talking about.

Skipping down a little bit, you say: "While lead emissions will also be greatly reduced, blood-lead levels are still predicted to exceed health-based goals in 2011. This is due to the fact that dust and soil in La Oroya will still have high residual concentrations of lead from historical emissions."

Is that consistent with what you said in your Report? Your Expert Report --

A. Yes, my Expert -- 2021 Report. Yes.

(Overlapping speakers.)

Q. Is this Statement in 2005 consistent with what you said in your Expert Report in this Arbitration?

A. Yes.

Q. One more. Now, let's go to the 2008 Report, C-139 at Page 22. Here, the highlighted paragraph talks about predictions for after 2009. Maybe we could just blow up that paragraph. I think that'll make it easier to read.

Here you say: "The operational changes are expected to cause lead emissions to decline by 91 percent." You go on to say: "There is some uncertainty regarding the extent of decline in soil and dust lead concentrations relative to the decline in air emissions. It is assumed that soil concentrations are heavily influenced by historical emissions and are not likely to decline

dramatically in the short-term."

Is that consistent with what we've been discussing?

A. Yes.

Q. Ms. Gehring Flores gave us an analogy about home and garden and poisonous gas coming down like snow. If the poisonous gas had been coming down like snow for 75 years before the operation of the new owner, would that have contributed, potentially, to the exposure that whoever is living in that home and garden might have?

A. Yes.

Q. Last subject, Topic 3. I want to talk to you again about the cooperation of the folks at Doe Run Perú. Ms. Gehring Flores implied that maybe they hadn't given you accurate information.

Did you find that the people at the Plant were open and honest with you about whatever it was that you needed to know?

A. Well, you know, everyone's different; right? And most people were open. There were some people at first who were wary of us because they didn't know us, but as they got to know us and understood what we wanted to do, they were very cooperative, and part of that was because my colleague, Alma Cárdenas, is absolutely fabulous and delightful, and people fall in love with her, but we didn't

feel like there were any barriers to us getting what we needed.

Q. There's a man at the end of our table, Pepe Mogrovejo. Did you meet him when you were down there?

A. Yes, many times, happily.

Q. Did you interact with Mr. Mogrovejo?

A. Yes. He was very, very supportive of all of our efforts, and made sure that his staff were giving us what we needed.

Q. What did you understand his attitude to be about trying to improve things at the Plant?

A. He seemed passionate about caring about the community and the workers, and trying to make everything work as well as he possibly could.

Q. And last question, Dr. Schoof, we've seen the charts of the declining blood levels in the community over the time that Doe Run Perú had operated the Plant.

What do those declining blood levels tell us about the emissions from the Plant?

A. Well, they tell us that they were tackling this huge problem, which was very complex and technologically challenging, and causing reductions in the exposures. And I'd mentioned again my experience with Trail in British Columbia, because that's another large smelter where the community and the Company were working collaboratively to

try to reduce exposures and to try to improve the Plant, and it just shows that you can't fix these Plants overnight. It takes a while.

And so I felt like Doe Run Perú's efforts to improve the situation in La Oroya, they were coming from farther behind than Trail was when I got involved in Trail. But I felt like they were certainly making the effort to improve the situation.

Q. Thank you.

MR. FOGLER: That's all the questions I have.

PRESIDENT SIMMA: Thank you, Mr. Fogler, and I apologize again for having overlooked -- that was just the morning. I'm not a morning person.

Okay.

So that concludes the examination program, with the exception of questions from the Tribunal. I wanted to ask --

ARBITRATOR GRIGERA NAÓN: Not for the time being.

PRESIDENT SIMMA: Not for the time being.

Mr. Thomas.

QUESTIONS FROM THE TRIBUNAL

ARBITRATOR THOMAS: Good morning.

THE WITNESS: Good morning.

ARBITRATOR THOMAS: I wanted to begin just by asking you about the data that was available to you when

you produced your 2005 Report. And you mentioned yesterday that you didn't do blood work because there had been a substantial study prepared the year before.

THE WITNESS: Yes.

ARBITRATOR THOMAS: The question I had -- I had a few little questions about this, and if -- it's a long time ago; so if you don't know the answers, that's fine.

Do you recall what the size of the sampling population was in the blood study?

THE WITNESS: It was quite large. I don't remember the exact numbers, but it was hundreds of people.

ARBITRATOR THOMAS: Okay. And would it be possible to discern from the study the location of individuals that were sampled? For example, you mentioned yesterday -- you had made quite a few comments about Antigua La Oroya.

Would the blood study differentiate between the location of different segments of the population?

THE WITNESS: I think we had the blood data broken out by the neighborhood, by La Oroya Antigua versus La Oroya Nuevo and Marcavalle, you know, the various neighborhoods, because we made our predictions on a neighborhood-specific basis.

So -- and the power of this blood lead data was that there was lots of information for young children in

La Oroya Antigua, and there was also quite a bit of data for -- I believe for pregnant women. So we had -- it was a very powerful data set, that's very unusual to have. Most communities, you don't have that kind of information about.

ARBITRATOR THOMAS: Okay. You anticipated my next question, which was the question of segregation of the data by groupings of ages. And you've indicated that there was a lot on young children.

Can I ask you a question about that, from a toxicology perspective, and that is, can you explain, in layperson's terms, the difference between a child and, say, somebody in their 20s in terms of the impact of exposures to the kind of particulates that we've been talking about in this case?

Is -- for example -- well, I don't know anything about this from a medical perspective, but I would like to understand the receptivity or the susceptibility of a child versus an older person from a given load of exposure.

Have I made that very clear?

THE WITNESS: Yes. And it's a question that we get very fairly often. So children are considered to be more vulnerable for two reasons: One is because of their behaviors that causes them to actually ingest more soil or dust than adults do, and that's because, if you are familiar with one and two-year olds, their hands are in

their mouths all the time, and they're often down on the floor. So there have been studies that actually attempted to quantify the frequency of hand-to-mouth activity, and they're also less likely to wash their little hands.

So generally we expect that in the same exposure setting, children will have -- will ingest more lead than adults. They may, then, absorb more of that lead than adults do, and then because central nervous system effects are one of the concerns, and their central nervous systems are developing, they may be more vulnerable than adults.

The targets that we use for adults, we tend to focus on protection of the fetus in pregnant women. So the fetus might have that same susceptibility, but it will be buffered by the mother's lack of that hand-to-mouth activity, and the fact that blood-lead levels in the fetus tend to be lower than those in the mother.

ARBITRATOR THOMAS: Okay. Thank you.

Just another question, just a question of fact pertaining to the 2008 Report. I recall that the evidence is that in around August of 2007, there were flyers that were being distributed in the community by a law firm soliciting plaintiffs to bring an action against Doe Run/Renco, et cetera. Were you aware of that effort when you were preparing your 2008 Report?

THE WITNESS: I don't remember whether I was or

not; so I think maybe I wasn't.

ARBITRATOR THOMAS: Okay. All right. That's fine. Thank you very much.

PRESIDENT SIMMA: Thank you. I have just a couple -- actually, three questions. But -- so the first one is just more or less "en passant." You mentioned yesterday that at some point during your visit you found the iron and calcium, that you found major important iron and calcium deficiencies, and my question is, do you know whether DRP did something about that, whether the remediation efforts comprised all of these deficiencies?

THE WITNESS: I don't know specifically about the iron. And so in 2005, we collaborated with the nutrition institute in Lima, which actually conducted a pilot diet study, and showed that -- so those are preliminary results. At that time, I thought Doe Run had actually started a dairy, and was trying to provide dairy foods to the population, and I think we may have mentioned that in our Report.

When we went back to do the 2008 Report, there had been a follow-up diet study, and more comprehensive study done, and may have been done by the Convenio, I'm not sure, but that study really reinforced that the iron levels were very low. And so that may have been the first time that that fact became well-established.

And so I don't know if there were, you know -- I mean, it would be -- it was especially in the pregnant women, so I don't know if nutritional supplements were offered to the women at the Convenio, which would be one way to approach that. I just don't know if that happened.

PRESIDENT SIMMA: Okay. Second question, I think one of the particular features of La Oroya is the altitude. So it's 3,750 meters, and -- I don't know, 14,000 feet or even a bit more. So my question is, does the altitude of a source of emission, does that have an impact on the effects of emissions, in the sense that maybe some stuff reached at, let's say, ocean level would cause considerable damage, would cause less damage, or the other way around?

THE WITNESS: That's a good question, and it may differ between the sulfur oxide and particulate inhalation versus the lead. So living at that altitude causes physiological changes in people, in terms of lung capacity, and in terms of -- especially in terms of red blood cells count in the blood. So lead in the blood is stored in the red blood cells.

And so people in La Oroya who have a higher hematocrit, more red blood cells, have -- will report higher levels of lead in the blood as compared to somebody at sea level, even though the body stores are not also higher. So we -- there have been studies of this, and we

calculated that the blood-lead levels in La Oroya would be about 20 percent higher than for a comparable exposure at sea level, but that the adverse effects wouldn't be also 20 percent higher. So that's kind of complicated.

Does that make sense?

PRESIDENT SIMMA: Well, I can guess what you mean. Of course, I wouldn't understand any, let's say, more complicated explanations anyway.

My question is, do the -- I was surprised that WHO was never mentioned. It was always the American's limitation values, markers, that you used. Are they -- I'm sure the WHO has similar things. Would the American or U.S. systems -- how should I say? -- prescriptions and markers be more, let's say, favorable to people affected or exposed to things like lead or sulfur dioxide?

THE WITNESS: That may be variable as well, depending on what chemical you're talking about. We were instructed by the Government to specifically cite American risk assessment guidance, but, I think, as I was rereading the 2008 Report, that, wherever we could, we presented WHO toxicity values or information. I don't know that we did specifically for lead, but for some of the other chemicals I believe we tried to cover that.

PRESIDENT SIMMA: Okay. Finally, at the -- in a moment in which I was still kind of grappling with setting

up my machine here, there was a -- it might have been the first document that Mr. Fogler called up from the 2008 Report. I think it was the first one. Could we have a look at that just very quickly?

MR. FOGLER: The first document I showed her was from her 2021 Report in this case.

PRESIDENT SIMMA: I refer to -- I mean, what it says is there was a lot of -- if what I found is going to continue, if what I consider necessary, some of that was initiated, but there was a lot in the language. It's probably not this one. There was a lot of the language, "if this will continue, this could continue," there is something, let's say, some, let's say, negative effects might always be just gone, et cetera. And when you read out -- of course, you didn't put the emphasis on the "will be," "will be," if this and this continued in 2008 or 2009. So I don't know whether that is sufficient to point out the document that I saw. But I didn't get the document number. And, of course, nothing -- I mean, at least, DRP didn't continue; right? In 2009? They just finished their, let's say, their work or their efforts there.

I just get the impression that you are putting this into a bit too positive context, as if all that stuff had already been completed. And I just thought, oh, come on, I find a lot of "will be," "under circumstances," "of

continuation," et cetera. So that's all I wanted.

Do you remember what you -- does that ring familiar at least, the things that I tried to paraphrase?

THE WITNESS: So in 2008, we -- all those -- and there was one document that showed a list of all the things that had been accomplished. What hadn't been accomplished was that there were two circuits that still needed the Acid Plants to be installed, and so we were given an estimate of how much further the emissions would decline once those two circuits were -- subsequently had the Acid Plants added to them, and so our predictions were dependent on that assumption about how --

PRESIDENT SIMMA: Continuation.

THE WITNESS: Yeah. And I should say that these models that we constructed include a lot of professional, best professional judgment. This is the term of art when we do risk assessments. We didn't know exactly -- we don't know exactly how much -- what the range of soil ingestion rates are in La Oroya versus the kind of estimates we have for the U.S. So we had to -- there were a lot of factors like that, that go into the model, so we used our judgment and experience with other similar sites to construct this model.

And then, the power in La Oroya was we had blood-lead levels that we could compare to and try to make

our model match. Whenever you do that, you could have gotten it all right or you could just be lucky and have picked a combination of factors that work; right? So, you know, in my scientific judgment, I think we got it pretty close, especially because when we -- you know, in 2005, we got it pretty close because, when we came back in 2008, our predictions appeared to be holding. So, to me, that suggested that all these assumptions that went into this model and all of the information we've been given about expected emissions reductions were valid.

PRESIDENT SIMMA: Thank you very much.

ARBITRATOR GRIGERA NAÓN: I have a question.

PRESIDENT SIMMA: Mr. Grigera Naón has a question.

ARBITRATOR GRIGERA NAÓN: My colleague is always a source of inspiration.

Ms. Schoof, in your Report, you say that, because of certain technological Measures that were adopted, both the stack and fugitive emissions were reduced. Does that imply that you can quantify stack emissions and fugitive emissions? Because I think we have some doubts about how fugitive emissions could be or should be quantified?

THE WITNESS: We were -- so that was the point at which Dr. McVehil worked very closely with the DRP staff to understand because not only did he need to know the amount

of emissions -- and this is from at least a dozen, maybe dozens of sources; right? He needed to know where those were relative to the buildings in the Complex. So there's a -- it had to be very specific in terms of the amounts and where they were because the air models depend on knowing the elevation of the releases because it varied, and the bulk of the buildings around it because that affects the air dispersion once the fugitive emissions are released.

So it was -- I'm not the air modeler, but he had a lot of very detailed information in order to attempt to model the fugitive emissions.

ARBITRATOR GRIGERA NAÓN: Well, I am not a technician either, but I am reading from Page 87 of the PAMA, under the caption "fugitive emissions copper smelter," and it reads as follows. It says "fiuri," (phonetic), but it means "fugitive." "Fugitive emissions from the copper smelter are produced in the preparation Plant as materials are taken outside the area of the collection hoods. This usually occurs when the capacity of the extractors are exceeded."

Isn't that an easy fix? You improve the capacity of the extractors, and the fugitive emissions seems to not be so substantial or maybe even be neutralized. I need to understand what fugitive emissions means. If this is an easy fix or not, and why not.

THE WITNESS: Well, again, I may not be the right person to answer that question, but I can say that that implies that there was a perception that there was one source of fugitive emissions, and that's incorrect. That I know, that there were multiple sources of fugitive emissions.

ARBITRATOR GRIGERA NAÓN: So the PAMA is wrong on that?

THE WITNESS: Well, I don't know if it's wrong about the one that it focused on, but it may just be silent on -- and I don't know whether that is from not knowing or just choosing to be silent on all those other sources.

ARBITRATOR GRIGERA NAÓN: Okay. Thank you very much.

PRESIDENT SIMMA: Thank you. This concludes the expert examination of you, Ms. Schoof. You are hereby released from your duties. Thanks for coming here. Thanks for your cooperation. Thanks for what you have taken upon yourself, an evening, a night in Washington.

THE WITNESS: That was a pleasure. You release me from the lawyers.

PRESIDENT SIMMA: And from the Arbitrators.

THE WITNESS: Yes. I had dinner with friends. Thank you.

PRESIDENT SIMMA: Great. Wonderful. Wonderful.

Well, thanks again. And that concludes your examination here.

(Witness steps down.)

PRESIDENT SIMMA: And that gets us to the next Expert in line, which is Mr. Connor. So do we need a few minutes' break? How instant?

MR. SCHIFFER: We can go right into it, Mr. Chairman.

PRESIDENT SIMMA: Sorry?

MR. SCHIFFER: I think we can move right in to him.

PRESIDENT SIMMA: Okay. Great.

JOHN CONNOR, CLAIMANTS' WITNESS, CALLED

PRESIDENT SIMMA: Good morning, Mr. Connor.

(Comments off microphone.)

PRESIDENT SIMMA: You were talking about three people that you would like to --

THE WITNESS: Is it on?

PRESIDENT SIMMA: It's on. Now it's on. Yes.

THE WITNESS: Okay.

PRESIDENT SIMMA: And what was the --

THE WITNESS: I was just asking if you could see me over this screen here. I can see that you can. Yeah. That's working.

PRESIDENT SIMMA: So would you please read out

the Declaration that you find in front of you.

THE WITNESS: Yes.

I solemnly declare, upon my honor and conscience, that I shall speak the truth, the whole truth, and nothing but the truth, and that my statement will be in accordance with my sincere belief.

PRESIDENT SIMMA: Thank you very much.

Who will be the direct?

MR. SCHIFFER: Well, actually, Mr. Connor has a presentation to make. So without further ado, I'll turn it over to him.

PRESIDENT SIMMA: Thank you, Mr. Connor. You have the floor for your presentation.

DIRECT PRESENTATION

THE WITNESS: Okay. I'm going to wait a minute until they bring it up. Okay. I'm starting.

Hi. I'm John Connor, as you already know. I've done two Reports in this procedure, and I'm going to talk about those a little bit today.

First, a little bit about who I am and what I do. I'm a Board-Certified Environmental Engineer and a licensed geoscientist, I've spent 44 years doing just the kind of stuff that we're talking about today, and that includes environmental pollution control for many types of industries, it includes Human Health and Risk Assessment

that tells us how clean things need to be, and I've done a lot of papers on those same topics.

So, what questions was I asked to address? Well, here they are, and here are my answers.

Are the third-party claims related to the PAMA? Yes.

Are the actions or the issues exclusively attributable to DRP's actions? No.

Were DRP's standards and practices worse than Centromín's? No.

My Reports cover all these. Today, I'm really going to focus on the third point: Was DRP worse? I think it's the point that's got the most conversation about it and it's really the easiest to answer.

My Report lays out my finding, that DRP's operations were more protective. They were more protective because things were very bad beforehand, the PAMA was designed to fix that, DRP did the PAMA and more things, 42 pollution control Projects, and the actual measurements showed things they improved.

I can't find any way to review those basic facts and conclude that DRP was worse than Centromín. But we have six reports from Experts on behalf of Perú that say just that. I've looked through those Reports very carefully, I've checked their calculations in detail, and

I'm ready to talk about that today, if I receive those questions.

Let's get a little background on CMLO and La Oroya. What's it look like? What's going on there?

Here's a picture looking down on the Complex. You can see a big main stack in the middle, and, in the back, you have La Oroya Antigua, little town there. Well, what the heck is a smelter? All right. This is a super simple diagram that shows that, from the mine, we get what's called "concentrate." It's ground-up ore that's been concentrated to increase the metal content. That comes into the smelter that, by a number of metallurgical processes, extracts metals and purifies them and issues them as metal product. At the same time, it issues a lot of other things that aren't product. They're waste. You get air emissions. You get wastewater. You get slag and solid waste, and that's the domain of the environmental engineer. This is what I do. We look at these different emissions and we try to control those so that the stuff coming out of a smelter or a petrochemical plant or refinery or manufacturing plant doesn't impact the environment. And the things we do or the things you've heard about in reading all these documents.

For air emissions, you've heard about Cottrells and baghouses and acid control. For wastewater, the goal

is to reduce the flows, treat that water before it hits the river. And for slag and solid waste, we want it to take safe transport to a landfill that's secure. Okay. These are the things that environmental engineers do. This is what I've spent my career on.

In June 2019, I visited the CMLO to see what it really looks like and what's going on there, and I went to the towns around the area, and this is what I saw.

This is a picture looking down over the town of La Oroya Antigua, in the far background there you see a little column. That's the main stack. And the first thing you notice when you go to La Oroya Antigua is dust. The hills there are bare. They're denuded of all vegetation due to 100 years of sulfur dioxide emissions that resulted in acid rain. It killed all the vegetation. Those hills are still bare. They're not only bare, they're full of heavy metal emissions, lead and arsenic and other things. And that's the situation that creates the dust every time the wind kicks up. Here's a couple more views. On the right -- the left-hand side, you see these bare dirt hills looming over the town. On the right-hand side, excuse me, you see that rain also erodes those hills and carries mud and dirt into the town. The dust that's in those streets and the dust that's in those towns comes from those bare hillsides, and you know it as soon as you step into town.

It's not just in the streets, it's also in the homes themselves. The adobe homes were built of the contaminated soils right on-site; right? So the walls contain lead and arsenic. And it comes in, the dust comes in through the loosely-fitted metal roofs and many windows that have no glass. And as we see on the right-hand side, although some streets are paved, most are dirt.

The CMLO had impacts on the environment as soon as it started operating in 1922. Here, we have a study that was done in 1934 that shows that the impacts on vegetation and agriculture and cattle extended over a huge area, 100 kilometers long, 50 kilometers wide. For us in the U.S., that's 60 miles by 30 miles. It's a huge footprint.

By the time DRP arrived at this site in October 1997, over 300,000 tons of lead had been emitted from that stack based on the actual review of the emission records from these Facilities.

And that dust is still on those hills, and, of the dust on the hills, 2 percent comes from DRP's operations. If you read the Rejoinders, there's one that says that this is nonsense, but remember this: In 2003, SVS Golder, on behalf of Centromín, does their own survey, and the data they put in their Report says it's 95 percent lead from before DRP, 95. And AMSAC, Activos Mineros,

issues a report in 2010 which gives data that says it's 90 percent. 90, 95, 98, whatever. It's not a problem that's exclusive to DRP.

Standards and practices. I believe, Mr. President, you asked the question, what do we mean by these standards and practices? Here's what we mean in the environmental business. Standards and practices are the operations and processes that can contribute to impacts to human health. The environment stuff that comes out of the Facility. How do you stop that? Well, when we want to compare different facilities, how do we do that? One operator versus another.

Let's look at their performance over a period of time that we can see the trend, and let's see what projects and policies they implemented to stop pollution. Pollution-control projects. And, finally, let's measure it. Let's measure those conditions over time to see if they really improved, and this last point is the key. In the environmental business, we rely on measurements. We measure the air. We measure the water. We measure the soil with laboratory measurements to say, did it change? Did it improve?

I've done mass balance equations analyses many times in my career, I've run air models and water models and every type of analyses you can think of. But none of

them are as important to replace an actual measurement. You want to know what's in the air? Measure the air. And that's what we will be looking at today.

I've spent my career doing environmental measurements and looking at what they say and interpreting that, and there's a few rules to the road I wanted to visit before we dive in.

First, the monitoring program specifications come from the State. In this case, Perú mandates how those measurements are done, where they're done, how frequently they're done. And when you get that data back from the laboratory, you need to look at it to say does it make sense? Are these data reliable? That's a question that often is yes, and rarely is no.

We'll look at some notes as we talk today.

And, finally, how do you assess these data? What does it mean? You need to look at the trend over time to see how -- what they tell us on average over time, and here's a simple way to distill it all down. Did the Operator leave it better than they found it? Look at the data. Did they leave it better than they found it? That's the question we want to look at when we look at DRP.

Well, let's look at what it was like before DRP and the PAMA are implemented. In the mid-'90s, in response to the PAMA Act that came out in 1993, Centromín

commissioned several engineering and scientific studies to develop the baseline information on the environmental conditions. They found that practices were poor and there was high contamination of air, water, solid waste, and soils. And on that basis, they developed the PAMA. The PAMA is a program to transition a highly-polluted facility to a non-polluted facility. And what it stands for, in rough translation, is "Program of Adaptation and Environmental Management." Environmental management. The word "metallurgy" is not in there. This an environmental problem.

In 1997, the PAMA mandates 16 major projects for 16 major problems. If there hadn't been problems, they wouldn't have needed a PAMA. And that PAMA sets out mandates for what projects should be done, their schedule, and their cost.

In 2006, the PAMA is extended to deal with three acid plants that weren't done and they added 12 other air projects. In 2009, an extension for the one Acid Plant that wasn't finished.

Well, let's look at these Projects, what they entailed, and what they look like. Okay. This is from an interactive information tool that I provided with my Second Report. It has a map. You can click on it and a project comes up and it tells you about that project.

Here, I have overlaid some additional colors that indicate where these pollution-control projects were located. We have 28 PAMA Projects, 14 non-PAMA projects, 42 pollution-control projects. And as you can see by the color, they affect almost every square meter of that 40-hectare Facility. And five facilities off-site.

The original PAMA set out for the PAMA Projects a specific schedule at which they needed to be completed. On this slide, I sort them into the type of pollution-control project that was involved: Water, solid waste, or air. And what you see here is the water and solid waste Projects were given priority by the Government and Centromín, and they had reasons for that. And I can explain those to you, if you're interested.

The air Projects were last for the PAMA Projects. They were last. DRP arrives in October '97, and none of these Projects have been started. The PAMA comes out in January. They have nine years left to do this work.

These are big projects. These are expensive, major capital projects, and the Project Budget increased by four times over DRP's tenure, from around 100 million to over $400 million, and they increased because the Projects turned out to be more complicated and expensive and they had cost increase because, in the 2006 Extension at DRP's request, 12 air projects were added.

Well, what's the score card? Did they get them done?

Here, we see the original 14 PAMA Projects; right? And I have a checkmark by every one of them except one: A Project 1. There were three acid plants that were part of the PAMA. When they came out and did inspections, it included those Acid Plants. One of those three wasn't done, the copper circuit Acid Plant was half-done when operations were suspended.

Let's look at the 12 new air Projects that were added in 2006. All were done. Of those, eight were fugitive emissions projects to capture and control the fugitive emissions, as Mr. Grigera Naón mentioned.

Okay. If -- stepping back, if a new Operator came in and did one major capital project for pollution control, say, put in the lead Acid Plant, $50 million project that didn't exist before, you could say that's an improved standard and practice, less pollution.

What if they did 42 pollution-control projects, 42 pollution-control projects? I think we can pretty readily and logically conclude that that's an improved standard and practice.

In the interactive information tool, I give -- I try to give a virtual tour of the site. I want you to see these things. They're real. They were built. They

happened; right? That's important. If you click on a site on the map, up pops a short page that gives a very basic description of projects, some photos, some key facts.

I'm just going to look at a few of these Projects, but there's a lot of them in there. Okay. 1998 the coking plant. Bad emissions, shut down, better practice.

Here's another air project. The smelting beds enclosed so that wind can no longer blow the dust through the town. This cuts fugitive emissions. Better practice.

The site was paved. The 40 hectares are paved. If you've ever driven your car down a dirt road, you know you've seen fugitive emissions. Well, then, these would be full of lead and other things, stopped, better practice.

Before the PAMA, before DRP, wastewater and some of this funky-colored water from these Facilities went straight into the river. Afterwards, no water goes out without going through a wastewater plant to be cleaned. Better practice.

Solid waste, here we see the Huanchan Landfill, where all the slag is disposed. Prior to the PAMA and DRP, this was open to the elements and dust blew through the area. Afterwards, it's covered, contained, and controlled. Better practice.

Acid plants, oh, man, a lot of talk about acid

plants, and an impression, perhaps, that they weren't done. Three acid plants, we see two of them here, they were done.

The copper circuit Acid Plant, that's the third Acid Plant; right? It was half-done. Here, you can see the construction underway. The Project was half-done, $100 million project when the Facility stopped operating.

Here is a pretty complicated slide, and it comes from the information tool kit; right? And it gives the history of the sulfuric acid timeline, what was done, and you can see that, almost every year during the operation of DRP, there is some major milestone in that Project. It's not an activity where they waited until the last end to do this work. In the December 2005 square, you'll see a very important fact: $14 million. It's the one down on the bottom, in the center. $14 million in engineering work had been dispensed by DRP by December 2005. These are some of the biggest engineering companies in the world are working on this to solve a difficult problem, and they've come up with an effective solution and they implement that solution over the following years.

The technology that they put in was very different from what the plan was originally. They came up with a better plan, and they implemented it.

Okay. Let's look at the final piece of the data; right? The actual measurements out there. What do we see

when we look out there and measure the performance?

First, a very basic concept, okay. A definition of "emissions" and "pollution," just to clarify. Emissions would come out of the Facility. Pollution is what happens out there in the environment; right? Emissions cause pollution and, conversely, reduced emissions result in reduced pollution, better air quality. This is what environmental engineers do. We try to reduce the emissions from a facility to be more protective of health and the environment.

Two other definitions: "Stack emissions" and "fugitive emissions." All right. Stack emissions result from -- as Mr. Grigera Naón was saying, a ventilation system acts like a giant vacuum cleaner and it sucks up the gas and sucks up the dust, puts it through a filter, and puts it out through the stack. DRP improves that suction system, so they capture emissions that would have left and been fugitive emissions. That's the stuff they don't capture. It goes out the skylights. It comes off the trucks. It goes out the doors.

Now, total emissions are the sum of those two things, and total emissions are what drive air quality. Okay. So the pollution that is measured at Sindicato across the river from the site is a function of total emissions. If there are fugitive emissions, they see it,

the impact. If there's stack emissions, they see it.

So when the pollution goes down at Sindicato, total emissions are going down, both stack and fugitive.

Well, let's look at some of the data. Here is the reality again. There's the big old main stack on the right-hand side. It has two little monitors on it to get continuous readouts, SO2 and dust. Here's the dudes in the control room looking at their screens continuously monitoring these emissions and other emissions from the Plant. And there's one of the readouts. What do those guys see?

Here is a plot of total lead that goes out the main stack every year, from 1975 up to 2008. Let's look at the time that DRP comes, the dotted line -- the dashed line there. From the time they come, the trend is down; right? And that's what we want to look at. Remember, the trend over a period of time, based on actual measurements, what happened?

They left it better than they found it. It's lower when they leave -- right? -- when they're finished. That was the result of all those Projects.

Well, as I said, here, it's the result of projects. This is from the interactive tool kit, and what I've done is taken that same gray line of emissions and I've overlaid it on a Gantt chart of the Projects. You can

see they're all named there. And you can see they start immediately in 1998, and they extend through time and cumulatively have the effect of driving down emissions. That's how it happened, and it did go down, and the trend is it got better.

Okay. That's the emissions. Now, let's look at pollution. There are a system of air monitoring stations that are scattered around that valley. Sindicato is the closest. We're talking about Sindicato very often. This is what the air monitoring stations look at. There's a couple of guys looking at a high volume of particulate sampler. I've installed those. I've operated them myself.

Well, what do they see? What does that monitor, just across the river at the Sindicato Labor Union Building see in La Oroya? These show the concentration of lead in the air in micrograms/meter cubed, comparable to a part/billion over time.

You can see, when DRP comes in and DRP goes out -- the trend is downward; right? The trend is downward over time.

Now, let's do something that I find interesting. Hopefully, you will too. Let's compare that -- what's the emissions to the air quality; right? Okay. Gray line is the emissions out of the stack; the blue line is the lead in the air at Sindicato. And notice something important

here: When the lead -- when the emissions go up, the lead in the air goes up. When the emissions go down, the lead in the air goes down. Well, of course they do; right?

And the important thing here is how closely the stack emissions track with air quality. Stack emissions matter, they are important. And reducing emissions reduces pollution; right?

And, secondly -- really important -- reduction in pollution shows that total emissions went down. The Sindicato Station measures whatever comes out of that Plant, fugitive or stack, and it only gets cleaner if both go down. We can't measure fugitives, but we know they went down.

On this plot, there's three data points that don't fit the pattern. And let's remember reviewing the reliability of data. Okay. You see those three little data points that -- actually, what the heck is going on with those?

Well, here's 35 years of measurements that show that emissions and air pollution track pretty closely. I now have the gray line, stack emissions, going all the way back to 1974, and I have some data back then of air quality. It tracks pretty close. Emissions goes up, air quality gets worse; emissions go down, air quality gets better. And that also happens on the database we have

during DRP after 1987, except for those three points.

They don't follow the expected trend where they track emissions. And when those emissions are coming out, the air is full of dust. You're right across the river. How could that same dust be coming out, but the air at that point is as clean as it is after $300 million of pollution-control projects; right? It doesn't make any sense.

It also doesn't make any sense for this reason. Centromín -- this is all on their watch. Centromín is working to reduce emissions from their operation, but as they are reducing emissions, as we see on the top, the air is getting way worse. What could Centromín possibly be doing to make this happen? They weren't making that happen. They were trying to make it better.

So that pollution going up can't be right. So when we look at these charts, remember, these data are not reliable. Why do we care?

SVS 2003 -- I hope we get to talk about that today -- says the air got worse under DRP's operations. That is because they are using those three data points, and those three data points are not valid.

We also know they are not valid because there have been a bunch of audits of these labs and people using these data over time and they've written reports about that

that said there were some big problems. We'll all talk about those right now. They are in my Report.

Okay. We have looked at pollution. Now let's look at health. Remember, protective of environment and human health. Were they?

Let's look at the data. Okay. Average worker BLL dropped by 40 percent during DRP's operations, 40 percent. That is health. And it reduced because of safety initiatives, right? And, more importantly, average children blood-lead levels dropped by 49 percent over the course of DRP's operations.

That happened because they reduced emissions and they took certain health initiatives in the town. Hundreds of people -- hundreds of people did these hundreds of millions of dollars of projects on that facility for exactly this reason, and it worked; right? It is real. It is real. They did the Projects and they worked, and this is why they did it.

Ms. Proctor shows us the same thing. This is kind of a busy plot. But look at the big orange circles on there. That's how she organizes the blood lead. What happens over here in these periods of operation -- I'll add the orange arrow. The blood-lead level in those children decreases over the period of their operations, and it happened because they did those Projects. They left it

better than they found it, and that's what my conclusions are here, which I've already said.

So, now, let's look at some of the rebuttal issues. All right. I'm going to talk about Mr. Dobbelaere, Ms. Proctor, and Ms. Alegre and what problems I find in their conclusions. Let's start with Mr. Dobbelaere.

I have some bullets on either side here that kind of show the back and forth. I'm not going to talk about them all. They are in my Reports, and I can talk about them today, if I'm asked.

What I am going to talk about is the top left-hand bullet. Mr. Dobbelaere says that DRP greatly increased fugitive emissions by increasing production and using "dirty" concentrates. Let's look at that very closely, but start with reality. We are going to look at a lot of reality checks. The reality is that across the river in La Oroya Antigua, the air got better. And that air, reduced air pollution means that stack and fugitive emissions total went down. They had to go down. We know they did.

But Mr. Dobbelaere is telling us that, while the air pollution went down, the emissions went up hugely, huge emissions under DRP. That is absolutely not possible and every environmental engineer knows that.

There are several lines of evidence that Mr. Dobbelaere presents, and I've listed them there. And we'll talk -- I'm going to talk about each one of these. I'm willing to go through these in detail every single calculation, if you're interested and I'm asked.

But one big-picture thing is none of these, none of them are based on true environmental measurements. We tested the air. We tested the water. Those are not used. They did metallurgical calculations that are gross rough estimates of what happened out there.

I'm going to go through each one of these: Increased production, dirty concentrates, SX-EW mass balance, SX-EW reducing air quality, and then criticisms of the stack.

A little clarification to give you some context. Mr. Dobbelaere relies on other people's work, and he balances his Report on work done by SX-EW. That's a company that was contracted by Doe Run Perú, in liquidation in 2012, to do a study on mass balance analysis.

And SX-EW, in turn, relies on air modeling estimates that were done by Mr. McVehil for DRP in 2004. All of these have issues, and it undermines Mr. Dobbelaere's conclusions. I'll talk about each of these. And if I'm asked I can go into any details about Mr. McVehil's work or SX-EW. Anything you want to ask me.

Okay.

First question, did DRP dramatically increase production and result in pollution? Here's a plot that Ms. Alegre produced with her materials that shows metal production versus time from 1975 up to 2002.

The top, the blue line, is total metals, and the orange line is lead. Notice the slope of that line. Starting in 1989, Centromín is working to produce more material, and that continues after 1997 when DRP takes over. The slope of that line is continuous; right? It is the same after 1997, and it actually flattens out.

If you -- if they had ramped up production, the slope of that line would have tilted sharply up. It didn't. They continued on the same trend as Centromín, and the fact is they did not ramp up production.

How can that happen? You've heard, I think, if you read these Reports, and you may hear it later today again, that more production means more pollution. Absolutely not. And that's what environmental engineers do. We try to help you have more production with less pollution, and that's by increasing the efficiency of the operation. Miles per gallon on your car, that's a measure of efficiency; the higher miles per gallon, the less pollution. Same with a big smelter facility.

Here, this a plot of efficiency. Okay. Each

point on that map, on this plot indicates how much pollution you generated/ton of production. The X axis shows higher emissions at the top, lower emissions of lead at the bottom. The Y axis is lower production on the left, higher production on the right. So we're in the sweet spot is that lower right-hand corner. That's where you want to be, and you'll see DRP are the orange dots, Centromín is the blue dots, DRP drives the Facility to better efficiency. They can achieve more production with less pollution/ton of product.

Second question, did DRP cause air pollution with dirty concentrates? Well, let's remember what concentrates are. That's the stuff that comes from the concentrator in the mine and goes in to the smelter to be processed. Here's a picture of what it looks like. These are big piles of this stuff ready to be processed. And that's -- in that hand, that's what it looks like. It is ground-up rock, and it is like a sandy, clay material.

Now, a polymetallic smelter can handle what's called a "complex mixer of minerals" or called "dirty concentrate." It is not just copper. It is not just lead. It's a blend of those things; right? And a metal circuit can -- in a polymetallic smelter, you can transfer one contaminant to another circuit to be turned into a product.

For example, at my house I used to have to take

my cardboard and glass and cans and put them in separate recycling containers. Now I've got this big bin that I can dump everything in, and it goes to a recycler, and it's a poly-recycling center, and they sort it out. That's similar to a polymetallic smelter. They can sort it out.

Well, what's in that stuff? Okay. Here we take the stuff in that guy's hand, we run it to a lab, and we get this pie chart out. The pie chart gives us the basic breakdown of the major metals in there. And I've -- I've labeled lead. Lead is a sliver. There is a little bit of lead, on average, in that copper concentrate during Centromín's operations, 1.8 percent.

Now let's look at DRP. What's the average lead in the copper concentrate during DRP's operation? 2.4 percent. They are both really small numbers. There is very little lead in there, and the increase is just 0.6 percent.

Now, in Mr. Dobbelaere's Report, he has represented this as a 30 percent increase in lead. Well, 1.8 to 2.4 is 30 percent, but they are both tiny numbers. It remains a very minor component, and there is no reasonable way that this is going to cause extreme pollution, and I can show you that. Let's step back and do a reality check. Okay.

The blue bar here is the total amount of lead

coming into the smelter, in total, every year on average during DRP's applications. 138,868 tons per year.

Now, if we take Mr. Dobbelaere's assertion and we take the increased volume of copper concentrate and that 0.6 percent increase in lead, that corresponds to an additional 1600 tons per year of lead coming into the Facility from the copper concentrate. 1600 out of 138,868 is a 1 percent increase in the lead into the facility. This cannot possibly result in a large change in emissions. No way. And the air monitoring data proved it.

What you also see from Mr. Dobbelaere is a mass balance, and in the Perú's intro, they represented like that; mass in equals mass out. Yeah, that's right. We do these things. But the next part is actually a little misleading. They show that the inputs equal three outputs: Finished metals, main stack emissions, and fugitive. No way.

This is what actually was done by SX-EW and used by Mr. Dobbelaere. SX-EW looks at 31 different variables. There is 21 inputs, and there is 9 outputs that are left out. This is a complicated metallurgical analysis that has 31 variables and 31 sources of air, and fugitive emissions are not part of that mass balance. Instead, what we have is what's called indeterminate losses or gains. What is that? Never do these balances add up. When I look at what

I take in and take out, they never quite align, and they don't align for reasons I don't know. So I called it indeterminate.

What Mr. Dobbelaere says is that some significant part of those indeterminate losses are fugitives. No way. And I can explain that.

What the heck are indeterminate losses and gains? I said it's a mismatch in the equation; right? This is what DRP in liquidation, their EGAC of 2016. They say that these mass balances consider an indeterminate category which reflects sampling inaccuracies, errors in the lab, unquantified spills, unquantified waste. In sum, indeterminate losses or gains are the inherent errors in the mass balance calculations.

So, let's give an example. Slag. Slag is coming out of the facility and engineer goes out and takes a sample of that slag, estimates its mass, sends a sample to laboratory. They analyze a cubic centimeter, and they say this is how much lead is in it. Every time they take a sample, the numbers are different.

I do this for business. I take environmental samples. They are always variable, so when I say there is this many tons of lead in there, am I within 5 percent? Maybe. 10 percent? Maybe. 20 percent? I don't know. There is always some slop.

Okay. Reality check. Let's compare Dobbelaere's metallurgical balance to the actual environmental data. Remember: Environmental data is the key.

Here is the measured stack. You must have seen it before. And here I've added the fugitive emission estimates. So that is the total emissions estimated from this facility; right?

And those are the numbers that SX-EW relied upon. Now, here are Mr. Dobbelaere's indeterminate losses, completely unrelated to actual measurements. No way are those fugitive emissions. We have an estimate. They are no way five times higher.

Now here is another analysis that is in SX-EW's Report that Mr. Dobbelaere relies upon, and it's another type of calculation. And I can explain every number on here, if you're interested. The result is, they say, that fugitive emissions increased by 55 percent under Doe Run. All right.

Well, I'm not going to explain it. I'll just tell you one thing: On all those numbers on there, only one is a measured value. It is not based on measured value. It is fundamentally flawed.

Finally, in Mr. Dobbelaere's Report, he presents this plot. Okay. And I think you'll hear about it again this week, and I want you to remember something very

important about it: It is bunk. What we have is the redline Mr. Dobbelaere's equivalent emissions; right? He says those are the emissions from the Facility. And the blue line is air quality at Sindicato. Hey, they sort of line up. They look pretty good, but they aren't. This is false. This is false.

What it is -- what has been done is SX-EW's calculation -- I can show you this point by point, if you wish. What they have done is -- it says this in the Spanish version of the R-150. It doesn't include this sentence in the English version.

It says that the estimated lead losses in fugitive emissions adjusting them in indeterminate risk and then using lead concentrations for air as a reference, circular logic. I adjusted indeterminate losses to convert it to fugitive, based on the air emissions, and guess what? It matched the air emissions because I made it match.

Here's a very complicated plot. I won't go into it in detail. I'll just tell you this: Each one of those numbers represents the adjustment that was made to the indeterminate loss plot to create this fugitive emissions plot. None of those numbers have any factual basis, none of them, in reality. None of them are measured, and they shouldn't change from year to year, but they do. I'll explain that, if you're interested.

The other thing that Mr. Dobbelaere does is say that he's very critical of the SO2 data monitoring from the stack. And there may be some talks about the SX-EW 2003 Audit. I'm happy to talk about that. I can go through every line in there.

But this is what we need to know, did they leave it better than they found it? We know that, regardless of whatever way you want to measure it, the emissions of SO2 went down over the period of their operation. Of course they did. They installed two of the three acid plants. Of course they did.

Here is my response to Mr. Dobbelaere summarized, and I'll move on to Ms. Proctor.

Ms. Proctor has a couple of Opinions that I'll respond to. She says the air quality got worse under DRP, and she says the dust and BLL are primarily caused by DRP. She says in her Second Report that -- she clarifies that this -- the circled numbers are the basis for her saying it was worse, but the trend, obviously, went down. They, obviously, left it better than they found it, and there was only one point that was ever higher than the 1997.

And here I've taken that same plot and I added a green arrow that says what happened with the air quality, lead in the air. Her same data shows it went down.

Okay. Here's an important thing that I want to

go through because I think it is pretty darn confusing.

Her claim is that the DRP is primarily responsible for the lead at the upper 2 centimeters out there; right? The upper 2 centimeters, and then below that, that is old stuff, that is Centromín. Okay. So the DRP's emissions were higher, and they caused more acute problems for the children. No way. No way.

Now, let me explain that. Okay. There is -- what I'm looking at here is a slide from GWI, who did this study, published in 2009 on behalf of Centromín. And what they found -- I pulled out a translation here. The concentration of the key metals, including lead, the upper 2 centimeters are only 15 percent higher than the 2-10. Now, Ms. Proctor tells us that this upper part is DRP, and the lower part is Centromín. They are almost identical. Why?

You've seen what those hills look like. You know what's going on. The wind blows. This stuff gets mixed constantly. You don't have to be a soil scientist to understand that; right? And I'm a soil scientist.

The other thing that AMSAC says in 2010 is they say the DRP stack put a centimeter of dust on the ground every year. Okay. So that means in the 75 years before they came, there were 75 centimeters of dust that came out of that stack. Are you kidding me? You would bury your

dog. You would be wading through dust in the street. There is no way you are getting that much dust. I can show you calculations to show that what's on that street matches exactly what we would expect it to be. It's the soil and dust from those hills.

Here is another way to look at it. The lead in the outdoor dust didn't change when the plant gets shut down. The dash line there, the plant gets shut down. Look at the bars there and what the concentrate concentrations were in the dust on the streets. They are the same. Plant is shut down. They come from the hills.

Ms. Alegre -- she has a few Opinions here. I'll respond to only one of them. The idea that production exceeded limits that were established in the PAMA and represented a breach.

Permitted capacity, that's how much you are allowed to bring in. It is established in the operating permit of Article 2 of the operating permit for the facility. The white row there, or the permitted capacity, is specified. The green row, or the amount that was the maximum amount ever produced in a year by DRP, they are all less. They did not exceed permitted capacity. Fact.

Did they exceed the production levels? That's the amount you put out; right? Let's look at the major metals that were of concern here, lead, all right. What it

says in the PAMA is that, whatever that production level was at the time the PAMA was written, 96,555 tons per year, shouldn't be exceeded by more than 150 percent. That's that action level they put at the top.

Let's look at the production level was lead, lead bullion that came out of facility over the course of their operations. They never exceed that line. They didn't exceed capacity.

Same thing for total metals, they didn't exceed the capacity.

Well, here is the summary; right? DRP conducted the PAMA, quantitative measures showed it get better and I found that certain opinions of these people were not reliable. DRP's standards were clearly more protective than Centromín's.

That is the end of my talk. Thank you.

PRESIDENT SIMMA: Thank you very much, Mr. Connor. I suggest that we now have a coffee break. We are almost exact on time, and then we will open the examination at 11:15.

THE WITNESS: 11:15.

PRESIDENT SIMMA: And you know the rules.

THE WITNESS: I think so. Like I can check the plumbing and everything; right?

PRESIDENT SIMMA: You can get coffee, et cetera,

it is just talking which is.

THE WITNESS: All right. Thanks.

(Brief recess.)

PRESIDENT SIMMA: Let us return to the work.

And I give the floor to Ms. Gehring Flores for the examination, cross-examination.

You have the floor, Madam.

MS. GEHRING FLORES: Thank you, Mr. President.

CROSS-EXAMINATION

BY MS. GEHRING FLORES:

Q. Good morning, Mr. Connor.

A. Good morning. Do you prefer to be called Gehring Flores, or Flores? Or -- just want to be polite.

Q. Well, my father would be very happy with just Gehring, and my mother would be very happy with just Flores.

A. Okay.

Q. To make both of my parents happy, Gehring Flores is probably good.

A. Gehring Flores. All right. No hyphen.

Q. But I certainly respond to either or to all three?

A. Okay. Respect your parents. That's good. Great. Thank you.

Q. Exactly.

Well, as everyone know, my name is Gaela Gehring Flores, and I represent the Republic of Perú and Activos Mineros in this proceeding.

Mr. Connor, I'd like to understand the boundaries of your Expert Opinion that you've been giving before this international Tribunal, and in your presentation just a bit ago, you said that you have been doing just this sort of stuff for 44 years, just the sort of stuff that we're talking about today, and this is what environmental engineers do.

And I understand you have a bachelor's in English; is that correct?

A. Yes. I have a -- I did a double major in English and civil engineering, but at the time Stanford University would not give you the second degree if you didn't pay them an extra year's tuition, which I couldn't afford. So I went to grad school to get the engineering degree.

Q. Okay. And that's -- and that explains the master's in civil engineering?

A. That's right.

Q. Okay. And am I missing any of your degrees, Mr. Connor?

A. No. That's correct.

Q. And, I guess, before we get into more of your professional experience, I wanted to ask you about your

experience as an Expert.

In your CV, you don't disclose the other cases or other work that you may have done; so I guess we'll start with, have you ever worked for Renco or its affiliates before?

A. Not before this case, and in the St. Louis Case.

Q. So you worked for Renco in the St. Louis, Missouri Case; is that right?

A. Well, just let me clarify the terminology. I'm an Expert in that case, I don't represent them, but I have been -- have been retained by the attorneys in that case.

Q. Since when?

PRESIDENT SIMMA: Mr. Connor, could you just speak up a bit.

THE WITNESS: Oh, I'm sorry. Yeah, I'll speak up.

PRESIDENT SIMMA: Maybe a bit more directly into -- thank you.

THE WITNESS: Into the mike. Got it.

BY MS. GEHRING FLORES:

Q. Since when?

A. I don't know when exactly that started. I think it was pre-COVID.

Q. So six years ago? Seven?

A. I don't think it was that long ago, but I don't

know exactly.

Q. Okay. And have you ever worked for Doe Run or any of its affiliates, other than in the Missouri Litigation and in this arbitration?

A. No.

Q. And have you presented yourself as an Expert in other litigations in the United States?

A. Well, I have presented myself, I've been retained on a number of other litigation matters as an environmental engineer, yes.

Q. Do you know approximately how many?

A. There has been quite a few. The last 20 years, I've been asked to do that a number of times. And I think it's -- I've been on more than 50 cases, including international and national.

Q. And in those cases, who tends to be presenting you as an Expert?

A. I have been presented by industry many times, I've been presented by Government, sovereign entities, and I've been presented by individuals.

Q. Okay. And would you say that the greater percentage of those representations are on behalf of industry and individuals versus Governmental Authorities?

A. Yes. I worked for the Kingdom of Bahrain, and I worked for the Republic of Kazakhstan, but most of the

others are -- yeah, I think that's right. Yeah. Most of them are industry and individuals, yeah.

Q. And have you been presented as an Expert in any international arbitrations?

A. Yes.

Q. How many?

A. It's more than 10.

Q. Okay. Any international arbitrations that involve an international investment treaty?

A. Yes.

Q. And you've been presented in those cases on behalf of Claimant or Respondent?

A. In that case it was Claimants. Umm-hmm.

Q. In what case? In all of them?

A. You know, I don't really recall which were Claimants and which were Respondents. I know I was presented by one part. I don't know.

Q. I guess, to make it easier, would you have been presented by the Company or the country?

A. In -- if there were ten, in eight it was a company, in two it was a country.

Q. And were you an Expert presented by Chevron in the Chevron v. Ecuador Case?

A. Yes.

Q. Okay. So I think as -- in reviewing your CV,

it -- and now after your presentation, you consider yourself first and foremost an environmental engineer; is that correct?

A. I am an environmental engineer, and that encompasses a lot of different things. It also encompasses risk assessment as part of that practice. Environmental engineering has a number of different aspects, which include interpretation and application of regulatory specifications and the associated permitting, et cetera.

Q. Okay. Do you still consider yourself a civil engineer, Mr. Connor?

A. Yes. I'm a civil engineer. It's -- environmental is a subcategory of civil.

Q. And geoscientist?

A. I'm a licensed geoscientist, yes.

Q. Okay. And of those professions, whether it's geoscientist, environmental engineer, risk assessor, which one are you presenting before this international Tribunal?

A. I'm presenting myself in my whole person, which includes all those things.

Q. Okay. So with that experience in mind, civil engineering, environmental engineering, geoscience, at some point along the way, did you get licensed to practice law in Perú?

A. I'm not a lawyer, no. And I'm not intending to

offer any legal opinions in this matter.

Q. Okay. Well, let's look at your First Report.

Do you speak Spanish, Mr. Connor?

A. Yes.

Q. Okay. Your First Report at PDF Page 8, starting on Page 8. You state: "The purpose of PAMA was to improve the environmental conditions and health and welfare in the communities surrounding the CMLO, the La Oroya Complex, by reducing pollution, modernizing the Facility, and remediating contaminated soil areas, all while maintaining the Facility in operation in order to meet the economic imperatives of the Peruvian Government and the surrounding communities. The PAMA Projects are directly related to the very allegations that are the subject of the third-party claims asserted against Renco and DRR in litigation filed in U.S. federal court."

And I can keep going. It says: "The PAMA provides a time period during which a Facility can be transitioned to an environmentally-protective operation, consistent with applicable regulations, while the Plant is still operating, which was a key objective of the Peruvian Government."

And I can keep going a little bit down further. "The PAMA specifies projects that are to be completed within a certain time frame to achieve health and

environmental goals and, within that time period, the PAMA protects the Facility Operator from fines or penalties related to not achieving those goals. In the case of the CMLO, given the magnitude of the environmental issues and the scale of the Plant upgrades that were required, completion of the proposed Projects in the allotted 10-year period was recognized to be exceptionally challenging. By the end of the initial 10-year PAMA Period, in January 2007, DRP had completed all but one of its assigned PAMA Projects.

"The third-party claims against Renco and DRR are directly related to the PAMA, as the alleged contamination and exposures that form the basis of these Claims are the same issues that were being addressed by the PAMA and the PAMA extension."

Did I read that correctly?

A. Yeah. It's pretty well-written, thanks.

Q. So there's quite a bit going on in those paragraphs, and -- but that's just a sample of your Opinions, Mr. Connor, of the PAMA, what it means, the deadlines, the period of the PAMA, essentially your interpretation of the PAMA; is that correct?

A. Well, it's explained in greater detail in the body of the Report, and I present my basis for that. My basis as far as what the PAMA says, my experience in

implementing similar regulatory constructs of other countries and the factual basis of the case.

I'm not basing it on any interpretation of law. I'm basing it on what exactly the PAMA says and what the correspondence between the Regulators and the Permitee said, which is what I do. I write and apply permits.

Q. Okay.

A. The PAMA permit is the same as the ferrous metal program in the U.S. and a number of other constructs around the world, that's -- and that's what it based on, my experience.

Q. So your experience, based on what you've done in the United States; is that correct?

A. And other countries, yeah.

Q. Okay.

A. Because it's a common framework that when a regulation comes out saying that a facility needs to be adjusted to meet a new pollution limit, that there's a grace period offered. Sometimes I've seen that be four year, seven years, ten years, and that grace period is allowed so that the Operator has time to make the necessary changes. And I explained that in the body of the Report, what's that based on. And the description is what the PAMA said and the Government's intentions, et cetera, are out of the PAMA itself and other correspondence.

Q. Well, let's go to PDF 36 of your First Report where you say: "As noted, Perú has asserted that the extended time frame does not apply to the full scope of the original PAMA assigned to DRP but, rather, only to that portion of the PAMA that DRP had not yet been completed, i.e., PAMA Project 1. However, with regard to the technical provisions of the PAMA, the modified PAMA is equivalent to a full PAMA Extension, as all other PAMA Projects had been completed in accordance with the terms and conditions of compliance, and only Project 1 remained to be completed under those same conditions. In addition to the original conditions for PAMA Project 1, the modified PAMA imposed further technical specifications for Project 1, complementary Projects, and applicable health-based criteria."

Did I read that correctly, Mr. Connor?

A. Yes.

Q. And so it does seem that you are offering an interpretation of the Extension, and whether the Extension was an Extension of the PAMA Period. And when you offer your Opinion here, I don't see any citations to Legal Authorities; is that correct?

A. No, I don't depend on Legal Authorities for that, and I'm not asserting that this is based on Legal Authorities. It's based on what the document said and what

was done. If you read the PAMA Extension, and all the different decrees that were issued in conjunction with that Extension, first of all, they are named "Extension" and they extend the period very specifically in those documents for a specific Project, not for the whole PAMA, just for that specific Project.

And it says in there that you're afforded the grace period to do that. So what I was trying to clarify is that, based on the PAMA documentation themselves, and what it said and what was done, it's apparent that the Extension was an extension, and that's what I mean. I explained that more in the body of the Report.

Q. You're aware, are you not, that Renco and DRRC have not presented an Expert on Peruvian Environmental Law in this international proceeding?

A. I don't know who they presented.

Q. You don't know which Environmental Law Expert Perú and Activos Mineros presented in this proceeding?

A. No. No. I don't -- I'm not familiar with what the roles of the different Experts were, and I haven't reviewed the Legal Experts. I've only been focused on the technical issues.

Q. Well, let's look at PDF Page 27 of your Second Report.

A. Oh, did you say Perú?

Q. I did.
A. You say -- I'm sorry.
Q. Yeah.
A. Yeah, yeah. There is a Report by Ms. Alegre, and I look at that Report strictly -- I'm trying to reconcile that with the action and the Permits that were issued to see if it lines up.
Q. Okay.
A. So I'm not -- I don't mean to challenge Dr. Alegre's legal knowledge, but I'm just checking it, a reality check against what was really done based on the permits that were issued and what the permits say. So I'm just saying --
(Overlapping speakers.)
A. I said it completely wrong. I'm sorry.
Q. Okay. Yeah, I'm not sure about using the word "permit" but maybe that's because I'm a lawyer. I'm not sure there were "permits" issued in this case, Mr. Connor, but let's go to your Second Opinion at PDF 27?
A. Just to clarify, when I say "permit," I want you to know that I'm considering -- I'm viewing in my capacity as an engineer, I see the PAMA as a permit to operate. Without the PAMA, you can't operate. So here you are given a Permit that has certain restrictions and certain conditions that are laid out in those various Decrees that

you have to do X, Y, and Z. That's a permit.

And then -- in the Regulations, if you don't do, if you don't meet -- if you somehow step outside the bound of those specifications, there's a fine, and there can be more fines, and can be more actions taken. That's the -- that's what I mean by a permit.

Q. Okay. So, I guess, going back to the fact that Renco and DRRC have not presented an expert opinion for Peruvian Environmental Law, are you aware that you're the only one of Claimants' Experts who responds to Ms. Alegre's Expert Opinion in Peruvian Environmental Law?

A. I'm not aware of what the construct is, but I'm not responding -- I want to make this clear. I'm not attempting to respond to her expertise in law. She has a lot of Opinions and background in specifics to law. I'm not talking about that. I'm talking about what the permit said, and whether that aligns with her factual statements. I'm not challenging her Legal Opinions.

I'm just saying, reality check here. If her -- when I read her Report, it seemed to say the "Extension" was not an extension, but it's called an extension; right? So-called an extension, it was an extension, and it gave them more time for this one Project. I'm just -- that's just the factual situation, and that's what I'm talking about.

Q. Yes. Ms. Alegre does give her Legal Opinion on the significance of the Extension that DRP requested, and was granted, and what that means with respect to the PAMA Period. And at, I -- I guess, this is PDF Page 27 of your Second Opinion, you state that: "Based on my review, I find that Dr. Alegre's opinions are in error regarding DRP's compliance with the PAMA, and the significance of the PAMA modification for completion of PAMA Project 1 and the Sulfuric Acid Plants."

You don't cite any Legal Authorities with respect to that assertion, do you?

A. Oh, no, of course not. That's a factual analysis. She says, for legal reasons, X, Y, and Z, I'm tracking that with a fact check as to what the facts said about compliance. Were there penalties? Were they granted this Extension? They were.

And those are facts.

Q. Does Ms. Alegre's interpretation of the significance of the extension that DRP was granted -- is that a fact or is that a legal analysis?

A. Well, she's working for you. I'm not going to characterize what her Opinion is. She's a lawyer. I mean, that's a legal opinion. Mine's not a legal opinion. It's just that I'm just saying that a document came out that set certain requirements, an extended time period to complete

those, and all the actions that were taken were consistent with that allowance of additional time, what was done, what happened.

If she has a legal opinion that it is contrary to that, she's entitled to that opinion, and I don't -- I'm not going to delve into the legal aspects of it. All I'm saying is that the PAMA was issued, the extension was issued for one Project, and that Project was granted a grace period, obviously, as you can tell by the record of the activities that were taken at the facility.

Q. Is it your understanding that Dr. Alegre agrees with you with respect to this grace period that you're talking about?

A. I'm not clear if she agrees with me or not. I did hear part of her testimony, and I found her answers a little bit hard to follow. I think she -- well, again, I shouldn't characterize her Opinions. You need to ask her, and you need to depend on what she said. But my understanding is she felt that -- that DRP was covered for certainly everything up until 2007, and then she had -- I wasn't clear if her Opinion was different after 2007. But, again, I don't want to characterize her Opinion.

Q. Right. Ms. Alegre came to that Opinion, her Expert Opinion, her Expert Legal Opinion, on the interpretation of the PAMA Period and whether it ended in

2007 or not, based on over 30 years of experience as a Peruvian environmental lawyer. And you're telling me that your experience as an environmental engineer allows you, without citing to any Legal Authority, to say that her interpretation is in error?

A. No. I would say that her interpretation is her interpretation, but it doesn't comport with the facts.

An Extension is granted, 12 more Projects are done, they're accepted by the Government, they're built, and if they didn't have an extension, they couldn't have done that. They did it. It did it. There's not even an argument. They did it. So the facts are that these, all the Parties behaved as if there was an extension. If there wasn't one, they were all confused. I'm saying that's what happened. There was an extension. It was called an extension. They did the Projects. That's an engineer's perspective. That's what happened.

Q. That is your engineer's perspective, and I understand, Mr. Connor, that you're telling this Tribunal that what Peruvian law might say about that extension is irrelevant to you; is that correct?

A. No, it's not irrelevant to me. I don't have an Opinion on it, and I think that the Tribunal is going to have to make their own judgment on those issues, but in terms of facts, please listen to what I'm saying. The

Extension was granted, they did the Projects, and regardless what Ms. Alegre says, it can't change those facts.

But that -- you all may have a lot of legal issues. I don't understand those, and I don't pretend to. I'm just laying out what really happened, and Ms. Alegre gives other Opinions about exceedance of production limits, factually incorrect. So perhaps her Opinions would change if she were to look at those facts. I don't know.

Q. So regardless of what the law might say, facts are facts. That's what I understand you to be saying.

With respect to your assertions regarding the facts, and -- and exceedance of production limits, I'd like to go to your PowerPoint Slide 115.

So you were saying that Ms. Alegre was wrong on the facts here, and it's your contention that Doe Run Perú never exceeded capacity limits. And above you're citing to a document in Spanish, which I will read into the record.

"Article 2: To authorize the operation of the Beneficiation Plant indicated in the prior Article for a feeding capacity to the copper circuit equal to 36,723.3 metric tons/month. For the lead circuit, equal to 22,488 metric tons/month, and zinc circuit, equal to 15,750 metric tons/month for regularization purposes."

I'd like to -- you said, Mr. Connor, that Doe Run

Perú never exceeded the capacity, that is -- or the capacity limit that is set by this Regulation. I actually don't quite remember what kind of governmental document this is, but they never exceeded the limit. I know you like to focus on facts, Mr. Connor, and I'd like to focus on the fact of the word "alimentación" in that limit.

A. Right.

Q. You are interpreting that word to mean concentrates; right? Just concentrate?

A. No.

Q. No?

The numbers that you put for DRP in the bottom row, 269,330, 252,437, that's not concentrate. What is it?

A. Oh, maybe it is concentrate. I'm sorry.

Q. Yeah.

A. But I know that inputs -- the inputs can include fluxes and transfers, but it's not -- but they're really a small percentage, but what I'm looking at is the -- what I take "alimentación" means what comes to the facility -- right? -- not what happens inside the Facility as they move things around, but what comes to the Facility. That's -- that was how I understood that.

And I've used the annual numbers that were presented by Ms. Alegre.

Q. And so if you were to add, say, the fluxes and

transfers to those numbers, is it still your contention here that DRP would not have exceeded the limit?

A. I'd have to check that math, but I would say -- my understanding is the fluxes are a really small percentage. Those are -- by fluxes, they mean, they -- in order for the reaction to occur within the furnaces, they'll bring in some silica or other minerals that mix in there, and it's less than 5 percent of what goes into the furnace.

Q. Yeah, I understand --

A. Transfers are things from within the Facility, and I didn't -- I didn't include transfers. They're a larger quantity, but I haven't checked that.

Q. Right. You haven't checked that.

I also understand from, listening to you today, that whenever something involves a smaller percentage, you don't think it's particularly relevant?

A. No, I'm not saying that.

Q. Okay. Well, I think we'll probably hear later from Mr. Dobbelaere, who has done the calculation on what these -- what this would be if you actually included all of the inputs, not just concentrate. So --

A. He includes transfers?

Q. He includes inputs, what that word means, "alimentación."

A. How can they contemplate in the permanent capacity internal transfers within the Facility? I don't know how they would possibly do that, but I'm sure the Tribunal will welcome those numbers.

Q. I'm sure -- I know that Mr. Dobbelaere includes fluxes. I don't know about transfers.

A. Okay.

Q. But he certainly includes fluxes, and I know that those numbers are quite different when you do.

A. Really? Okay. Well, we'll just have to see that.

Q. But you didn't do that, Mr. Connor; correct?

A. No, I did not. No.

Q. You interpreted the word "alimentación" to mean only concentrate?

A. Yes. I interpreted the operation of the Facility to represent the management of the concentrate for that circuit, and that's what the circuit treats.

You can add the salt and pepper to it, but the steak is the steak. Okay. So I'm looking at what they're managing as the input to the Facility. I think it's the right thing to do. This is what comes into the Facility. This is the concentrate supply that it actually processes. You can add some other chemicals to that, but they're not the metal that's being processed. I don't think -- I think

you could add fluxes. The fluxes are not -- they contain some small amounts of those metals, that's not what the Plant was built to process. It was built to process concentrate.

Q. And that's based on all of your experience in Peruvian Environmental Law and how to interpret that word; is that right, Mr. Connor?

A. No, I'm not an expert in Peruvian law. I'm just a --

Q. Right. And you're not -- Mr. Connor.

A. Wait. Wait. I'm supposed to answer your question for the sake of the Interpreter so they can understand us; right? So I'll answer it. Here you go.

Q. All right.

A. My answer is based on my experience as an engineer in permits. When they say, "you have a certain capacity for throughput," that's what they meant. You may have, under law, a different interpretation, and I get that. But my interpretation is that, when you talk about the supply to the Facility, you talk about the stuff that the Facility is going to treat, not the 17 or 18 herbs and spices that you might add to that to help with the reaction. It wouldn't make sense to me that a permit would include the 17 herbs and spices.

Q. Well, and it certainly wouldn't help you in what

you want to say in this slide, if you added the 17 herbs and spices, would it, Mr. Connor?

A. I don't want to say anything in this slide. I want to present the numbers as they were documented by the different Parties, and these are what the numbers are. If they're different, they're different, but they make sense to me, and they're what's in the record. And these numbers come from documents that were put together by the various Parties that are indicated below. It makes sense.

Q. Are you telling me that there are no numbers that you could have added to those? Are you saying that the flux numbers don't exist? I think you said that you could do the calculation.

A. Yeah. The flux numbers -- there are flux numbers in the metallurgical balances that SX-EW put together and that Mr. Dobbelaere used. But it doesn't make sense to me that, when you put out a permit and you're allowing a facility to do adjust the throughput -- and this is a normal operating permit condition -- that you would say that you're allowed to handle this many tons per year into the circuit of the product it treats and say that, no, you need to adjust that based on your metallurgist's idea about how much flux needs to be added. The flux is part of the engineering operation. It doesn't make sense to me to say, "if you decide to add more flux, which helps the reaction,

that you're going to be limited by your permit." It doesn't make any sense. But, perhaps, Mr. Dobbelaere believes that, and he'll present his numbers and the Panel will look at those.

Q. Actually, I was more focused on the Peruvian Environmental Law aspect of this. I'm sure Mr. Dobbelaere will get to this as well, but, just your interpretation, which I understand you keep saying you're not offering an interpretation of Peruvian Environmental Law; right, Mr. Connor?

A. That's correct.

Q. Okay. And you are not qualified to do that, are you, Mr. Connor?

A. No, I'm not.

Q. Okay. Mr. Connor, you also offer Opinions on the correct interpretation of the STA, the Share Transfer Agreement, the Contract involved in this case, do you not?

A. No, I don't believe that's true.

Q. And just making sure, you aren't a Peruvian contractual lawyer; right?

A. Have we not covered this?

Q. Well, that was Environmental Law. Now, I'm covering the next area.

A. Oh. Contract law. Ditto. Ditto.

Q. So you don't offer your Opinion on phrases like

"exclusively attributable," "whether something is within the PAMA or not," and "whether something is more or less protective than." Where did you get those words?

A. I get those words from my own experience. You can get those words out of any dictionary. I think their meaning is plain as the hand -- wait -- plain as the hand in front of your face? Is that the right term?

So those terms were put to me and asked, how would I interpret that as the kind of person working at this Facility and implementing this permit. "Exclusively attributable," to me, and I'm not looking -- to me, I'm not looking at that as a legal term. I'm looking at it as a factual term.

If you have two companies that are issuing pollution -- and I do this a lot -- that -- which Party -- what's the allocation between them? How much did each Party attribute to this? It's a common problem. I'm not asked to make a legal interpretation, I'm asked, factually, how much of this guy's stuff is present versus that guy's stuff. That's how I -- that's the facts I'm trying to present. I don't know how that's interpreted legally. And the same with the other words that you put forward. I understand those as they are written in the dictionary. I understand what those mean to an environmental engineer, and that's all I'm presenting to

you.

Q. Did you review the Contract in this case, Mr. Connor?

A. No. I read Section 5.3 and other sections. I'm not offering any interpretation of those. I believe you have Contract Experts. I'm not one of those.

Q. Yes. The Contract Experts are Messrs. Payet and Varsi. Did you speak with Mr. Payet about Clause 5.3?

A. No.

Q. And just to be clear, you're not offering yourself up as an expert in Peruvian contractual law; is that correct?

A. Yeah. I think we've nailed that one.

Q. Okay.

A. So what I'm saying is what I've already said, to answer the question that you've already asked.

Q. And also, to be clear, you're not licensed to practice law in the United States either, I assume?

A. I'm not a lawyer. You all got this? Okay. I'm an engineer. I'm interpreting as an engineer. I'm not offering -- and please don't take anything I say to be a legal opinion. I think I've clarified that to you all, and I hope it's not a question.

Q. That's certainly clear. Your words are clear. Your actions, however, in your Reports, are a slightly

different thing because you do seem to offer opinions, for instance, in this case, about the nature of the Missouri Plaintiffs' Claims, and how -- then, in turn, how they could be applied to the allocation of responsibility clause, Clause 5.3, in the STA Contract, between DRP and Centromín.

So I understand, Mr. Connor, that you have said that you're not a lawyer, but I want to go beyond words and to what you did in your Reports. So I need to clarify: Are you versed in U.S. tort law, Mr. Connor?

A. No. What I've done with regard to the Missouri Claims is read the document, and they said "we make a claim about lead emissions from this Facility." Boom. Lead emissions from the Facility are exactly what's covered by the PAMA. Are they interrelated? Yes. The PAMA was designed through many projects to reduce lead emissions, and it did. The concern, as is expressed in that case, is that it wasn't done fast enough; right?

Now, I'm characterizing their Complaint, but I give you quotes straight out of the Complaint, and I don't think that anyone could say they're not related. Now, there may be a fancy-schmancy legal basis for saying they're not related, and I'm out of that. I'm not in that game. But the words are the same. It's clearly related to the things the PAMA was trying to fix. And the

PAMA -- they needed to be fixed. They needed to fix that problem, and it's exactly the problem that those persons identify.

Q. And I know that you attached at least one of the Missouri case documents to one of your Reports, Mr. Connor. As far as you're concerned, the only claim that the Missouri Plaintiffs make is about lead emissions.

Is that what you're saying?

A. No.

Q. Okay. So are you also aware of the other Claims that they make, like conspiracy? There's a claim of conspiracy.

A. I didn't look at that.

Q. Okay.

A. All I've looked at is the technical aspects of Claims. There are certain claims that certain emissions were made and they had certain effects, et cetera. That only -- that's the only purview of my analyses.

Q. Okay. And you're aware that Doe Run Perú is not a defendant in the Missouri Litigations; correct?

A. I don't know what the legal construct is there. I don't know if they're named in that. I haven't looked at that, but I don't know. I can't opine on the interrelationship of those entities.

Q. But you are an expert for Renco and Doe Run in

that Litigation; correct?

A. You know, I don't know if both those Parties are in it or what exactly the named entity is. I know that I was retained to provide information to the Court in that case about many of the same facts we're talking about today.

Q. But you weren't retained by the Court, Mr. Connor, in that case; right? You were retained by the Defendants in that case; correct?

A. I was retained by the attorneys on behalf of the Defendants. I don't know the specific entity of the Defendant.

Q. Okay.

A. Generally -- I generally understood that to be entities associated with Doe Run Perú.

Q. Okay.

A. But I'm not offering any Opinion about that.

Q. Right. Because you're not qualified to offer an Opinion on U.S. law issues; correct?

A. That's correct.

Q. Or how U.S. law might actually, maybe, eventually apply to a Contract that's governed by Peruvian law; correct?

A. Well, yeah. That's not what I'm attempting to do, and hopefully the Tribunal is clear on that.

Q. And just so we have all the legal bases covered, there's one other type of legal expert that has been presented in this case, and that's Peruvian Bankruptcy Law.

Are you offering any Opinions on Peruvian Bankruptcy Law?

A. No.

Q. Okay. You do offer your Opinions on toxicology, though; right, Mr. Connor?

A. I offer the Opinions on risk assessment, which is distinct from toxicology, yes.

Q. Okay. So to the extent that you are criticizing the Expert Opinion of Ms. Proctor, the toxicologist for the Republic of Perú and Activos Mineros, you are doing so as a risk assessor?

A. Yeah. A risk assessor and environmental engineer. So the difference between a risk assessor and a toxicologist is the analysis of dose response. So the toxicologist purview determines, if you intake a certain substance, what effect would that have on your health. That's toxicology, and I don't go there.

What I do use is whatever dose response they determine is the factor that applies to a chemical, I use that in a risk assessment.

In my response to Ms. Proctor, I believe that most -- that my comments fall within that boundary. I'm

concerned with a risk assessor. You're concerned with how does exposure happen. What's the mechanism for exposure? The toxicologist can take that farther and analyze the factor that goes in there, convert exposure into health effects. But my comment on her -- I'm not challenging the toxicology of lead on the body of a child or an adult. I'm challenging the exposure mechanisms that occur and how they occurred.

Q. The exposure mechanisms, like the difference between dust versus soil, for instance?

A. Yes.

Q. Were you here yesterday during Dr. Schoof's testimony, Mr. Connor?

A. No, but I did hear some of that testimony.

Q. Okay. Do you disagree with Dr. Schoof on the distinction between "dust" and "soil"?

A. Yes and no. In Dr. Schoof's presentation, she used the integrated stochastic exposure model as a Monte Carlo overlay on the IEUBK model to estimate the uptake of children, lead from the soil and dust. And in that, she broke soil and dust apart. And I think the judgments she made in that make sense with one exception, and I don't think she disputes this.

In fact, I think we agree on this, that the dust that's on the street comes from the hills. Most of it

comes from the hills. And so the distinction from "dust" and "soil" may have relevance in her analysis, and I don't challenge that analysis, but you have to recognize that that dust is soil. It's 99 percent soil.

ARBITRATOR THOMAS: Sorry, may I just interrupt just briefly. I have no idea what a Monte Carlo overlay is.

THE WITNESS: Oh, I'm sorry. Yeah.

ARBITRATOR THOMAS: You've lost me at that, Mr. Connor. So can you tell us what you're trying to say?

THE WITNESS: Oh, okay. Yeah. That's pretty nerdy. I'm sorry.

The IUEBK model takes the soil concentration and converts it into a blood-lead concentration used in this mechanistic deterministic approach. It says, "I have this much in the soil, it will create this much" -- it gives you a number; right?

A probabilistic model is what Mr. Fogler and Dr. Schoof were talking about yesterday, where she said there was a triangle. You know, that, on average, there would be this much uptake and it would range from X to Y.

We call that a "Monte Carlo." What it does, what the integrated stochastic exposure model does is it takes the IUEBK and it runs it thousands of times with different inputs, and it's like a Monte Carlo, you're spinning that

roulette wheel. And after running it so many times, you'll get a distribution of answers -- you don't just get one answer, you get thousands of answers. And those answers tell you, on average, it's about X. And I can then use that model and say, "well, I want to be 80 percent sure I'm safe." So you take the 80 percentile off this Monte Carlo and throw in the dice.

Does that make sense? I mean, it's kind of a cool name. Did it help?

ARBITRATOR THOMAS: You've advanced it slightly, but, that is good. Thank you.

THE WITNESS: Well, what it does is it converts a model that gives you one answer into a model that gives you a thousand answers, and you look at the thousand answers and you determine -- if I want to be 90 percent sure, I'm going pick the answer at which 90 percent of the answers are lower. If I want to be 50 percent sure, the one that has 50 percent lower. That might be a little bit better explanation.

ARBITRATOR THOMAS: I'm starting to grasp the concept.

THE WITNESS: Okay. Sorry about that.

MS. GEHRING FLORES: Mr. Thomas, in our world, Monte Carlo scenarios might come in when it comes to damages scenarios. There are many Damages Experts that

might use Monte Carlo overlays for DCF analyses, but we could stop the nerd talk.

THE WITNESS: Let's get those guys to explain it. They can do it better than me.

BY MS. GEHRING FLORES:

Q. So back to the dust and the soil, Dr. Schoof and certainly our Expert, Ms. Proctor, our toxicological Expert, Ms. Proctor, have been quite clear in their Reports that dust comes from active emissions. You -- and Dr. Schoof said that several times yesterday.

You disagree with that? You think it comes from the hills?

A. Oh, yeah, it comes from the hills.

Q. Okay.

A. There's some part of that that's associated with active emissions, but those active emissions cover everything. And the dust on the street is a little bit higher than the soil on the hills, and so there's a differential there that suggests that it could have more of the dust from the -- or the emissions from the Plant to be in it.

That's a different -- it's a pretty small difference. It ranges from 15 to 25 percent, which indicates there's a little more of the emissions in there than there are on the soils on the hillside.

Q. And that's based on your comprehensive toxicological study of the dust and the hills?

A. It's based on just the measurements that are made that any of us -- if you want to look at that, we can.

Q. The measurements by Dr. Schoof?

A. Excuse me.

Q. Okay.

A. I'm going to finish.

Q. Okay.

A. Okay. So it's based on what the actual measurements were on -- of dust on the street, when they scooped it up, put it in a container and took it to the lab and they measured it for lead. And they did the same thing on the hillside. So this has been done, many, many, many, times by the Government, by GWI, and by Integral, themselves. And those data give us a lot of information about what's in the hills and what's on the streets.

And what's on the hills and what's on the streets are very similar. The streets were a little bit higher, they're a little bit higher. So that data is in Dr. Schoof's analysis; right? It's in there. And I agree that -- I agree with those concentrations, yeah. But most of the material that's on the street comes from the hills.

Q. In your -- in your opinion as an environmental engineer, not as a toxicologist; correct?

A. No. You don't -- no. The toxicologists don't -- they don't work in that realm. The toxicologist takes what that measurement is and analyzes it to see what health effect it is. A toxicologist doesn't normally opine on where those chemicals came from. Where those chemicals came from is an environmental engineering determination. How the chemicals move through the environment and then arrive at a place where they can be contacted, that's environmental engineering, and that's what we do.

So how those chemicals got on that street, is that the greatest portion of it comes off the hills, but there is an addition from emissions, certainly.

Q. So you disagree with Renco and DRRC's toxicology Expert, Dr. Schoof, on the origin of the dust in the streets?

A. I don't know that I disagree with her on that. I don't think that -- my understanding is she said that dust on the street has this concentration, the dirt on the hill has that. That's right.

What she doesn't say is what the origin of that dust is, that -- she uses the dust, fine. But where the dust comes from, I didn't see anything in her Report where she did a transport analysis to say where that dust comes from. That dust comes from the hills, and I can prove that to you with a simple calculation.

Q. Did you do that calculation in either of your Reports, Mr. Connor?
A. No. I did that calculation after I last reviewed the response from Ms. --
Q. Proctor?
A. Proctor, yes.
Q. And I can represent to you that, yesterday, Dr. Schoof said multiple times that the dust comes from the emissions from the factory -- from the smelter.
A. Right.
Q. So apparently, you disagree with Dr. Schoof.
A. Yeah, I don't -- that's not correct, regardless. Yeah.
Q. Okay.
A. The facts are it can be clearly demonstrated that it comes from the hills. And with a contribution --
Q. But that's not in either of your Reports; correct, Mr. Connor?
A. Oh, it is, certainly. Oh, yeah.
Q. That calculation that we just talked about. Not in your Report?
A. Yeah, hold on. The Opinions in the First Report and the slides I showed you with the bars showing how the dust on the streets doesn't change when the Facility is shut off -- hello? So where did it come from? It came

from the hills. That's in the First Report.

And then, after I saw Ms. Proctor's Second Report, I went ahead and did the calculation because another thing that I'd learned is from the SX-EW Reports and Mr. Dobbelaere's discussion of those is something I didn't know.

I didn't know what the lead concentration was of the particles that were coming out of the stack. And once I had that, I could do the calculation. And I did the calculation. And that calculation shows that the dust on the street is more than 99 percent dirt from the hills.

Q. Okay. But, again, we don't have that analysis in your Report; right?

A. I can do it right now. No, it's not in the Report because it didn't come up until Ms. Proctor raised the issue that I was wrong about my analysis of where the dust came from.

Q. But, again, you're not here speaking on questions of toxicology. You're offering yourself as an environmental engineer or risk assessor; correct?

A. Yes, that's right. And as I said before, the mechanisms of chemical transport through the environment, that's environmental engineering, or geoscientist stuff. And then, the exposure, where that dust came from, that's risk assessment.

Q. Mr. Connor, just reviewing your CV and the -- I believe there's about 72 or 70 articles and presentations and publications that you list in your CV. Is that about right?

A. Yeah. They're almost entirely papers.

Q. Okay.

A. It's more than 50.

Q. And, I think, over 50 of those 70 are on the topic of water -- water, groundwater, aquifers, basins. Is your particular environmental engineering or risk assessment specialty water?

A. I've done -- of the publications I've done, most of them have to do with water and transport in water. My Projects that I've done cover air emissions and modeling, control of those air emissions, management of water quality, management of waste. I haven't written papers on those because my company works -- does research and development. It's about 20 percent of our business, and the rest is using that knowledge for pollution control. So in my particular area, most of my R&D has been on water issues, but my practice has covered a much broader gamut of environmental engineering. But my R&D part, the part I do in that part of our company is mostly water. That's why the papers are mostly water.

Q. Right. And I didn't see any papers or

publications that had to do with metallurgy, pyrometallurgy, or smelting; correct?

A. No. No. And let me add one thing to what I said just a minute ago. There are publications that deal with risk assessment, and there's a number of papers that I did that were sponsored by the Government and some are done on our own, that deal with the software that I produced for risk assessment. And in that software, there are air transport models, water transport models, soil transport models, and dust transport models, and they're integrated together to say that, when you have an emission, how much of it gets to the point where someone could drink it, breathe it, or touch it. That's what those models are.

I think there's 14 models in there that we integrated together to answer those questions. So that research covers the gamut of what we do as environmental engineers. So I do have publications on that. I have a software product that I've sold around the world for that purpose, and I've done training to Environmental Regulatory Agencies throughout the U.S. and other countries on how to do those risk assessment calculations.

Q. But, on the topic of metallurgy, pyrometallurgy, just to be clear, you're not a metallurgist, you're not a pyrometallurgist, are you, Mr. Connor?

A. No. I'm an environmental engineer, and this is

an environmental engineering project. We have --

Q. According to you.

A. Well, according to the PAMA. It says "environmental management." Everything in there are environmental standards that -- the Law of 1993, I think, has the word "environmental" in it. Yeah, environmental. We have a mining division. I have 20 people that work for mining industries and metal processing. None of them are metallurgist, and never has a client said, "hey, where is your metallurgist for this environmental project?" So metallurgists on an environmental project -- that's not saying that an individual couldn't be knowledgeable. It's a little unusual. Okay. Or maybe not just a little. But Mr. Dobbelaere -- I don't know the gentleman, perhaps he's very knowledgeable on environmental. That would be different. But never, on an environmental project in my career or in my mining division, have people asked us to bring in a metallurgist to solve an environmental problem.

Q. Even if you want to understand how a metallurgical complex operates? That's not relevant?

A. I think it is relevant. I think it is helpful. It's not mandatory, but I think when you're working on different types of industrial facilities -- be it a refinery, a petrochemical plant, a manufacturing plant -- it is important to know how the process works so

you know how the waste and emissions come out.

And sometimes the chemical engineer or manufacturing engineer that runs that facility, has designed that facility is an important partner in determining how you might reduce emissions, not with an external emission control, but by going into the process and improving that process to cut down its emissions.

We saw that. We saw that in this case. The copper circuit required change-out. It needed heart surgery to change out the core of that Facility such that it would produce sulfuric acid gas at a concentration that was amenable to converting it to sulfuric -- to an acid liquid; right? It needs to be a certain concentration, and if it's not, you can't convert it or it's very difficult. And so --

Q. Mr. Connor, do you remember my question anymore? Because I don't think I do.

A. I don't think I do either, but I'm going to finish this -- you're not interested in my dialogue here?

Q. I mean, yeah.

A. It's not good?

Q. I think we have a limited amount of time.

A. You're not digging it.

Q. This is certainly enjoyable --

(Overlapping speakers.)

Q. I have loved learning about metallurgy during this case.

(Overlapping speakers.)

A. I remember your question. You said: "Is it not important to know something about the process." And I said, "Yeah, it is useful."

Q. Okay.

A. And then I started elaborating on that. And then you said you're not interested anymore, and so I stopped. And then unless you -- if you had a question, but you did say you were happy to learn about metallurgy, which was a weird interpretation of what I was saying.

(Overlapping speakers.)

Q. Mr. Connor, in order to redesign a metallurgical process, a metallurgical complex, you would need a metallurgist; right?

A. Yes. For that part that I said was heart surgery, you need that heart surgeon, and that is different from all the other environmental considerations we have here, the air and the wastewater coming out of the Facility.

But for that one copper circuit, there was a fundamental change that had to happen in how it operated, and I believe that is metallurgy, yes.

Q. And how to execute metallurgical projects, you

would need a metallurgist to do that; correct?
A. No.
Q. No? You don't need a metallurgist to execute on a metallurgical project?
A. No.
Q. Okay.
A. The way that works -- do you want me to explain that?
Q. No, I don't.
A. Okay. Well, I worked at big construction -- engineering construction companies.
Q. I think, Mr. Connor, the Counsel for --
(Overlapping speakers.)
Q. Counsel for Claimants can ask you to explain, or maybe if the Tribunal is interested, but we do have limited time.
A. Okay. I'm sorry.
Q. So let's -- would you agree that the field of metallurgy is essentially where you offer most of your opinions in this case, Mr. Connor?
A. Absolutely not.
Q. Absolutely not. Okay.
You're aware that Claimants offered the Expert Opinion of a metallurgist in 2021?
Are you aware of that?

A. You're talking about Dr. Partelpoeg?
Q. Yes.
A. Yes, he wrote a report.
Q. Do you disagree with Mr. Partelpoeg at all?
A. No, I don't believe so. I didn't -- that is not my area. He talked about the metallurgical process and how the plant would need to be modified specifically for the copper circuit, and that is the two Experts in that area have their own Opinions about that, and I don't question those Opinions.
Q. Are you aware that Mr. Partelpoeg, the other Expert metallurgist in this case, did not respond to Mr. Dobbelaere's Metallurgy Opinion?
A. He issued one Report, which I thought was responsive to the Opinions that came out later. He covers a lot of those topics, but he did not issue a Second Report, to my knowledge.
Q. Right. So the Second Report would have responded to Mr. Dobbelaere, but he didn't issue a Second Report, is what I hear your understanding is?
A. Right. But a lot of the content that relate to his Opinion about those matters is contained in that First Report if you look at it. But he did not issue a Second Report.
Q. Right. Sure. But you do respond to

Mr. Dobbelaere on aspects of metallurgy; correct?

A. No, only on aspects of environmental engineering. He brings a metallurgical approach to an environmental manner, and I'm looking at that within the purview of an environmental manner.

Q. So you are offering your Opinion with respect to metallurgical matters as an environmental engineer; is that correct?

A. No.

Q. Okay. As a geoscientist?

A. No. I'm not offering any Opinions about metallurgy. I'm not offering any Opinions about the heart surgery of the copper circuit. I'm only offering Opinions about the environmental emissions that managed those emissions from this facility.

That is environmental, how the copper circuit modernization took place. I can tell you what happened, but I don't have any opinion about the work that was done by the major international engineering companies to develop that. I don't know if they are right or wrong. I know what they did. Mr. Partelpoeg has an opinion on that. I believe Mr. Dobbelaere has an opinion on that. I'm not offering an opinion on that.

Q. You do offer an opinion on whether or not small percentage increases in certain elements or impurities in

concentrate can result through the metallurgical process in increased emissions; correct?

A. It is whether or not -- if you take any process, from an environmental engineering point of view and you change the inputs to that process by 1 percent, could you see a 137 -- or 179 percent change in its emissions? I'm talking about emissions. That can't happen.

Q. Is it possible that you might not understand some of the metallurgical processes that happen from the input to the output, Mr. Connor?

A. Well, I understand how large facilities work and what input and output looks. I don't care what happens inside that house. There is no way that you're doing something magic that takes 1 percent and turns it into 147.

This is not loaves and fishes here. This is a chemical -- this is an industrial facility, and when we manage industrial facilities, we know that input changes by 1 percent, you cannot get an exponential change in the output. Anybody knows that; right? Just common sense.

Q. Mr. Connor, are you aware of what happens to sulfur when it to turns into sulfur dioxide?

A. I'm not sure what you're asking.

Q. Do you know what the atomic weight of sulfur is?

A. Not offhand.

Q. Okay.

A. But it becomes twice as heavy when it becomes sulfur dioxide. That's right.

Q. Okay. So sulfur -- let's say you have one sulfur, small number, and it attaches to two oxygens to become sulfur dioxide, and it doubles in value; right?

It doubles in weight; correct?

A. Well, if it was pure sulfur, which doesn't exist in the environment -- right? -- except on Saturn. Pure sulfur is a molten material in the environment. It exists as -- most commonly it's in some type of sulfide complex with iron or something else. So when you bring it into a facility like this, you are converting a sulfide oxidizing it into sulfur dioxide, which is a gas. There is no elemental sulfur coming in there.

Q. Mr. Connor --

A. I'm sorry. I made a mistake. I just made a mistake. I was talking about sodium. I made a mistake. Scratch that.

So it is not a question of pure sulfur coming into this Facility. It's a question of a sulfide being converted. You can do the mass balance on that, and you can do it the way you said.

Q. You could also know about chemistry and the chemical reactions that happens when sulfur turns into sulfur dioxide; correct?

A. Yes.

Q. And a metallurgist or a pyrometallurgist would know what happens; correct?

A. Lots of engineers and chemists know what happens, yes.

Q. And chemists. Okay. You do have to have quite a bit of background in chemistry to be a metallurgist?

A. Not really. To be a metallurgist? Oh, perhaps, yeah. You don't need to have a lot of background in chemistry to understand something as basic as that.

Q. Right, or to understand that when sulfur, whether it's present in concentrate or something else, gets converted or attaches onto two atoms of oxygen it doubles. Its molecular weight doubles.

So if you have a hundred sulfurs going into a smelter and those 100 sulfurs attach to oxygen and they turn into sulfur dioxide, all of a sudden you have 200, let's say, metric tons of sulfur dioxide, when you started with 100 sulfurs. Is that correct?

A. I think it is correct in the constrained way that you said it, but you don't get a doubling of the mineral mass by magic; right?

They come in a complex, an iron sulfide, copper sulfide, and that bond is broken and that sulfur that was in the sulfide bond gets converted, oxidized to sulfur

dioxide and becomes a gas. So it was in a complex with a certain weight, and that complex gets converted to a different compound.

But whether -- the total weight, as you've said, Ms. Gehring Flores, is that mass in is mass out. So you're not creating any new mass, but you are converting sulfur from one mineral complex into another, but the total weight in your facility doesn't change.

Q. In that conversion, Mr. Connor, you can have exponential effects; correct? From sulfur to sulfur dioxide.

A. No.

Q. No?

A. No. No.

Q. I'm not saying that you're increasing your sulfur. I'm saying that you start with 100 sulfurs. You're going to have 200. If you have 100 metric tons of sulfur going in, you will have -- if all of those got converted to sulfur dioxide, you're going to have 200 metric tons of sulfur dioxide, and it's not magic, Mr. Connor. It's chemistry.

A. Okay. So if you brought just sulfur into the Facility and it oxidized, the sulfur would be in a different complex; right? But you added oxygen. You have oxygen come in, you have sulfur come in, they get combined.

You didn't create anything; right? You can't create anything.

But if you were to ignore everything else and just look at the sulfur atom that came in, it does get oxidized, but it is not exponential.

If I accepted your representation, it would have increased by 2. All right. I bring in 1 percent, it is 2 percent; right? So I don't accept that construct, but that's the significance of it.

Q. I think I've reached a point where, if we want to break for lunch, this would be a good spot.

PRESIDENT SIMMA: Yes. That's fine. You have 50 minutes that you add at the end, so we meet again at 1:30. So that would be fine. Thank you.

MR. SCHIFFER: May I ask for the total time used by each side? Do you know that, Mr. Doe?

SECRETARY DOE: Sure. Up until this point, it is 11 hours and 7 minutes used by the Claimant and 14 hours and 19 minutes used by the Respondent.

PRESIDENT SIMMA: I think I don't have to ask you what you're not supposed to do because I might, thus, disclose that I'm -- what is it? -- tortured by -- you know, you have these, if you know something about the bit, then I think you are fall into that category of professions, et cetera.

So just from one human being to another without claiming any doctorate or anything, just enjoy a lunch your own and don't talk to any of the Experts.

THE WITNESS: Okay. Mr. Simma and Ms. Gehring Flores, some of my answers were too long. I'll work on that and try to be direct with you. I apologize if I was getting offtrack. So I recognize that. I don't want to use your time not fruitfully. So I'm mindful of that.

PRESIDENT SIMMA: Okay. Thank you. Let's have lunch now.

Whereupon, at 12:35 p.m., the Hearing was adjourned until 1:30 p.m., the same day.)

AFTERNOON SESSION

PRESIDENT SIMMA: Good afternoon.

I hope you had a good lunch. We continue the proceeding with the continuation of the examination of Mr. Connor. And you have the floor again.

MS. GEHRING FLORES: Thank you, Judge Simma.

BY MS. GEHRING FLORES:

Q. Hello, Mr. Connor.

A. Hello.

Q. I want to go back to the subject of "dust" versus "soil," and the notion that you present today to this Tribunal that the dust to which people in La Oroya were subject during the DRP's operations was from the hills and

not from DRP's contemporaneous emissions. And let me see if I get this right.

Actually, Kelby, could you go to PDF Page 23 of Ms. Proctor's Report. PDF 23. If you could zoom in on that, just the title on the top. Yeah.

So this is Ms. Proctor's First Report that she submitted in this case, something that you could have responded to with your Second Report, where Ms. Proctor states: "The Gradient and Integral Health Risk Assessments clearly demonstrate that DRP's ongoing airborne emissions and deposition as dust were the primary sources of exposure. The contribution from soil was minor by comparison. As a result, excessive exposures and adverse health outcomes are associated with DRP's emissions, including that to sulfur dioxide, lead, and arsenic."

Did I read that correctly, Mr. Connor?

A. Yes, I believe so.

Q. And every single Expert that is qualified in this area, every single toxicologist we have in this case, every single toxicological institution, the U.S. CDC, Integral, Gradient agree with this premise, but you here today, in front of this international Tribunal, are telling them that that's not correct.

A. No, I'm not telling them that. What I'm saying is something different.

Q. Okay.

A. And just to clarify it from earlier, I think you characterized my testimony to be that the dust on the streets is exclusively from the hills, and not -- doesn't have a contribution from emissions. It does have a contribution from emissions.

Q. Dr. Schoof, her Company, Integral; Gradient, Ms. Proctor, have all testified as Experts in toxicology, and the U.S. CDC to boot, have stated that the dust, the dust in La Oroya is from -- from contemporaneous emissions.

You disagree with that?

A. I disagree that that's their testimony, including the CDC. I believe that my interpretation of those risk assessments is that they've determined that the material that's on the streets is of greater importance than on the hills because they use exposure factors that are higher for that. They said the kids will come in contact with that more often, but I didn't see any analysis that they did that said that that dust was just emissions. It can't be.

So the distinction there is I'm not disagreeing with their analysis of how they did the risk assessment, how they ran those calculations. I'm pointing out an issue that I don't think they touch on, and that is what portion of the dust on the streets is really historical, and what portion is from current emissions? I don't see where they

talk about that in their Report, and in that, to that degree, I don't think that I'm disagreeing with their analysis.

Q. Okay. But you did have an opportunity in your Second Report to respond to this Statement of Ms. Proctor, I; correct, Mr. Connor?

A. I'd already laid that out in my First Report. The provenance of the materials are on the street, and I felt that I'd covered that issue. She expanded on this quite a bit in her response to me, and I'm now giving a response to her response.

Q. And that is based on what hat? I think we've established -- you wear many hats in this proceeding Mr. Connor.

What hat are you basing that Opinion on, your Opinion that the dust comes from the hills and not from DRP's contemporaneous emissions?

A. I don't really know quite how to answer that. I'm not wearing a legal hat. I'm not wearing a metallurgical hat. I'm doing the things I know about, and those are environmental engineering and risk assessment and soil science. I know about these things, and I'm trying to give you an answer to your questions as best I can.

Q. And is it your testimony that toxicologists don't do risk assessments?

A. No, that's not my testimony.
Q. Okay. Because that is what Dr. Schoof did -- correct? -- with Integral? And that's what Gradient did; correct?
A. I believe so, yes.
Q. And they had toxicologists at the helm of those risk assessments?
A. That's correct.
Q. In your presentation earlier today, I believe you testified that only Measured Values count, or only Measured Values are relevant; is that correct?
A. I think I'd state that a little bit differently. I would say the Measured Values are the gold standard in terms of the kind of information we consider, but other values inform your decision as well. They can be modeling. They can be other types of calculations.
Q. And if the Measured Values that you would like to use in your calculations or in your evaluations are unreliable, then what?
You just throw up your hands and do nothing?
A. Well, that's a very site-specific determination. You have to try to make your decision without those data, and so you would have to look at what situation that left you in. Historical data, you can't really go resample that. Sometimes you get data in today, and some of the

data have problematic -- you can go out and replace that data. So it depends on the circumstance.

Q. You state that the air quality data before 1999 is unreliable; correct? Or 2000, is it?

A. No, that's not my testimony. For my purposes, I've found three data points that are clearly unreliable. There's questions about the other data that's discussed in some of the Reports. I think Dr. Bianchi characterizes it where, before 2000, has issues with it, but for the purpose of all my analyses, I've assumed that from 1997 forward, the data is sufficient for my evaluation. I haven't -- I've used those data as they appear.

Q. But DRP didn't install new air quality monitors until either late 1999 or 2000; right?

A. I can't remember the date at which they did that. They did replace the old university equipment. I'd have to look in the records to see when they exactly did that.

Q. But you wouldn't want to use data from equipment that was unreliable. Am I understanding you correctly?

A. I agree with that.

Q. Once Doe Run Perú replaced the air quality monitors, either in the main stack -- well, main stack monitor -- separate topic. It's not an air quality monitor. Okay.

Once Doe Run Perú replaced the air quality

monitors with new monitors in areas of the La Oroya community, did DRP control those monitors?

A. My understanding is that DRP operated those monitors as part of its obligation to the Regulatory Agency. But the measurements that were done, and the reporting was dictated by the Regulatory Agency, but my understanding is that DRP collected and analyzed those samples.

Q. And I understand that there were different air quality monitors with respect to sulfur dioxide versus lead.

Is that your understanding?

A. Yes.

Q. And for the first -- I don't know, let's see -- at least six, seven years, that DRP had installed its sulfur dioxide monitors, those were capped; right?

A. Yes, in a sense, I think that's right. The monitor that I'm most familiar with is the one at Sindicato, and it had an SO2 detector there, but the setting on it maxed out, and he didn't get a complete reading. It underestimated the actual measurements -- or actual concentrations, excuse me.

(Comments off microphone.)

Q. And so those sulfur dioxide monitors were unable to register or measure any sulfur dioxide values, I

believe, beyond the number was 6,000. I don't know if that's -- I don't know if that's 6,000 metric tons, or what the unit is, but it was 6,000, I believe, is the limit.

Is that your understanding?

A. I think it's -- yeah. It's in my Report, where I give you that information. It's also in -- I think it's in Dr. Bianchi's Report where it shows the plot versus time, and you see the concentrations being very flat, and then once the range is corrected on the instrument, they jump up to be high. And I think it's around 6,000 micrograms per meter cubed, but I'd have to look.

Q. Okay. I'm going to show you that graph from your Report, which is on Page 21. Page 21 of your Report.

A. Of the Second Report?

Q. Yeah. Of the Second Report.

A. Okay.

Q. And if we could zoom in on that graphic, Kelby. Thank you.

This is what happens when DRP leaves the cap on the sulfur dioxide monitors; right?

A. Yes. The range was set such that it couldn't measure above that limit. But my understanding is that, inadvertent, but nevertheless, it -- during that period of time, it didn't give a reliable measurement of the ambient sulfur dioxide concentrations in the air at Sindicato.

Q. Do you think the logical assumption there would be that all of those years before were the same, or maybe even worse than when they actually took the cap off?

A. I think they were higher because you see the cap seems to be -- shaving it off like you'd mow your lawn; right?

Q. Right.

A. And they hadn't implemented the SO2 pollution control systems, with the first one going in 2006, the second one in 2008. So given that, the emissions were higher, I expect them to be higher than that, yes.

Q. Probably a lot higher?

A. I don't know how much higher.

Q. Would it be at least as much higher as they are in -- starting in the mid-2006?

A. I think they could be higher than that, yeah.

Q. Yeah. Because --

A. They're probably similar.

Q. Because the only thing that can abate SO2 is a Sulfuric Acid Plant; right?

A. Technically, no. There are other technologies for that, but at this Facility, they were -- they had some scrubbers on the Sinter Plant, but, in general, to really abate the system, they were going to need to install those Acid Plants.

Q. You mentioned scrubbers on the lead Sinter Plant that could abate SO2?

A. I might have that wrong. I know they had -- the plan was to install those scrubbers. I might be wrong if they had them in at that time.

Q. Well, this might be where a metallurgist might be helpful; right?

A. Well, someone who's more familiar with the system than I am at the moment.

Q. And a metallurgist would be familiar with the system; right?

A. It depends on the metallurgist, and whether or not they're working at that Facility and know those facts, but it could be any type of person that knew those facts.

Q. A metallurgist who has decades of experience at one of the only other polymetallic metallurgic facilities in the world might be helpful?

A. If that metallurgist, with all that experience had -- was working at this Facility, and knew whether or not scrubbers had been installed for the Sinter Plant, that would be helpful, yeah.

Q. In any event, going back to what abates SO2, you did mention that there are some metallurgical facilities that might use other technologies to abate SO2, but do you have experience with any metallurgical facilities that use

anything other than Sulfuric Acid Plants to abate SO2?

A. Well, a Sulfuric Acid Plant, by definition, is a Plant that captures SO2 and puts it in a liquid form. There are other technologies that can reduce sulfur dioxide concentrations in your emissions. And those can be contact or double-contact scrubbers. But for a Facility of this magnitude, with the magnitude of SO2 coming out of it, I'm not aware of another way to handle that than what was proposed in this case.

Q. And when you say "the magnitude of SO2 coming out of this Facility," that means a lot more than what is shown in that buzz-cut part of the graph; right?

A. No. That means the emissions. This is the air quality. Air quality is a different animal. It doesn't really -- air quality varies. You see all those little spikes on there? That's a daily variation based on the wind and the rain and what happens.

What you -- the environmental engineer is looking at the stuff that comes out the stack, the smoke, and the smokestack -- excuse me, and the fugitive emissions from the site. And at this site, from those different units, the SO2 volumes were high at a level that would require a Facility such as were designed and installed here.

Q. And you would expect if the SO2 coming out of the metallurgical facility, if that amount is high or at a high

magnitude, that air quality is going to be high as well?

A. Well, pollution would be high. So, yeah, there's a definite link between emissions and pollution.

Q. Okay.

A. And the higher the emissions, in general, the worse the air quality, yes.

Q. And is it your testimony that you think that the sulfur dioxide levels of air quality between 2000 and mid-2006 would have just been a little bit higher or a lot higher?

A. Well, to answer that question, you need to look at the emissions chart, because I think the question you're asking me is would the emissions have been higher, and we have charts on that, and that -- that's what we would need to look at to answer your question.

Q. Yeah, well, I think we'll --

A. I think that the air quality, I think the readings were higher than that cutoff, but how much was coming out --

(Interruption.)

A. All right. Good question. I think that the air quality concentrations would be higher than that cutoff, but the question you're asking me is really what are the emissions, and what levels were those during those time. That's a different chart and a different question.

Q. Yeah, I think we'll get to sulfur dioxide emissions in a bit.

In your presentation, you state that Project 1, under the original PAMA, was a last, temporally, you know, the last in time, and I believe you have it starting in 2003, which is consistent with Claimants' Counsel's Opening Statement; is that right? You understood that Project 1 just started in 2003?

A. PAMA Project 1.

Q. Umm-hmm.

A. There are other Projects for modernization that aren't on that schedule, but for the enforcement of the PAMA, that Project started at the time shown on this chart. It's directly out of the PAMA Permit itself.

Q. And your reading or interpretation of what is a PAMA project versus what is a modernization project is based on your -- well, what hat, Mr. Connor?

A. It's based as a reader of the PAMA. There's a chart in there, they identify in certain Projects as modernization, and in other Projects as PAMA Projects. And it's -- I think you showed that chart to --

Q. Mr. Neil.

A. To Mr. Neil, yeah. And you noticed that there's a PAMA Project Section and there's a Modernization Section. They're different. There are different schedules and

different requirements.

Q. And did you remember what Mr. Neil said about what needed to happen before they even started the Sulfuric Acid Plant Project?

A. No, I don't recall what he said.

Q. You don't remember that he said that they couldn't start the Sulfuric Acid Plant Project until they finished the Modernization Project, which started in 1998, according to the PAMA?

A. Oh, according to what?

Q. According to the PAMA. I mean, this -- sorry, this is from Mr. Connor's PowerPoint. This -- I don't know if you can put this up, Kelby. Slide 28.

You recognize this, Mr. Connor; right?

A. Yes.

Q. You know, so this is you kind of reordering the numbers of Projects, and making Project 1 last, and saying it's last because you really don't need to start it until 2003.

A. Right. That's what the PAMA says.

Q. Right. The PAMA -- the PAMA document, which, I assume, you are familiar with, Mr. Connor; right?

A. Right. The PAMA document has PAMA Projects, and it also has Modernization Projects.

Q. Right.

A. But under the PAMA, the PAMA requirements, there is a schedule for the PAMA Projects, and the schedule for modernization is not, my understanding, an enforceable requirement under the PAMA. What they had to spend on modernization is a separate pathway.

But the PAMA -- and you'll notice on those charts, and we could certainly put it up, that, if they didn't mean to distinguish PAMA Projects from Modernization Projects, I wouldn't image that they would have set it up like that on that chart. So what I'm showing you are the PAMA Projects, and the requirements and the subject of the auditors. Never in my review of auditors did I see any challenge to the investment and modernization, but they do talk about the PAMA Projects and their schedule.

Q. I guess just trying to get -- you're using the original schedule of the PAMA with respect to what you call "PAMA Projects" and divorcing PAMA Projects from Modernization Projects. I'm not asking about auditing or anything like that.

I guess, would it be surprising to you that, within the section of the PAMA called "Project 1," there is one calendar that gives these dates that you're focused on. And the very next page is another calendar for Project 1 with dates that start in 1998, that start with the Modernization Projects that Mr. Neil himself said had to be

done in order to even start the Sulfuric Acid Plant Project?

A. Well, there's two parts to your question, and two parts to my answer.

First, let's look at the document, if you will. We can -- I think everyone would be better-served by that.

Q. Yeah, I'm pulling it up.

A. Then, secondly, when you say it can't be started until the modernization is done, the modernization in the Acid Plant for the copper circuit were inseparable. And the -- starting in 1998 with the master plan, engineering companies were working on that, to come up with a best method to change the copper circuit; so as to facilitate the Acid Plant, and that was the $14 million study that was done and completed at the time of December 2005.

But if we -- and in the PAMA, there's a clear distinction between modernization and PAMA. PAMA or the environmental improvement Projects, and modernization is identified as a separate issue. And that's why they say PAMA Project, and that's what this is based on.

Q. And it's your testimony that DRP was obligated to complete PAMA Projects but not Modernization Projects?

A. No, that's not my testimony.

Q. Okay. So I think we've found it. So this is Exhibit C-90. And we're getting there, maybe. Okay.

Yeah -- no, another one. Okay. So maybe if we could blow that up a bit, Kelby. I believe so. Yeah.

So this is certainly what you focus on, and what Claimants' Counsel focuses on, and you can see in the left column we're talking about a Sulfuric Acid Plant for -- and the very top row would be for the -- "Cu" stands for copper, for the copper circuit, and the next row would be the Sulfuric Acid Plant for lead, and then they have another row for zinc.

Do you see that?

A. Yes. Lead and zinc are the same, or lead and zinc in the original plan were one --

(Overlapping speakers.)

Q. Right. I do believe in the original PAMA, and maybe you're not -- maybe you didn't see this, but the original PAMA gave the option of either having the lead and zinc Sulfuric Acid Plant shared or separate.

Were you aware of that?

A. No.

Q. Okay.

A. I don't recall that.

Q. So in 2003, some pretty hefty investment needs to start on the copper circuit Sulfuric Acid Plant; correct?

A. That's what their schedule says, yes.

Q. Because those amounts are actually millions; so

it's $20 million, then the next year is $21 million, and then the next year, in 2005, it's $22,500,000, and then the next year in 2006, it's $26 million for the zinc circuit.

A. Yes. They were very big, very expensive, very complicated Projects.

Q. That's just for the Sulfuric Acid Plant aspect of it. But as I discussed with Mr. Neil, and I think as you just said here right now, there is a modernization aspect, particularly for the copper circuit, also for the lead circuit, that needs to happen before they could even start the Sulfuric Acid Plant; right?

A. No. They could do them at the same time, which is what they did.

Q. So you disagree with Mr. Neil?

A. I don't really think that Mr. Neil -- I didn't really interpret his Statement in the same way that you are. I think he said, logically, that you can't add the Sulfuric Acid Plant without modernizing the copper circuit, but they happened at the same time. Like the ISASMELT that was chosen, was a necessary element of the Acid Plant, and they were being done at the same time.

So you can't do -- you can't do the Acid Plant without the modernization, but you can do them at the same time. That's what they did.

Q. Okay. Well, just in the very next page of the

PAMA -- this is the PAMA -- we have another schedule.

A. Yeah, here you go. This was the one that you were looking at.

Q. And, actually Kelby, go back to the other one real quick. I'll just, you know, the first table is Environmental Management Program. You know, this is PAMA. And then it says remediation and adjustment Projects, and then the next Table says, Environmental Management Program Investment Schedule of Adjustment.

And here, on the first row, you have the copper circuit requiring maybe three-quarters of a million dollars in 1998. The lead circuit, requiring over $1 million, and the zinc circuit requiring 20 million, and then in 1999, for the copper circuit, that's close to $38 million. And then in 2000, $6 million, and then later on in time, in 2003, for the lead circuit you've got $40 million, in 2004 you've got $15 million.

Do you -- these are the calendars that I was showing Mr. Neil, where he testified that, yes, the PAMA and -- in his experience, the PAMA was requiring modernization of, in the very least, the copper and lead circuits that you can see also the zinc circuits, before the Sulfuric Acid Plant Project started.

Do you understand that?

A. You're saying that's what he said? I didn't get

your question.

Q. I just said, do you understand that that's -- I showed him these calendars, and he said that, yes, you had to do the modernization before the Sulfuric Acid Plants, and that is what's reflected in these calendars, which are in the PAMA. They are two calendars right next to each other.

A. Well, let me answer it as clearly as I can. In your conversation with Mr. Neil, if you're saying that he said, as a general, you know, principle, you can't, for that Plant, the copper circuit, you can't -- you have to have the modernization as a prerequisite for the Acid Plant, that's true. In this schedule, I don't believe he understood -- and I think he made that clear in his testimony -- that the PAMA is distinct from modernization. So whenever we talk about the PAMA, the audits of the PAMA, you can see very clearly on this chart they're separated. The Projects above are the modernization.

My understanding, from the record and from speaking to Mr. Mogrovejo, is that the enforcement under the PAMA was directed towards the PAMA Projects themselves. It wasn't directed towards the investment schedule of the modernization Projects. And, in fact, you don't see -- I didn't see any inspections that indicated a failure to abide by the modernization schedule.

Q. Did you read the 2003 MEM Report that followed the 2003 SVS Report, Mr. Connor?

A. You would have to show it to me.

Q. It's Exhibit R-314. And we can go to the English version. Maybe, zoom in a bit.

Do you recognize this, Mr. Connor?

A. No, I don't. I don't recall this document offhand. I may have seen it, but I'm not sure.

Q. Okay. Could you go to the next page, Kelby, please.

A. Hey, could you go back to the first page. It's just that I want to take a look at it.

Q. Sure.

A. Thanks. Can you bump it up, chief? Thanks. Can you just scroll down just a little bit. I want to read the lower part. Thanks.

Q. And apologies for the clunky translation at times.

A. Okay. I've read that.

Q. Could you go to the next page, Kelby, please. The same, like, zoom in a bit. Let's go down to 2.10.

A. Just -- can I finish reading?

Q. Sure. Go ahead. Go ahead.

A. Thanks. I appreciate that. Can I see the -- just the lower part of that page, please. Let's

see. Okay.

Q. And I'll -- as you're reading, I just want to read from 2.10: "There is a concern about the environmental effectiveness of the Measures adopted and the feasibility of complying with the PAMA's schedule in what regards the Sulfuric Acid Plant Project. Because of the area of its installation, the acid transport system, the placement of the acid in the market (market study), the feasibility of the schedule, and other things, have not yet been identified."

Did I read that correctly, Mr. Connor?

A. Yes.

Q. Okay. So -- but you're saying you haven't seen this document before?

A. What year is this document?

Q. 2003.

A. Okay.

Q. This Report the MEM issued after the SVS Report.

A. Yeah. And this is the same time that Doe Run is determining that they're going to have problems meeting that. In 2004, they issue a statement saying they need to -- they're requesting an extension for that reason.

Q. All right. Because --

A. This would consort with that.

Q. Because the Sulfuric Acid Plant Project isn't

really just a three-year project. It's longer, as identified in the PAMA, because you had to have started in 1998, three months after DRP came to La Oroya. They had to start the modernization first so that they could then start the Sulfuric Acid Plant.

A. So -- well, I think, what you're saying in general, yeah, you have to start working on that, but you just need to understand that, three months after they get there, they can't break ground on rebuilding the lead circuit and the copper circuit. It's a very complicated project, and they had engineering teams working on it in 1998. And by 2005, when they submitted the Extension, they had spent $14 million on those studies.

And so, they did start working on it, but it's not something -- you can't build a facility of that magnitude starting within three months of when you show up. And they did do that work and they did get those things installed.

Q. When?

A. They had the -- see if I remember. The zinc is in -- Sulfuric Acid Plant for zinc is 2006. So Sulfuric Acid Plant for lead is in 2008, and Sulfuric Acid Plant for the copper circuit -- excuse me -- is not finished when they complete. It's under construction. The design had been finished, the equipment had been procured. The

equipment is still sitting out there on the property, but it was not finished.

Q. So you're saying that they started the zinc, at least as far as you understand. They started doing the zinc Sulfuric Acid Project in 2006?

A. They finished it in 2006.

Q. They finished it in 2006?

A. I don't know when they started. They started -- the copper circuit work was underway in 2006 as well, but it wasn't finished by the time they suspended operations in 2009.

Q. When did they start -- according to you, when did they start working on the lead circuit?

A. I'd have to look it up. But I have it in that interactive tool kit, it indicates what the timeframe was for that. I could look that up, if you wish.

Q. So at least, just focusing on the copper circuit, according to the calendars that we just looked at, it was contemplated that they would start investment on the copper circuit in 1998. They didn't start, in your understanding, until 2006; is that right?

A. My understanding is that they broke ground on the construction in 2006. The investments in developing the Plants began in 1998.

Q. That plan changed a couple of times; right?

A. It changed at least once, and maybe twice, because, early in the analysis, there was the idea that all three circuits could deal with -- be handled in one central facility, which, in the engineering document, says it had an advantage in terms of a confined space. There wasn't a lot of space out there. But, ultimately, it was determined that three separate units would be more feasible and provide a better outcome.

Mr. Partelpoeg talks about the rationale for that.

Q. Yeah, from what I understand, the original PAMA recommended two or three Sulfuric Acid Plants, then Fluor Daniel came in pretty early on, I think, in 1998, and said, "we can do it with one." And then, later, much later, after Mr. Neil came in, in 2003 -- maybe 2004, they decided to go back to three. But 2003 is a lot later than 1998; right?

A. It's definitely four years later, but it's not that long a time on a project of this magnitude. I think if you look at -- I think it's the EGAC that lays out the schedule for the new modernization. It lasts way longer than those four years. They give a long period of time to get that job done. That's normal. For a project of this magnitude, engineering companies are working on that Project, and I'm not going to second-guess what decisions

they made in that regard. They arrived at a conclusion, based on a lot of work, that these were effective systems, the systems that were installed were effective. And Mr. Partelpoeg is of the opinion that the third would have been very effective as well. It's a very different technology --

Q. I don't think I asked about the effectiveness. I asked the length of time that it -- we were talking about how long it would take.

A. Okay.

Q. Right?

A. Right. And what I need to say to you is that that is not an exceptionally long period of time for a project of that magnitude. Not at all.

Q. It's not an exceptionally long period of time to wait to start an exceptionally complex project that is contemplated to take eight years?

A. They didn't wait to start it. They began the engineering on it immediately, and you can't go out and build it. You have to do the engineering. And, yes, it was a challenging project; and, yes, they did come up with a range of solutions before settling on one that was a good solution, apparently. But, you know, you have to do the homework in order to build a facility of that magnitude, and it takes a long time.

Q. The calendar of investments that are -- in which there are numbers around 20 million, $30 million, is that for designs, or is that for actual equipment?

A. I don't know what it's for. It certainly wasn't possible to bring that equipment in, in the first three months of that Facility. And I don't think any engineer would have thought that. I don't know why those schedules are set up like that. They certainly aren't realistic from any practical point of view or for any construction of a project like that. They did try to meet the schedule of the -- January 2007 on having those Acid Plants installed. The engineering team determined that that was unfeasible and asked for an extension.

I believe they asked for an extension of four years and got two years. Mr. Partelpoeg is of the opinion, I think, that, if they had been granted the four years, they would have gotten it done.

Q. I think they actually asked for five and got three, or close to three, but, in any event --

A. Well, that's the same difference; right? Good point.

Q. Let's turn to Slide 42 of Mr. Connor's presentation.

Just a question here: Are you aware that -- so on the picture on the left, you identify that as a Sulfuric

Acid Plant?

Do you understand that is a Sulfuric Acid Plant, on the left?

A. No. That's the ISASMELT tower.

Q. Okay. And then, on the right, the picture on the right, the one that you say ISASMELT, that's actually the Sulfuric Acid Plant; right?

A. Well, it's the footprint of the full facility. I don't know where the -- I'm not familiar enough with the photo, but the Acid Plant would be contained within that.

Q. Could you point out where the converter tower is that would convert the SO2 to SO3?

A. No.

Q. Okay. Bear with me a moment.

Let me turn you to Slide 89 of your presentation where, I believe, you testified that fugitive emissions just can't be part of indeterminate losses; is that right?

A. No.

Q. No?

A. They can be part of it.

Q. So fugitive emissions can be part of indeterminate losses?

A. Yes.

Q. Okay. And were you observing when Mr. Buckley was testifying?

A. Yes.

Q. And I was asking him what conclusion he might be able to draw if he was comparing the resulting -- the figure resulting from a mass balance or a sulfur balance for sulfur dioxide emissions --

A. Yeah.

Q. -- versus the figure coming from the main stack monitor on sulfur dioxide.

And in that case, the measured figure for sulfur dioxide coming out of the main stack was lower. I think the figure is around 320,000, and the mass balance number was larger for sulfuric dioxide. I think it was around 361,000.

And actually, if, Kelby, you could pull up Transcript Day 2, PDF 131. Where, I believe -- I'll read it for everybody.

"Now, Mr. Buckley, if you -- as President and General Manager of DRP -- if you saw in the Year 2000 that there was a 41,000 metric ton discrepancy between what you were measuring at the main stack, what you thought was coming out of the main stack, and the mass balance calculation, you would be concerned; right?"

And he answers: "Well, I certainly don't remember seeing those numbers."

"Question: But if you had, if you had seen them,

you would be concerned; right?"

"Answer: Well, I would be asking questions about the calculations."

"Question: If the calculations were correct, would you have to assume that you were emitting 41,000 metric tons of fugitive emissions?"

"Answer: I would most certainly have to give it consideration. That's for sure."

"Question: Right. Because those 41,000 metric tons are going somewhere. They can't just disappear. That's the whole point of a mass balance; right?"

"Answer: That is correct."

So do you agree with Mr. Buckley, Mr. Connor, that, if you saw a measured number -- which I understand is your gold standard. If you saw a measured number for the main stack for sulfuric dioxide, and then mass balancing figures that kept coming in that were 41,000 metric tons larger, would you have to assume that you have a fugitive emissions issue?

A. Can we look at that chart that you had been showing Mr. Buckley? It's from the SVS 2003.

Q. The SVS.

A. Yeah, let's bring that up if we can. I want to refresh my memory about it.

Q. Well, we'll try to find it.

A. Okay. I'll wait.
Q. I believe I'm showing you Respondent's Demonstrative 3.
A. No. This isn't what I'm thinking of. I think you had a page from the SVS Report that was -- where it shows how they came up with those numbers.
Q. I think that's the one, on the right.
A. No. Oh, on the right? Oh, yeah. I want to see the whole page, please. Yeah, you're right. That's it. We'll go ahead and look at the whole page. So this is for Year 2000. I see. Okay. Yeah. Can you bring that up. Okay. Do you have the prior page too? Yeah.
Q. So it says -- in Spanish, it's saying "annual sulfur balance."
A. Yeah, that's right. But there's other years on there. You only showed years -- 2000. There's a bunch of other years.
Q. Oh, yeah. No. I showed him 2001, 2002.
A. Yeah, I know, but there's other years.
Q. Yes.
A. Can you show me the other years, please.
Q. Well, we'll have to go somewhere else.
A. Okay. I'll wait.
Q. We'll look for it, and then -- but, in any event, my question is --

A. Go ahead.

Q. Do you agree with Mr. Buckley that, if you compare -- if you have a measured value coming out of the main stack, that then you have a mass balancing number that's different -- and just for everyone's knowledge, Mr. Buckley is a metallurgist.

A. Umm-hmm. Yeah.

Q. Mr. Buckley said you would assume that that's fugitive emissions?

A. Umm-hmm. Yeah.

Q. Do you disagree with Mr. Buckley?

A. Yes. Tribunal, something very, very misleading is going on here. If you see the other dates on here, you'll see the flipped relationship. Here, they've only shown you the column and the years in which the calculated mass balance is higher than the measured value. All the other years, it's flipped. All right.

So, now, what I've been asked, and what Mr. Buckley was asked -- without knowing what the rest of the table showed, he's told, hey, the mass balance gives a higher number than measured, so there must be -- there must have been fugitive emissions. There must be some extra emissions. 41,000. Scroll up higher on the page, and you'll see it's just the opposite. The measured are higher than the mass balance. So that I have a negative fugitive

emission here -- positive, negative, it doesn't mean anything. It's the indeterminate loss that's part of every mass balance. Sometimes it's high. Sometimes it's low.

I think it's not right that we don't see the full chart. And if you have it available, we can go through that. But, if they don't show it --

Q. Yeah. We'll try to find it, and you might have to do that on redirect with your Counsel?

A. Okay. That's fine.

Q. But, regardless, if you are -- if you were responsible for running a metallurgical facility, Mr. Connor, and you did see mass balancing numbers that are higher than your main stack measured numbers -- same question that I asked Mr. Buckley: Would you worry, or would you just say, "oh, no, those numbers just change and it doesn't matter"?

A. No, I would look at the numbers over time, determine the reliability, and I wouldn't trick my boss by showing part of the data. And I think that Mr. Buckley told you he's not familiar with these things. He told you that his environmental unit handled them. And if he were to look at all those data or have his staff do it, like an environmental engineer, he would see that the mass balance gives you variable numbers relative to the measurement from year to year. Sometimes it's higher, sometimes it's lower,

because the inherent problem in mass balances that we talked about, that's the way it works.

That doesn't mean the mass balance isn't useful. Mass balances for sulfur are useful, and they can work for sulfur. You'll see them in the PAMA and you'll see it pretty often. It works because 90 percent of the sulfur is lost. So a little bit of slop in the numbers doesn't matter.

Lead, only 3 percent of lead is lost. A little bit of slop in the numbers gives you the wrong answer. But here, specifically, we're comparing a measured value and an estimated value. Sometimes they're higher, and sometimes they're lower. That's the nature of the beast.

Q. And, again, if you were running the metallurgical facility, maybe you wouldn't worry if they're lower, if the mass balance number is lower. But, if it's higher, would you worry? Or you would just say, "eh, it doesn't matter, sometimes it's higher, sometimes it's lower"?

A. No, I would never say, "eh." I would always look at it. But I would be well aware of the inherent problems with mass balance and I wouldn't try to trick anybody.

Q. I think, Mr. Buckley, during -- while I was speaking with him, I think he very clearly said that he knew there was a sulfur dioxide problem.

Do you disagree with Mr. Buckley on that?

A. Yeah. Whichever number you use, mass balance or measurement, there was definitely a sulfur dioxide problem. Yes.

Q. And in the context of operating a facility that has a known sulfur dioxide problem, regardless of whether numbers go up or down beforehand, regardless of whether Mr. Buckley saw other numbers for other years, if you knew you had a known sulfur dioxide problem, you would worry if the mass balancing number were higher; right?

A. You knew you have a big sulfur dioxide problem, so the numbers aren't going to change anything. You have a big problem, and you need to take care of it. If one measure says it's really high and another measure says it's really high, it's really high. And so, that -- those numbers would not change the decision that would be made on that problem. The problem needed to be addressed. And it was addressed.

Q. So, Mr. Connor, you stated that your interpretation of -- I think this is the STA Contract risk allocation standard. You stated that your interpretation of the risk allocation standard in the Contract is: "Leave it better than you found it"; is that right?

A. No. That's not right.

Q. What do you apply the "leave it better than you found it" standard to, in this case?

A. I'm not interpreting the risk allocation standard in the Contract. I'm telling you that, when asked, from an environmental engineering perspective, what standards and practices mean and how I evaluate those, I said that, in the most simple terms, when we look at a trend over time and we measure that trend, the goal is to leave it better than you found it. And that's the question that you ask yourself about those measurements. That has nothing -- I'm not trying to give you a legal interpretation. I'm telling you how we do our work.

Q. Did you see that standard in the PAMA, Mr. Connor, the "leave it better than you found it"?

A. Not specifically, but, certainly, the goal of the PAMA was to reduce the emissions of the Facility, and, at the end of the PAMA, definitely leave it better than you found it. So you would have taken a highly polluting facility and brought it into compliance so that it was better.

Q. And with respect to your reference to "more protective," that's a reference to the STA Contract between Centromín and DRP; right?

That's Clause 5.3?

A. Well, that language is used there.

Q. Okay.

A. And what it means from a legal perspective is a

different question. What it means from an environmental perspective is that we have certain criteria that are established in the regulations to be protective, and you would look at whether or not those goals were achieved. If they weren't achieved and are greatly exceeded, and then they were achieved, that's more protective.

Q. Okay. And what hat are you using to create that standard for the PAMA and the STA Contract?

A. Just to clarify, I'm not trying to create a standard for any contract. I'm telling you what standards and practices means within the environmental ambit and how we measure those things, how we do audits and how we determine whether or not the standards and practices have improved over time. That's the limits of my Opinion in that regard.

Q. And, I mean, let's say that that is essentially the standard that one would apply to the PAMA and the STA Contract. Let's use the "leave it better than you found it" standard.

Does that standard -- would that standard allow the Operator of the La Oroya Facility to start it worse than it found it? Or, as long as they leave it better than they found it, they're fine?

A. Yeah. I think you're making a good point. I think that, as I said, you need to look at the trend over

time, and there can be bumps in the road. But the real analysis is are they making progress in that direction, and the simplest way to say it is, if you're looking at a trend, you look at the beginning and the end. But there can be bumps in the road. There will be. But the goal is to get those Projects in place that bring those emissions under control, and the emissions, until those things are in place, you'll have -- you can have higher emissions.

Q. I'm going to go to Page 19 of your presentation, where you compare -- I don't know -- maybe, the total atomic weight of all of the emissions, since 1992, from the La Oroya Facility to the 12 years that Doe Run Perú was running the Facility; is that right?

A. No.

Q. Oh, this is lead. Sorry.

This is tons of lead emitted from 1922 to 1997 compared to 1997 to 2009; is that right?

A. Yes.

Q. Okay. So going with the "leave it better than you found it," probably not allowing you to start it worse than you found it, and, more importantly, appreciating the contemporaneous human impact for the people of La Oroya -- or let's talk about the children of La Oroya, would a child born in, let's say 1999, would that child or would the parents of that child be concerned about the

historical emissions that happened since 1922, or would they be concerned about the emissions that are impacting them then, in 2000? What's more important?

A. All those emissions impact them, and that was supported in the 2006 World Bank study that -- and they pointed out that there's a reservoir of lead in that town. Every time you touch the ground, you're touching historical emissions --

(Interruption.)

A. And you're touching new emissions too. They're mixed. And so, even with that Facility off, even if DRP never existed, those hills would be contaminated and everybody in that town would be exposed to lead. When the Facility is operating, there are greater emissions that are falling, and that's why it was so important to reduce those emissions.

Q. Yeah. I think -- and that's the point, Mr. Connor, isn't it?

A. That's --

Q. When you have the constant source -- and I asked you to give me a comparative answer -- what are you more worried about? The child that is born 1999. What are you more worried about? Do you want the poison to stop? Is that your first priority? Or is the stuff in the soil, the lead in the soil, is that your first priority?

A. Well, I think the concern of the community is that, since 1922, the "stuff," as you just signaled it, has been falling on this area. You know, if you took a pepper shaker and you shaked it on all those hills, I think every time the wind blows you're going to sneeze. So every time you get exposed to that lead, it's a history of lead. And it seems that you characterize it as something that's unique to DRP, and we know that's not true; right? We know that that Facility ran continuously through that time. And that, under the PAMA, whoever took it on, DRP or whomever, the goal was to stop that. And they made tremendous progress in doing that.

So would I be living there concerned that they do that? Yes. I would want there to be a large team of engineers and contractors and construction people working to stop those emissions finally. And I would also be pretty darn concerned that my house was full of lead because my child lives in that house, and the walls of that house are made from contaminated soil.

So I don't really see that you segregate those issues, but I agree with you that terminating the emissions that had gone on for decades and decades out there was an important thing to do. That's why the PAMA was written. That's why they did those Projects.

Q. Are you testifying that this case is about people

who lived back in the 1920s in La Oroya? It's about people who lived in La Oroya during DRP's tenure there; correct?

A. No. My understanding is that this case is something to do with the Contract, and the question posed to me that we're talking about is, did it improve? Was DRP worse than Centromín?

Centromín only started operating in '74-'75. So I'm not trying to say that they had responsibility for Cerro de Pasco; right? I don't believe they did. I don't know what their relationship is. But this graphic was just to point out -- to deal with this issue of historical emissions and the importance of dealing with historical emissions, and then I don't -- my understanding is the case is not about what's going on in the town and what the priorities were in the town. The case is about were they worse than their predecessor. And that's the question I've been trying to answer.

Q. And do you understand that this case wouldn't exist and we wouldn't be talking about Clause 5.3 of the STA if it weren't for the Litigation in Missouri, for which you have been offered as an expert?

A. I don't know if this case would be happening or not. I know that that's -- it's very germane to this case. We've heard that in the conversations of the past week, and I think everybody knows that answer.

Q. Are you aware --
A. And certainly that's why I -- in my Report, as you pointed out, I talk about the link between the two issues, and there is definitely a link, yes.
Q. Are you aware that the Missouri Plaintiffs have limited their Claims before U.S. Courts to, very specifically, the time that Doe Run Perú was operating the Facility?
Are you aware of that?
A. I'm not aware exactly what they are saying. Some of the Plaintiffs were born before Doe Run began operations. So from a -- within this case, from an exclusive argument, I know that that is not exclusive. We looked at those Plaintiffs. But I am aware generally that is how they crafted their claims, yes.
Q. I guess -- so just keeping in mind the contemporaneous human impact of emissions, a child in 1999, when it comes to -- I know this is about lead. So I guess we can just take this down.
Sulfur dioxide dissipates; correct, Mr. Connor? It doesn't stay in the soil.
A. Sulfuric dioxide is a gas, doesn't stay in the soil, but you'll have sulfur fixation that will change the pH of the soil. So some of the sulfur remains in the soil, depending on the soil type, whether it is calcareous or not

calcareous. But I think the simpler answer to your question is that, no, sulfur dioxide doesn't stick around. Lead sticks around.

Q. So the child in 1999 in La Oroya and that child's parents, would be extremely concerned about the sulfur dioxide coming out of Doe Run Perú's Facility; correct?

A. I don't know what they would be concerned about, but I think that we all know that, in terms of toxicology, the lead became a priority because of -- it's more -- you know, it's a more significant chemical with regard to toxicity of children or whatever those effects are.

It's not to say sulfur dioxide doesn't have any effects. It does have respiratory effects, but I'll leave it to the toxicologist to parse that out.

Q. I was just going to ask you that, if you were giving that Opinion as a toxicologist, but I think we can skip that.

I was really asking you if the child in 1999 would be concerned about the contemporaneous emissions of Doe Run Perú, or would they be concerned about sulfuric dioxide emissions that existed 10 years ago from Centromín?

A. I would think that the child, or at least the child's parents, would be concerned to know that someone was actively working to fix this situation, and that was the case and that would be important.

If I were a parent in La Oroya, I would want to know that a company had taken on something like the PAMA and was working to develop a new plant that didn't exist before that could cut lead emissions and cut sulfur emissions for the benefit of that community. That's what I would want for my kids.

Q. Let me ask it another way.

Can the child in 1999 breathe sulfur dioxide that came out of Centromin's operations? Is that possible?

A. No.

Q. Thank you. So going back to -- you know, I think now understanding that sulfur dioxide has immediate impacts; lead can have immediate and very long-lasting impacts. If you stop the sulfur dioxide at its source, then it dissipates. You won't have it anymore. If you stop the lead at its source, the lead sticks around in the soil; right?

A. Yes. That, again, is generally correct.

Q. Okay. And going back to the concept of leaving La Oroya better than you found it, but what if you started worse than you found it? And I'd like to go to your Slide 51 from your presentation.

So you can see the point in 1997, and this is lead emissions from the main stack. This does not include any calculation of fugitive emissions; correct, Mr. Connor?

A. This is the stack emissions, yes.

Q. Okay. And in 1997, that dot is lower than it is in 1998 and in 1999; correct?

A. Yes.

Q. And is it your testimony, Mr. Connor, that the children who were impacted by those increased emissions of lead in 1988 -- sorry, 1998 and 1999, that they should just simply not worry because the lead emissions went eventually down in 1998 and 1999? Is that your testimony?

A. No. Let me clarify the characterization of "Leave it better than you found it." I don't mean to do a point-by-point analysis. That is not really the issue. The issue is, over time, did they achieve a downward trend?

And if they didn't and only the last year was better, I want to see a downward trend, right, and you clearly do see a downward trend. The emission levels that were measured in those first two years indicate there were higher emissions. There can be different reasons for that, but I accept that.

But the action was to bring those emissions down. And you see that by the year 2000, within two years of their arrival, they have achieved a big drop. And that the general drop continues over time, with some bumps in the road. But that is what needed to happen, and that's what did happen vis-à-vis some very large engineering projects.

Q. Do you think the child in 1998 or 1999 is -- that that child's health, that the parents of that child care at all about any future downward trend, or do they care that it is worse in 1998 and 1999?

Do they care that DRP started -- started the Facility worse than the way they found it?

A. Well, I can't speak for the parents, but I would say that the information in the community indicates that they recognized the initiatives that were taken to stop the runaway train, to help put the brakes on these emissions over time, and that's what was important. It had been going on for decades, and it needed to be brought under control, and it was brought under control.

I don't want to speculate about one point on the curve. I want to tell you that in the evaluation, as I presented it, I look at the trend over time and determine, for the purpose of this case, were they worse or better than their predecessor? I'm not going to do that based on one or two years.

They operated for 12 years. They implemented over $300 million of pollution-control projects that had the result we see on this plot. That's my basis for my analysis.

Q. If you want to stop a runaway train, Mr. Connor, would you take off the brakes and make it go faster in 1998

and 1999?

A. That's not what they did, and we have already talked about that.

Q. But you do concede, Mr. Connor, that in 1998 and 1999, at least just with respect to lead, things got worse; correct?

A. The emissions, according to this chart, increased, yeah.

And there are questions whether or not that was a correct measurement, but I'm not bringing that up in my analysis. I'm looking at the October 1997 arrival date and what happened after that time, and I've looked at it with respect to '97. I've looked at it with respect to the entire tenure of Centromín.

So you and I now are having a conversation about one point in time in 1997. You can see from this chart that Centromín made efforts to bring those emissions down, and DRP continued that and achieved much lower emissions. And environmental engineering is that last 10 percent reduction where most of the money gets spent because it is hard to do, but they did it if there is any question about that. And I don't think that looking year to year is a fair measure of what the achievements were.

Q. But it might be a fair measure for the child that lived at that time; right? No?

A. Well, let's put it this way: I think that -- I think the control of emissions were important to all the Parties, and I also know that the investments made by those companies in reducing those emissions, reducing blood lead were a high priority.

That's why the PAMA was revamped. That's why they had the Convenio, and the end result of that was to achieve that objective. That's what -- everyone shared that objective, and that's why those engineering projects were done.

Q. So if we look at --

A. Excuse me. I'm sorry. That the '98 and '99 numbers are not -- they don't dismiss those benefits.

And here we are looking at emissions. Earlier I put up a chart that showed the air quality, and the air quality is what really matters. That's what happens in La Oroya. And we see from that, that one year is higher than the air quality under Doe Run, under Centromín. All the other years are less. That's really what is happening in La Oroya.

They are related to the emissions, but in terms of the exposure of the people in La Oroya, that's pollution in the environment. That is air quality, and you that won't see this type of pattern.

Q. Mr. Connor --

A. But, again --

Q. Are you finished, Mr. Connor? Because I think your scope just went way outside of my question. You can talk about that on redirect, if you wish, but I'd like to get my questions answered if I could, please.

So we are on a limited amount of time. You mentioned they spent a lot of money on air emissions projects, and so, if we do look at the money they spent year to year on actual air emissions projects, that would show us their dedication to reducing emissions?

Is that what you're saying?

A. No. I don't think the year-to-year spend.

Q. Okay. Only at the very end? That's the only thing that counts? Not year to year?

A. No, I'm not saying that. What I'm saying is that the Projects were started, financed, and implemented, and they take time to do and they did them. Never did they stop and say: "We are not going to do these Projects." They did the Projects. They take a long time to implement. They take a long time to procure the equipment and get it installed. Those were done.

And there was a commitment from the time the PAMA was assumed by DRP to do that. Some of that they got done; some of it they couldn't. The air emissions control project started Day 1 in their operations.

MS. GEHRING FLORES: Kelby, could you pull up Slide 68 of Mr. Connor's presentation?

BY MS. GEHRING FLORES:

Q. So I know -- yes, a lot is going on in this graph as you mentioned. I think -- the focus here is on the orange dots.

The orange dots are blood-lead levels of children six years and younger in La Oroya starting in, I guess, 2000. And I see it got consistent with your focus on what DRP did at the end of this story. You focused on the end. You focused on the downward trend; right?

But, again, just looking at this, looking at the year -- let's see. I guess this is between 2004 and 2005. There is a little orange dot that goes kind of high up there. That is not -- if DRP had stopped at that point, if you wanted to focus on the end, if DRP had stopped there, they certainly wouldn't be leaving things better than they found it; right?

A. Well, let me answer that in a couple different ways.

One, they did not stop there, and there was never any intention to stop there; and, two, there is a data point left off this plot that shows that it was higher in 1999. I know that Ms. Proctor says that she left that off because it wasn't very many children. In fact, there were

samples of 18 children under 6 and 39 children under 10; that if that was plotted on here, it would be higher than all those other numbers, and you would see the downward slope, but it's been left off.

Secondly, in that period of time between 2004 and 2005, the numbers have been parsed out into three subsets for reasons that I don't understand, but it has the effect of taking one of those dots and making it very high on the chart.

I'm not sure if that was meant to be misleading, leaving off the plot and parsing the numbers like that, but I would say that, regardless of that -- and I don't -- I do not mean to say that it was meant to be misleading, but it is confusing.

So if you take the data from any date, whenever, you'll see that it goes down over time, and that was the objective. It goes down over time when the lead emissions and air quality get better.

Q. It could be that Ms. Proctor left the 1999 dot off because she is a toxicological scientist and understood the implications of a small sample size; right?

A. Yes, but the other reason could be that she didn't understand how -- what the real sample size was.

Q. You think that Ms. Proctor doesn't understand?

A. What the sample size? Sample size?

Q. Yeah. You think that?
A. Yeah. I know that's true. Yeah.
Q. Okay.
A. She said in her Report she thought it was 9 individuals -- or 8 individuals, which actually it is 16. She may have gotten the 8 from my Report because I mistakenly put 8 instead of 16, but beyond that, if you went to the 0 to 10-year-old, would you still find a high number with 39 kids sampled.

So if you were to put that number on there, it would underestimate, most likely, the 0 to 6 age blood-lead level, but you could put it on there as an underestimate, and it would fill out this chart so and show that they made progress starting in 1999.

Q. I think we'll hear from Ms. Proctor later, and I do believe that she'll probably have a different graph that includes the 1999 number and, perhaps, that will satisfy you and she can explain the issue with sample size.
A. Good. Yeah. That's good.
Q. But in any event, focusing on that dot between 2004 and 2005 -- I know you don't want to talk about that dot. I know you want to talk about the dot in -- what date is that? 2011?

I know you want to talk about those dots, but focusing on the dot, the contemporaneous -- the child that

exists at that time, that child does not care about where the dot is in 2011; is that right, Mr. Connor?

A. Well, let me just clarify. I'm happy to talk about any of the dots. I'm looking at all the dots on this.

Q. Could we talk about that one?

A. Excuse me. So, no, look at any dot you wish. Look at any of the data you wish in its entirety and pick any dot on there. Over time the general tendency is to decrease the blood-lead levels. There is no dispute about that among any of the health authorities working on there.

Q. Could you answer my question?

A. Well, your question was: Do I love that dot or not? I don't care about that. I don't care. All those dots --

Q. No, the child. Does the child --

A. Oh, the child.

Q. Yes.

A. Well, I -- I'm going to answer it the way I answered it before. Those children are important. Their blood levels have been measured. The goal is to bring those blood leads in the population down. Yes, it's important to address that. That's why these Projects were done.

Q. When were they done?

A. They were started on the planning in 1998.
Q. When were they done?
A. When were they finished?
Q. Yeah.
A. The fugitive emissions projects were added by DRP in the 2006 Extension. They were all finished by 2008. The --
Q. 2008 is after the PAMA Period; correct?
A. It is within the PAMA extension period. So then the Lead Circuit Acid Plant was also completed in 2008, and the Zinc Circuit Acid Plant was completed, finished and operational in 2006. The Copper Circuit Acid Plant was under construction in 2006 and not finished by 2009.

All of those Projects, in concert, were the reason the emissions went down, and those, in combination with the health initiatives in town, are the things that are credited with moving these blood-lead levels down.

It was some very important things to do, and I believe that all the people involved in that shared that objective.

Q. I think we talked quite a bit about lead. I know we talked a little about sulfuric dioxide a bit ago. I'd like to go back to sulfur dioxide.

PRESIDENT SIMMA: Ms. Gehring Flores, we would have the coffee -- time for the coffee break now, but, as I

said, we are going to sit longer anyway today. So I'm in your hands.

Would that be a good moment or would you -- good moment?

MS. GEHRING FLORES: Yes. That's fine. Thank you.

PRESIDENT SIMMA: Okay. That means we'll have a coffee break until 5:20. I'm sorry. 3:20. That was wishful thinking.

MS. GEHRING FLORES: You're not enjoying this, Judge Simma?

PRESIDENT SIMMA: Okay.

(Brief recess.)

PRESIDENT SIMMA: Okay. We can continue.

Ms. Gehring Flores, please continue.

MS. GEHRING FLORES: Thank you, Judge Simma.

PRESIDENT SIMMA: Ah, did you want to make your remark now?

(Comments off microphone.)

(Interruption.)

THE WITNESS: I just wanted to clarify that, in looking at that chart, I don't want to demean Ms. Proctor's work or in any way imply that she's being misleading. I apologize if that's the impression I did.

She has her own Opinion about that, and I think

she's being straight about that. If I implied that, I apologize. So that I just wanted to make sure that, you know, that I didn't insult someone unfairly.

BY MS. GEHRING FLORES:

Q. Mr. Connor, are you aware that the Missouri Claims filed before U.S. courts were filed first in the year 2007?

A. No, I don't know when they were filed.

Q. If that were true, then those Plaintiffs would not be claiming about lead emissions levels in 2009; correct?

A. I guess I didn't follow that.

Q. If the Missouri Plaintiffs filed their case in 2007, in 2007 when they made their Claims, they would not be claiming damage due to a future event that they didn't know about in 2009; correct?

A. I think that's fair, yes.

Q. So kind of going back to the "starting at worse than you found it," could we look at -- this is Mr. Connor's interactive tool, which is Appendix C to his Second Report at PDF 129 and also PDF 132.

So correct me if I'm wrong, Mr. Connor, but I believe this shows your graphing of lead and sulfur emissions from the Facility -- not sulfur, sulfur dioxide emissions during Doe Run Perú's time; is that right?

A. Yes.

Q. And you'll see that -- I think everyone can appreciate that, on both graphs -- so the graph on the left is following lead, and the graph on the right is following sulfur dioxide. In both graphs, there's a dramatic drop in the year 2000; is that right?

A. Yeah. Both show a drop from '99 to 2000. That's right.

Q. And that is charting the emissions numbers that were measured at the main stack, for both lead and sulfur dioxide; is that correct?

A. Correct.

Q. And I'm sure you are quite familiar with this concept. For some time now in this case, Mr. Dobbelaere and Respondents have been pointing out, quite a bit, that, at least from our perspective, that drop doesn't make sense. It doesn't make sense scientifically, mathematically, logically. It just doesn't make sense, and we've been asking about it a lot.

One of the reasons why we can't figure out what's going on there is because Doe Run Perú, when it first came to La Oroya, started things off worse. They increased production, used dirtier concentrate, and you can see on the graph things got worse, in the first couple of years, 1998, 1999, and then all of a sudden in 2000, it drops.

Do you think that that's a fair summary of Respondents' position, the way you understand it, of the drop?

A. That's not the way I understood it, no.

Q. How do you understand it?

A. I understood that Mr. Dobbelaere had discussed a lot about the SO2 emissions data, and he said he thought it didn't make sense, but the lead emissions data does make sense. It tracks closely to the ambient air measurement done by a totally different instrument in La Oroya Antigua, and we already looked at that.

So I think you need to bifurcate your discussion on the reliability of these plots. They're done by different instruments. We have validation of the lead plot in town. We don't have reliable SO2 measurements in town; so I can't make the same evaluation, but when you characterize them, and not making sense, lead makes sense, perfect sense.

Q. To you. To you. I was saying, was that a fair characterization of Respondents' position?

A. I didn't understand from reading Mr. Dobbelaere's Report that he was saying that the lead emissions data were wrong. If I understood it correctly, he was pointing to SO2, saying there had been no action that would explain the drop in SO2, and, therefore, the SO2 data were suspect.

He then, to some degree, extrapolated on that, that says it calls into question other measurements made on the stack, particularly temperature, pressure, and flow rate. But never did I see a presentation that said these emissions data don't make -- for lead, don't make sense. They make perfect sense.

But I don't -- now, you're saying -- I guess, you're representing you don't think that. But that wasn't my takeaway.

Q. Okay. Well, let me -- just so that we're all on the same page, let me express it. Doe Run Perú comes in to La Oroya. They increase production and use dirtier concentrate, which you can see, you know, in these graphs alone, 1998, 1999, lead emissions, sulfur dioxide emissions are going up. That would make sense if you're increasing production from previous -- over previous years, and using dirtier concentrate.

Now, in those years, from 1997, '98, '99, and then you get to 2000. Let's talk about SO2. Is there any Project that was done before this 2000 drop, and we're -- you know, so, now, we're focusing on the right. Any Project that was done at the Complex by Doe Run Perú that could have reduced SO2 like that?

A. Let me back up to the beginning of your question. You represented that the patterns that are seen here are

result of ramping up production and using dirty concentrate. And I've already talked about that. That's not true. We do see an increase in emissions according to these charts. There's other persons that have -- question the validity of some of those numbers. I'm not questioning it. I'm taking it at face value, but the changes on there are not a result of using dirty concentrates. No way.

Your, then, eventual question was, did anything happen in that interim period of '99 to 2000 that would explain the drop in the emissions for SO2, and my answer to that is, I'm not aware of that, no. I've read the SVS Report. I've seen their calculations in that regard.

There was a Statement by SVS that's explained that drop to our original reading that -- as they changed their way of measuring it. And originally, I thought that's what explained it. But now I don't think that's what explains it, after looking at SVS and Mr. Dobbelaere's analysis. So I don't know.

I do think, clearly, the trend line there is very clear that, over a period of time the SO2 emissions were driven down dramatically, but I don't know. I don't have an explanation for '99 to 2000.

Q. Okay. Going back to the first part of your answer, where you say that you don't agree that the emissions -- the increased emissions are the result of

increased production and using dirtier concentrate, is that opinion coming from you? What hat are you wearing when you're giving that opinion?

A. Well, I guess the same -- I'm same person, I've given my qualifications. I would say this, that we talked about the dirty concentrate issue with regard to lead. If you look at it with regard to sulfur, and you look at the information that was presented by Mr. Dobbelaere in the metallurgical balances, the sulfur content of the copper concentrate used by Doe Run is lower than the copper -- than the sulfur content that was used by Centromín over the period of their operations.

Therefore, it's not possible that -- for sulfur it could be a dirty concentrate problem either. Sulfur is lower. I don't quite know what the -- what explains those numbers early on. It's not dirty concentrate. And I don't know the answer for the '99 to 2000. I have more -- a better understanding of it after looking through SVS and some of the mass balance curves.

Q. I guess, yes, we might differ, and you, as an environmental engineer, might differ with Mr. Dobbelaere as a metallurgist on what might cause the emissions to go up from 1997 to 1999.

That being the case, emissions went up from 1997 to 1999; correct?

A. The data indicate they went up a little bit at the beginning, yes.

Q. Okay. And with respect to sulfur, which is on the -- not sulfur -- sulfur dioxide, which is the graph on the right. I think you said, in response to my previous question, that you haven't seen any evidence that there was any project that Doe Run Perú did in order to decrease sulfur dioxide in 1999 -- any time before 2000; is that correct?

A. They did not install any acid plant or acid capture systems.

Q. Thank you.

A. They did some optimization on the Sinter Plant, and on the two years which reduced the amount of air being blown through those systems, but I don't think that would change the SO2.

Q. Mr. Connor? Yeah, I don't think so.

A. That's fine.

Q. That the Sinter Plant you're referring to is in the lead circuit?

A. Yes.

Q. And did that -- were those emissions directed to the main stack?

A. Eventually they were, when they did the Acid Plant Project.

Q. In 19 -- right. But in -- at this point in 1999, 2000? No. No.

A. No, they were not.

Q. So there is nothing. I think we discussed this earlier. Other metallurgical complexes might use some technology other than a Sulfuric Acid Plant, but Doe Run Perú, the only option that was on the table, the only thing that they were planning on doing was a Sulfuric Acid Plant to address sulfuric dioxide; is that correct?

A. Right. And I think your point is that they didn't do the Project until they did the Project, and the Project was the Sulfuric Acid Plant.

Q. Right. And, therefore, the fact that Doe Run Perú claimed at the time, and seems to be claiming even through this arbitration, that they somehow magically achieved -- that would be magic, wouldn't it, Mr. Connor? -- if they actually achieved a drop like that in sulfur dioxide from -- in the year 2000? That would be magical; correct?

A. No.

Q. No.

A. Yeah. What you're seeing here is the required measurements that are to be turned. Under the Regulation, they have to turn in these measurements. Right? They have monthly or daily records of the SO2 out of the stack. They

report the flow, the temperature, the concentration. That's what is reported, and they're duly reporting that.

They have other ways of doing mass balances on the Plant. I don't think they're trying to be misleading, or try to claim that they had a big reduction or whatever. These are the numbers. That's how they're reported, and they're required to report those numbers.

Q. And according --

A. So then -- and whether -- what explains it? I don't know.

Q. Okay. So if the numbers that are coming out of Doe Run Perú's main stack -- if they're correct -- and I understand from you, Mr. Connor, that that is your gold standard, a measured -- you know, a measured value; is that right?

A. A measured value is the gold standard, subject to your assessment of the reliability of the data.

Q. Right. And if you're looking at those Measured numbers, and you look at that drop, and you know that Doe Run Perú has done nothing to abate sulfur dioxide in 2000, if that's the data, something magical happened between 1999 and 2000, because they've done nothing to abate sulfur dioxide.

It is a very, very simple question.

A. Well, it's not as simple, I believe, as you

think. There's two explanations for the drop, and I'm not saying that I -- I said before, I don't know what physically would have caused that drop. But I think what is important is that, when you're looking at the reliability of data, either side could be unreliable. The peak that's on there could be wrong. The lower value could be wrong. We don't know.

When Mr. Dobbelaere presents his -- he extracts the mass balance numbers from the SVS 2003 Report, he gets concordance with the later measurements that you have. They align. What doesn't align is that big hump in '99 -- '98 and '99. It also doesn't align with the way that they control numbers that are on that chart.

They're much lower. So neither the mass balance or the way that they control validates that hump. I'm looking at the hump. These are what they reported, but there's two other ways to measure it, and both of them suggested that that hump is either not there or much lower.

Q. So, Mr. Connor, I believe you've represented in your Reports that this is the best data that we have. And I think maybe what I'm hearing from you now is that maybe it's not. It's all unreliable. We don't know.

A. No. I'm not saying that.

Q. Okay. But back to my other question, from this chart, from this graph, if Doe Run Perú had done nothing to

abate sulfur dioxide, nothing, and, if you believe these numbers on the graph -- this is my hypothetical to you. If you believe these numbers, then the only thing that could have caused that drop is magic.

Yes or no.

A. No. The important thing is, there, that, in terms of assessing the reliability of numbers, there's definitely a question on these data. There's definitely a question.

Q. My hypothetical says believe the numbers. If you're looking at this graph, Mr. Connor, and you're accepting these numbers, and you see that drop and Doe Run Perú has done nothing to abate sulfur dioxide, the only explanation for that is magic.

Yes or no.

If you don't want to answer the question, that's fine.

A. I'm fine to answer the question, it's just so silly.

Q. But I -- well--

A. I mean, but you get to ask your questions.

So would there be magic? If all the numbers were correct, I don't believe in magic, and that -- there would have to be some reason. But I think that, given that, I think there's some irregularities in those data.

Q. Okay.

A. Later on, we have no irregularities in the data. The trend shows that it went down. Of course it went down. They installed two acid plants. No question. But what's going on there, I don't know. It could be an irregularity in the data. I don't think it's magic.

Q. With respect to sulfur dioxide, I do believe that we're all in agreement, now, today, that there is no way that DRP could claim any reduction in sulfur dioxide emissions if it had done nothing to abate them at the time; correct?

A. Well, I don't know, I think it's right. I think that -- I'm not aware of any major projects that were installed to trim SO2 emissions. If there were things that were done, I'm not aware of them or I'm not remembering and interpreting these right now. But that's what those data show. I think it's questionable too, but we can talk about that more, if you wish. The point of my evaluation was, did they bring it down over time, and they did.

Q. So that's SO2. And we've talked about the fact that the main stack monitors a number of data, different data. It monitors the different particulate matter or emissions that are coming out. So, for instance -- and I just want to see if we can focus on four different measured data. The first would be sulfur dioxide, that's measured

at the main stack; correct?
A. Yes.
Q. The second would be lead; is that correct?
A. No.
Q. Lead emissions are not measured coming out of the main stack?
A. That's right. They're not measured. What's in the main stack, you have a particulate analyzer, which is a light diffraction, so it measures the TSP, the Total Suspended Particulates, but the lead is measured back at the laboratory.
Q. There is a device in the main stack that allows them to get lead emissions data which make up the chart on the left; is that correct?
A. Yes.
Q. Okay. So either directly or indirectly, SO2 is measured in the main stack, lead is measured from the main stack, also you mention temperature is measured; correct?
A. Yes.
Q. And flow rate; correct?
A. Flow velocity.
Q. Flow velocity?
A. Yes.
Q. And -- but just so that the Tribunal is aware, if someone uses the term "flow rate," it would mean the same

as flow velocity. It's the speed at which the gases are going or traveling through the main stack; correct?

A. No. The flow rate means two different things. It can be the volumetric movement or it could be the speed of the particle. The -- so the velocity is the speed of a particle, and so it means either of two things. It's a pretty nerdy answer. What they are recording is volumetric flow.

Q. Okay. Volumetric flow.

A. Right.

Q. Well, you will forgive me if I use the term "flow rate," but I do believe we mean the same thing.

A. I think so, yes.

Q. Okay. So we've talked about sulfur dioxide and the problem with this drop in sulfur dioxide that clearly could not have happened.

Now, I want to talk about lead, and this is something -- in your Report, you turn to a number of projects where you assert that Doe Run Perú had completed work or started work on a number of projects that could have led to a reaction in lead emissions and other emissions; is that correct?

A. Yes.

Q. Okay. Well, I think, hopefully, if the technology works, I'm just going to go through those

Projects. As you can see, this is the first -- the first of the Projects that you describe in your Report, Mr. Connor, this is repairs and upgrades to particulate control systems. And I just want to go through -- you can see at the bottom I put sulfur dioxide reduction, lead reduction, temperature reduction, flow rate reduction -- which, I think, you're saying flow velocity?

A. Whichever.

Q. Okay.

A. Flow rate's better. Thanks.

Q. Okay. And then the date. So I believe you point to this Project first as one of the Projects that could have lowered emissions, whether it was lead or SO2. So I wanted to ask you, this Project, repairs and upgrades to particulate control systems, which involves repairs to flues and ductwork, roofs, would this Project have reduced sulfur dioxide?

A. No.

Q. Would it have led to a reduction in lead emissions?

A. Yes.

Q. Okay. How much?

A. I don't know that that's quantified. They say on here that they don't always know which one -- what these Projects have achieved individually. We know it will

reduce. They provide some numbers on here, and they say that the particulate rate, as a result of this Project, was reduced by 28 percent. And the reason it's hard to quantify is that the giant vacuum cleaner of the particulate management system is grabbing a lot of fugitives that -- I think, Mr. Grigera, you pointed out that, if they improve the capture, more stuff would go to the Cottrell and the treatment system. That's exactly what they were doing.

So how much more goes there is not always easy to say. You know that more is going there.

Q. I just note that, in your description of this Project and the resulting benefit, you say "particulate emissions." You don't say lead, in particular. You're talking about all particulate emissions, which can include more than just lead; correct?

A. Yes.

Q. Okay. And I think --

A. So the particles are the same and they have a certain lead content. So you could -- you can convert particulates to lead or any other metal that you wish.

Q. But, regardless, I think you said that you don't have a specific calculated value for that; correct?

A. What I have -- what I presented in this tool kit are the numbers that were documented for the various

Projects. Sometimes they're documented, sometimes they're not. And I haven't checked those numbers myself. They reported that they had these specific benefits, and I summarized that information here.

Q. When you say "they," who is "they?" "They reported," "they did."

A. It was -- there were two sources of documents: One would be those put together by Doe Run, and the other would be the verification of those Projects were put in place by OSINERGMIN or MEM.

Q. Okay. So I'm going to put a question mark on lead.

A. I don't think that's fair. The question that lead definitely went down.

Q. Right. But we don't -- can you show me the calculation? Show me where in your Report we have a calculation on how much.

A. I don't have a calculation.

Q. Okay. Thank you.

A. It's not --

Q. Let's move on to temperature.

A. Okay.

Q. There are 27 Projects, Mr. Connor. So, now, temperature reduction, what did this do to the temperature in the main stack? What did this Project do?

A. What it does is it cuts down on what's called "tramp air" or, in Spanish, they use the term "aire falsa." And what that means is that, if you have a hole in your duct, a lot of excess air is coming into that duct that you don't want there. It's as if you took your vacuum cleaner hose and you poked a hole in it. Well, it doesn't suction very well because there's a hole in there, and what's called "tramp air" is coming in there. And that your vacuum now has to handle all this extra air and it has less suction.

So when they replaced these flues and they patched up the holes, now, you have a much better suction. It pulls in more dust and it doesn't pull in the tramp air. The question would be, how that would affect the temperature? I think the temperature -- I don't know if it would go up or down, because you no longer -- because the air that you were pulling in was a different temperature than what's coming out of the unit. So the temperature would change.

Q. The temperature would change, and, I guess, maybe this is where a metallurgist might be helpful; right?

A. No, I don't think so.

Q. A metallurgist wouldn't know -- an experienced metallurgist wouldn't know what would happen when you plug up a hole as opposed to keep the hole there?

A. I think, if that experienced metallurgist were to acknowledge that they plugged up these holes, rather than making a hole, that would be a first step. Then, if that experienced metallurgist was standing out there with a temperature outside the flue and knew what the ambient temperature was of the tramp air, that experienced metallurgist would be very helpful in that regard, yes.

Q. Well, would you agree, with your metallurgical knowledge, that, if you have gases, hot gases flowing from -- let's just focus on the copper circuit -- from the converters, from the copper converters. Let's say there's really hot gases coming off of the copper converters, and they're flowing through the ductwork, you know, flowing fast through the ductwork out to the main stack. If there is a hole in the ductwork, the temperature is going to go up or down?

A. It depends where the hole is. If the hole is in the area of heat, like it's in the -- if it's in the converter building, then it's the same air; right? So it's -- I'd have a hard time answering your question as to whether temperature will go up or down. Depends on where the hole is. If the hole was outside that area, then you are bringing in cooler air. I would expect the temperature to go up.

Q. Right.

A. But that's going to be very site-specific as to what the things were that they were fixing.

Q. So -- but one would assume that, if you are fixing holes with this Project, in the very least, the temperature would go up. It wouldn't go down.

A. It depends where the hole is.

Q. But, if you fix the hole, wherever it is, the temperature would not go down?

A. Okay --

Q. No, no, no. It's okay. It's okay. If you can't -- if we're not going to agree, I don't even -- we don't have time.

A. These flues draw from all over the place. When you change that hole, they now draw -- the mixture of gas coming into the flue is changed, and, depending on all those different places where it's pulling gas, you're going to have a different mixture. And it's not just one circuit. These arms go all over the Plant. And now I'm pulling the different mixture of gas in, and I can't tell you -- I can't predict whether that is going to be a higher or lower temperature without looking at the specifics.

Q. Okay. So a question mark there.

And flow rate, what would you expect to happen to the flow rate if you fix holes?

A. Tramp air is stopped and flow rate drops.

Q. "Flow rate drops."

And then, the last thing that I have here are the date -- like, the date. When was this Project finished, Mr. Connor?

A. The information I have obtained from the records indicated that this -- the repairs to the flues and ducts began immediately upon DRP's adoption of the Facility, and that these Projects were -- the flue repairs, according to what I have, were done by 2001. There were additional work done on that ventilation system over time, of course. And what we have, on the left-hand side, is repair to the roofs that also became part of that -- that stopped tramp air and caught fugitives. But it's not -- that picture is not within that timeframe.

Q. Right. I think you have a timeframe of 1999 to 2001. So it would have been complete in 2001.

A. You would have to look. That's what I say on this particular chart. I'd have to look back at that -- the list of all the different Projects and see how long it actually went. I don't know if this is consistent or not. But I can do that, if you wish.

Q. No, that's okay. We'll go with 2001. But -- and just to note, yes, we talked about the picture on the left. It says 2008. I understand that there may have been Projects in 2008, but, over on the right, you're talking

about 1999 to 2001, so --

A. Right. So you can see the flue on that. You can see the flue that runs over that area, and that's what you're looking at. The roof is being done in 2008. The Project's really -- if we look back at the charts I showed earlier, the particular control upgrades extend from 1999 to 2002, and then the baghouse element of that starts in '99 and extends all the way to 2007.

Q. Okay.

A. So it was a continuous process, but the first piece was just repairing the long-overdue maintenance on those Facilities and the existing baghouses.

Q. If there was something that was completed in 2001, that couldn't explain a drop in emissions in the Year 2000; correct?

A. Well, yes. It could. It's a process of a bunch of different projects. You would see the incremental effect of those Projects over time. It wasn't just one project.

Q. Okay. So you might see some?

A. You might. I mean, they do see reductions in particulate emissions over that period of time.

Q. Let's go to the next Project, Mr. Connor. "Automatic control of sinter machine." Would this Project have any effect on sulfur dioxide?

A. I don't think so. What it did was --

Q. Again, there are 27 Projects, Mr. Connor, and so if you could limit yourself to these questions, to my questions, please.

A. Okay. It had benefits remissions, but I don't believe it changed the sulfur dioxide emissions.

Q. Okay. We'll get to that. So it says, "sinter machine emissions reduced." How much, Mr. Connor? How much lead?

Do you have a calculation for that?

A. No. I know the Project was done and the Project obviously had benefits. Those benefits were not quantified because what it did is it reduced fugitive emissions from the Facility, and fugitive emissions aren't measured, but they certainly went down, and I can explain why they went down.

Q. Okay. And temperature. Do you know how this Project would have affected the temperature?

A. The temperature where?

Q. In the main stack. All these things that are being monitored in the main stack. I'm trying to figure out what could have happened in 2000 to just have both lead and SO2 go down in the main stack.

You have pointed to 27 Projects and said that they -- all of these Projects had a number of benefits. So

I'm going through systemically and trying to see exactly what benefits they could have.

I see they could not -- this particular Project could not have had an effect on SO2, and we don't know what -- there has been no calculation done, with respect to how much lead this Project could have reduced in the emissions; is that right?

A. This Project doesn't go to the main stack.

Q. Oh, okay.

A. Look at the flowchart. It doesn't affect the main stack until they do the enclosure and complete the Projects by 2008. That's when it goes to the main stack. It doesn't go there before that.

Q. Okay. So --

A. No. What you would see is reduction of fugitive emissions because you have now controlled the sinter operation, and you have controlled the hotspots, and you don't have as many shutdowns.

It's the start-up and shutdown that triggers those high-fugitive emissions, and you now have controlled process. You're not blowing as much air through there, which creates dust. That was how it reduced fugitive emissions. They didn't measure it. They can't measure it, but they know it helped.

Q. Okay. So it didn't go to the main stack. So

this information wouldn't have -- it wouldn't have registered with the main stack. So that doesn't help us explain the 2000 drop --

A. It would once the --

Q. -- in 2008.

A. Yes.

Q. Okay. But that doesn't help us -- unless --

(Overlapping speakers.)

A. -- and the sinter machine.

Q. Do you have a time machine, Mr. Connor?

Are you saying that something that happened in 2008 could affect something that happened in 2000?

A. No.

Q. Okay. So Project Number 3, the next one, "new off-gas cooling system for Antimony plant." Let me start with this one. Is this on the main stack, Mr. Connor?

A. I'd have to look -- I may have to look at the process flow diagram for the Facility. I don't recall.

Q. Yeah, I don't think it is, but we can go through it anyway.

A. Do you want to bring up the flowchart? Is that what you're saying?

Q. You can do that on your redirect, if you want. I don't think there is any sulfur dioxide reduction for this -- correct? -- associated with this Project?

A. No. It's not a sulfur dioxide project.
Q. Okay. And do you have a lead calculation for this Project?
A. No, I don't think this would be -- this is not a particulate reduction. It is taking out different nitrous gases. It's a different type of pollution control.
Q. Do you know what it would do to temperature in the stack?
A. It wouldn't affect it if doesn't go there, and it wouldn't affect the flow rate either.
Q. Okay.
A. But the benefits of these Projects are manifest, even if we don't have them quantified.
Q. Right. But, again, you know, I'm just trying to figure out what happened in 2000, you know, the whole "starting it worse than you found it."
Okay. "Tuyere control in blast-furnace." How about this, Mr. Connor? Does this involve anything with respect -- is it on the main stack?
A. Yes.
Q. Okay. Would this reduce sulfur dioxide?
A. It would change the sulfur dioxide emissions, but there is nothing about it that would reduce sulfur dioxide emissions.
Q. Do you have a lead calculation for this Project?

A. It reduces the lead by reducing the gas throughput into the blast furnace, just as if you were a kid with a straw, blowing bubbles in your milk. Because it is now controlled, you don't get as many bubbles, and you don't have dust flying off. That's what this does.

So we knew that it reduced those emissions. I don't know that they quantified it. They were -- some of those emissions were, as Mr. Grigera said, captured by the ventilation system and some weren't. They didn't quantify that.

But we know clearly that reduced emissions, and the cumulative effect of these different Projects is manifest in the improved air in the surrounding communities.

Q. But we don't have any information on that?

We don't have any calculations in either of your Reports; correct?

A. No. You don't need those calculations to know that the air got better. They measure the air -- the air got better.

Q. Okay.

A. What I'm showing is that cumulatively the many pollution-control Projects drove down the air. I can't parse it among the different Projects.

Q. I thought that --

A. -- just didn't do that.

(Overlapping speakers.)

Q. I thought that you really required objective and measured data. But you just want us to take your word for it, as a metallurgist?

A. Oh, man. I've got to chill. Here's the deal. When I talked about the measured data, I said, if you want to know what's going on in the environment, measure the environment, air and water. Did they improve the environment? Yes.

You're asking me, as I understand it, what was the contribution of every Project? We don't know. We don't always know that. We know that the air got better. We know that each of these Projects incrementally was an action that reduces the emissions. This really and obviously reduces those emissions. The Operators didn't always quantify that, but we know that cumulatively emissions went down, fugitive and stack.

Q. What would it to do --

A. I can't parse that out for you.

Q. What about the temperature?

(Overlapping speakers.)

Q. What would a project like this do to the temperature in the main stack?

A. It is not -- I don't know how it affected the

temperature in the main stack because there are two factors of that --

Q. I think that that's all I need, Mr. Connor. Again, we've got a lot of these. How about --

A. You plan to go through every one of these Projects?

Q. I do, as long as we have time. So I really just want your answer to each one of these.

A. Okay.

Q. How did it affect the flow rate in the main stack?

A. I'm trying to think.

MR. SCHIFFER: Mr. President, can I intervene on this? He's already testified that he didn't do exact calculations on all these Projects to determine the question she's asking.

I really don't see the point in chewing up time going through something that he's already answered in total. The answer is not going to change because of his answer, but I just think that there has to be some rule of reason applied here.

PRESIDENT SIMMA: Well, I think, of course, the Respondent has the right to formulate questions the way it wants and to spend the rest of the time available to it the way it wants. So we all hope for a revelation, but I think

just continue.

You said until time runs out. Do you have an impression when that might be the case?

MS. GEHRING FLORES: I think I was just planning on trying to get this done in about a half hour, if I can.

But if Counsel and Mr. Connor are willing to concede that the answers to all of these is -- certainly for every single Project, there would be no sulfur dioxide reduction. We don't have a calculation on what the lead reduction would be. We don't know what it would do to the temperature, and we don't know what it would do to the flow rate, and we can see the dates involved, I guess, the alleged dates. I'm fine. I can skip to the end.

THE WITNESS: No, let's go through them. I see that you have picked the Projects that don't affect SO2, and you are going to ask me about them. That's fine. Let's go through them.

BY MS. GEHRING FLORES:

Q. But there were no Projects that affected SO2. That happened -- I'm talking before 2000. I'm focused on -- I'm trying to figure out what happened in 2000.

What did they do to either abate SO2 or lead, frankly, and to account for the fact that, in the main stack, temperature also dropped and flow rate dropped. So I'm trying to figure out through your 27 -- I didn't pick.

These are the 27 -- all of them, in your Report. I didn't pick.

A. Well, let's keep going. I respect your right, but I just want to ask one question, if I could take a bio break just for a minute. I'll answer any question you have as expediently as I can. That's your prerogative. I appreciate that.

Q. Thank you.

THE WITNESS: Is that okay?

PRESIDENT SIMMA: Certainly. You have five minutes.

(Brief recess.)

PRESIDENT SIMMA: Okay. Now, the floor is open for the remaining 22 Projects.

MS. GEHRING FLORES: Thank you, Judge Simma.

THE WITNESS: Let's do this.

BY MS. GEHRING FLORES:

Q. Well, one of the skills that one has to develop in this job is reading the room, and, as much as I would love to go through every single project with you, I think we're going to have to put that aside for the moment and just wrap it up.

A. Well, I'm happy to do it and hopefully I didn't offer any resistance. I just was being --

Q. No. No.

A. So I apologize.

Q. No. We just don't have enough time, unfortunately.

PRESIDENT SIMMA: Before you wrap it up, would you allow me a question? I mean, we were going through every element or every item in this entire Project, but the one that I missed was the particulates, and so it just -- it might be a very stupid question. Could it be that something around the particulates changed? For instance, I could imagine if you suddenly got that stuff from another source where the -- let's say, the contents might be different. Could that have an impact on the, let's say, on the famous drop between 2000 and 2003? Just the particulates coming from another source. Is there any information about that?

THE WITNESS: It could. If the sulfur content of the concentrate goes down, then the sulfur emissions will go down. But I don't know if that was the case or not. I know that the sulfur content of the concentrate on average for Doe Run was lower than it was for Centromín, but I haven't looked at it year by year. That's a very interesting point. I actually don't know the answer, but it would affect it, yes.

PRESIDENT SIMMA: Thank you.

BY MS. GEHRING FLORES:

Q. So, Mr. Connor, I think we have established that Doe Run Perú did not do any sulfur dioxide reduction projects until, maybe, starting in 2000 -- or finish those Projects until 2009 or so. Maybe 2008.

A. No. No. Let's see. They started construction on some of those Projects -- the sulfur dioxide Projects were finished for the zinc Plant in 2006, finished for lead circuit in 2008, and not finished for the copper circuit.

Q. Okay. And then, is it the case that we don't have any specific lead emissions reduction calculations for any of the Projects that you put in your Second Report?

Is that correct?

A. I'm not sure of that. I'd have to go back and look. But the -- I have gleaned the information that they provided for the purpose of these -- this information tool kit.

Q. Okay.

A. And some have data and some don't, and some are estimating and some are weighing the amount of dust that got collected by the baghouse. The baghouse is like a big coffee filter, and so you know how well it works by weighing how much it caught. And you know that -- if the baghouse didn't exist, which many of them didn't, you can calculate the benefit. You can't always do that with the other Projects, but I haven't gone through to -- I've

looked at the cumulative effect and the benefits for the air quality, but, as I've said before, I have not tried to parse those out on an individual basis.

Q. Okay. So we don't have a lead reductions calculation for each project that you put in your interactive tool; is that correct?

A. Right. That's correct.

Q. Okay. And we don't have a calculation or an estimate of what these Projects would have done to the temperature either, or the flow rate either; correct? Not in your Report.

A. No. I mean, you have some general understanding of that, but that -- no, it's not in there.

Q. Okay.

A. I haven't done that analysis. All I've done is the analysis of emissions. The lead emissions comport very closely with ambient air, and that supports their reliability. We can't do that for SO2.

Q. Could you go to the -- there you go. Kelby knows what I'm thinking.

Okay. So talking about the drop and the information that we have on the record in this case, you could imagine a scenario where there is no drop, certainly for SO2. No drop, no drop at all, all the way out until maybe 2006 when they did a bit of work on the zinc Sulfuric

Acid Plant.

Do you remember, Mr. Connor, just how much of a percent of sulfur dioxide the zinc Sulfuric Acid Plant achieved when it was finished?

A. No.

Q. I think it was around 3 percent.

A. Wait. Could you repeat what you said?

Q. I think it was around 3 percent. But I can --

A. What was?

Q. That that was the amount of sulfur dioxide that it abated, the zinc Sulfuric Acid Plant?

A. Yeah, I didn't look at that. I don't know off-hand.

Q. Okay. So you could imagine a world where that -- the graph on the right doesn't have much of a dip at all, if any, until maybe a little bit in 2006, or maybe a little bit more in 2008.

A. Are you saying that, from the acid that went through, from the zinc unit, it only caught 3 percent of that acid, or are you talking about --

(Overlapping speakers.)

Q. I'm talking about sulfur dioxide --

(Overlapping speakers.)

A. The sulfur dioxide throughput on the zinc unit? There's only 3 percent, or you mean of the entire facility?

Q. Yes.
A. Okay. Well, it was designed to affect that unit. And that's the unit it treated.
Q. Okay.
A. Right.
Q. So we're -- because I'm worried about all of the emissions coming out of the main stack, and, just so everybody is clear, this isn't even discussing fugitives. This graph is on main-stack data; correct?
A. Which graph?
Q. Both of them.
A. Yes.
Q. This is just main-stack data?
A. That's main stack. And I've talked about the total emissions issue before.
Q. Right. And on the record, we -- with respect to lead -- and I understand your position, Mr. Connor. I understand that you feel like the cumulative effect of a number of these Projects must have contributed to a drop in lead emissions. Now, of course, the Projects that happened after 2000 wouldn't contribute to the lead drop in 2000; correct?
A. Let me just back up on your statement there.
It's not my opinion that these Projects reduced lead emissions, they did. It's just a fact. It's not my

opinion what the air quality is. The air quality is the air quality. Those, I don't -- those are just facts. And -- but, continue. Then, you said something else. That was -- you prefaced your question that way, saying I had this opinion, but these are just facts, and -- but then, you went on to say something else.

Q. Facts from air quality monitoring that you, yourself, doubt. You, yourself, doubt the air quality monitoring data, do you not?

A. No.

Q. Okay. You don't. Also --

A. There are three years prior to Doe Run's operations that are clearly unreliable, but I don't question the rest of the data. And that -- that you would say something had happened in '94, '96, '97, would anyone in '98 care? Well, maybe, but it -- during Doe Run's operations, I don't -- and in '97, I don't question those data, nor do I question the data from 1974 up to 19 -- sometime in the '80s that were collected. Those data all make sense.

Q. But, presumably, you do question the data from the SO2 air quality monitors; right? Because they were capped?

A. That data is not reliable, that's right.

Q. Right. And Doe Run Perú --

A. There's no argument about that.
Q. Right. And Doe Run Perú had control over SO2 monitoring and lead monitoring for air quality; correct?
A. Yes. They're two different instruments.
Q. Yeah. But they're both the same amount of reliability?
A. No.
Q. Okay.
A. They're two different devices completely. If we have a problem with one, it has no impact on the other for the air quality. If that's what we're talking about.
Q. Again, I'm clear on your position, Mr. Connor -- that you have a position that a number of projects, presumably, if they happened before 2000 -- right? -- a number of projects would have led to that drop. That said --
A. Which drop?
Q. Have we talked about any drop other than the 2000 drop? Right now, for the past hour or so?
A. Well, there are two drops.
Q. Well, then, let's talk about the 2000 drop. Okay. That's all we're talking about.
A. The 2000 drop of what?
Q. Lead.
A. Oh, lead. Okay. That was my question.

Q. Okay.
A. SO2 is something else.
Q. Yeah. So I understand your position, Mr. Connor, that, if there were lead abatement projects that Doe Run Perú finished before 2000, that those would contribute to the drop in 2000; correct?
A. Correct.
Q. Okay.
A. And I can tell you what those are.
Q. And if we -- sorry?
A. I can tell you what those are, if you're interested.
Q. I think you can do it on redirect, if you wish.
If we go through those Projects that actually were finished before 2000, you could imagine a world in which the lead line similarly doesn't have a drop? I understand that's not your position, but, from the evidence we currently have on the record, from the calculations, from the actual data that we have on the record regarding emissions, regarding what Projects were done, you can imagine these two lines looking a lot flatter and having no drop, if any, or having a very gradual drop.
And so, Mr. Connor, this is the way we see these two lines. We don't see any drop because there's no data in the record to support the drop, and, thus, you would

have the citizens of La Oroya, for nine years? -- close to 10 years? -- facing just this constant emission of lead and sulfur dioxide. That's 3,285 days. That is what is important to the people living in La Oroya, not what maybe eventually happened in 2009. That is what we're talking about. That's why we want to know what happened -- what supposedly happened. We want to know what Doe Run did and why it would report this.

A. Okay.

Q. So, Mr. Connor, you can see my perspective?

A. Yeah.

Q. I hope.

A. No, you're living in a world of magical realism, you know. Bring in Beckett. So, you know --

Q. Mr. Connor, I asked you for real numbers and real calculations and you were not able to give me any. You've had a long time to give it to us, and you have not. This is how we see the situation, and you can see why your standard of "leaving something better than the way you found it" really does not apply here.

A. Yeah. I didn't mean say -- I didn't mean to agree there.

MR. SCHIFFER: Mr. Chairman, can this count against their Closing Argument time?

PRESIDENT SIMMA: You're not closing yet; right?

MS. GEHRING FLORES: That's it. No further questions.

PRESIDENT SIMMA: Okay. Thank you very much.

Yeah. So I give the floor to --

MR. SCHIFFER: I do have redirect, but I'd like to check with my technical people just to make sure that there's nothing that they want me to ask that I don't know about right now. Can I have five minutes?

PRESIDENT SIMMA: Yes.

MR. SCHIFFER: Thank you.

PRESIDENT SIMMA: But let's keep it short. Okay. Break again.

(Brief recess.)

MR. SCHIFFER: Mr. President, I'm ready to proceed when you are.

PRESIDENT SIMMA: Okay. Mr. Schiffer, you have the floor for redirect.

MR. SCHIFFER: Thank you.

B.B., will you put up one of the slides that Ms. Gehring Flores was showing.

REDIRECT EXAMINATION

BY MR. SCHIFFER:

Q. So I want to take a step back and make sure that we're crystal clear on what measures, what where.

What is measured coming out of the Facility, in

terms of lead and sulfur?

A. Coming out of the Facility, they measure at stacks, and they measure -- there's a device that measures the particulate content, and then the lead in that particulates, and then SO2 content of the gas going up the stack.

Q. And are -- is all the data from the main stack emissions reported to the Government?

A. Yes.

Q. Does the Government audit the Facility in keeping with the readings?

A. Yes.

Q. In fact, did that happen in 2003 by SVS?

A. Yes.

Q. So they looked at this very issue?

A. Yes.

Q. Okay. And we'll come back to the Report in just a second.

(Interruption.)

Q. So you have where emissions are measured, but I believe you already testified that fugitive emissions are not measured in the building?

A. But you can't measure them.

Q. Right. But is lead and sulfur total emissions measured anywhere else?

A. Only in the stack. They can't measure totally --

(Overlapping speakers.)

Q. I'm sorry. In the atmosphere. Once it hits the --

(Overlapping speakers.)

A. Oh, yes. Yes.

Q. Okay. What measures all of it?

A. What measures all of it are the air monitoring stations. When it gets away from the stack and creates the pollution, that's of the total objective of the pollution controls to control that pollution. So the monitor measure the combined effects of all emissions.

Q. Now -- and let's talk about Sindicato, for example. We've all heard about that.

It's an air monitoring station?

A. Yes.

Q. And you said there were two sets of monitors, one for sulfur and a separate one for lead?

A. Yes.

Q. Was the lead monitoring system ever called into question?

A. No.

Q. So during DRP's ownership, in fact, are there Reports that it was actually quite good?

A. During DRP's ownership, yes.

Q. Yeah. And then the sulfur, you've -- who brought up the fact that the sulfur monitor wasn't recording correctly? Did Respondents bring that up or did you bring that up?

A. I brought it up in my Report.

Q. Right. Why -- I mean, why would you bring that up if it -- you know, if it's this terrible piece of evidence that affects everything?

A. Well, I was looking at the data that were available on air quality and emissions, and that is a gap. They don't have those data. And so that affected, you know, responding to some of the questions raised by Ms. Proctor and Mr. Dobbelaere. Those -- I wanted to explain what the story was with those data, because they had interpreted those, I believe, to be a sudden increase in 2006 of ambient sulfur dioxide, but it wasn't. It was an error in the measurements.

Q. Okay. Now, I want to look at the air measurement for lead as you charted it.

Can we look at the next slide.

The -- explain -- once again, please explain the two lines, the gray and the blue.

A. The blue line is the measurement of air quality at Sindicato, that the combined effects of all emissions, what was in the air there. That's the blue line.

Q. And the gray line is what?
A. That's what's coming out of the stack. And, as I mentioned earlier, those lines trace pretty well, which gives us better -- which is why I don't have a question about the stack emissions.
Q. Okay. So -- and just, I think you just said it, but explain what that means, when the blue line and the gray line runs in a similar trend?
A. That means that when emissions go down, pollution goes down.
Q. Okay.
A. And -- hand in hand.
Q. So one more time. The gray line measures lead emissions from the stack?
A. Yes.
Q. But doesn't measure total emissions?
A. Correct.
Q. The blue line does measure total lead emissions?
A. Yes. It measures the effect of total emissions.
Q. Right.
A. So if it goes down, that means total emissions, fugitive and stack, are going down.
Q. Did -- was this data reported to OSINERGMIN?
A. Yes.
Q. On what basis, do you know?

A. Because we went through the monthly Reports that are submitted there in the record.

Q. Okay. So every month, the data is being submitted to OSINERGMIN?

A. Yes.

Q. And they were auditing the Plant?

A. Yes.

Q. And after 2006, they were there every day?

A. That's right.

Q. Okay. I want to shift gears, and talk about mass balance.

Mass balance is a calculation to determine what is lost from what goes in?

A. Yes.

Q. So, in other words, you have feedstock going in, and you have end product coming out, and mass balance tries to figure out what is lost in the process?

A. That's right. It's the waste. I brought in this much concentrate, I made this much metal, how much did I lose?

Q. Can you ever have the output be more than the input? Is that physically possible?

A. No.

Q. Would that defy the law of nature?

A. Yes.

Q. Okay. Let's look at some things that the Tribunal has not yet seen, but is going to see now.

So let's look at the next slide.

This is the comparison that Ms. Gehring Flores did with poor Mr. Buckley, who had no personal knowledge of this. And she did the calculation, and she showed that the mass balance on the right was greater than the air measurement, the blue line that we already looked like on the left, and, oh my gosh, you've got 41,000 pounds of stuff in the air you didn't account for.

Remember that?

A. That's right.

Q. All right. Well, let's look at another page from that same Report, the one that they didn't have on their slides.

Can we blow up the two columns on the right, please. We can't do it. Okay. Oh, Lord, we can't zoom in at all? Okay. Well, I guess I can see it --

A. I can read them here. I don't know if everybody else can.

Q. Okay. All right. So are there years when the mass balance is actually less than the ambient air measurement?

A. Yes. Every year on this Page.

Q. Could that mean that product is miraculously

coming from nothing?
A. No.
Q. What does that mean?
A. You can't have a negative emission. What it means is that the -- what's called "calculado" on here, which is the mass balance, sometimes it's high and sometimes it's low, and if you compare that, for example, 1996 here, you see the SO2 emissions based on the monitors, the mission monitor, it says it's 969 tons that went out that year, and the mass balance says it's 896. So if you follow the logic that Ms. Gehring Flores presented, you would have had a magic appearance of 69 tons of nowhere.
Q. Well, I mean, that means that -- that fugitive emissions would have sucked -- somehow sucked it in --
A. Yeah, it would have sucked it in.
Q. -- and not gone out?
(Overlapping speakers.)
A. Because there's a negative loss.
Q. Right.
A. Right? A negative loss means that it brought it in somehow.
Q. Okay. Right.
A. A negative emission.
Q. Can that occur in real-world?
A. No.

Q. So I know -- and we'll hear from the Respondents' Expert on this. You understand he uses mass balance to calculate, you know, his Opinions in this case?

A. Yeah. He relied on SX-EW's mass balance calculations.

Q. Right. And is it fair to say, it's a very complicated series of calculations?

A. It's 247 spreadsheets, yeah.

Q. Okay. But it's calculations?

A. It's calculations, yes.

Q. All right. If you can rely on -- let's go back to the blue line. Given a choice between relying on actual factual data, and doing 247 pages of calculations, what would you choose?

A. Well, you always choose the actual environmental measurement.

Q. Yeah. Of course.

A. Yeah.

Q. Okay. Let's move on to some more of the mass balance idea.

So you understand that Mr. Dobbelaere used what he has -- as WD-30 in his Opinions; right?

A. Yeah. I went through every page of this thing.

Q. Yeah. And I know the Tribunal can't see this, but, in all the yellow highlights, do we have -- where the

mass balance is actually a negative number -- in other words, it shows that more is coming out the end than ever went in in the beginning.

A. Yeah. That's what those negatives mean. So that's what always happens with this.

Q. So why do people even do mass balance if it's so -- if it's like this?

A. Well, I've never seen anybody do something like this for fugitives, but, in terms of the metallurgical balance, they are getting a sense, from year to year, what their efficiency of extracting and what a lot of the material come in is. And that has a value. But, when you break it down to individual metals like this, you're always going to get some absurd answers, and that -- you accept that. That's accepted, but, knowing that you're going to have these ups and downs, you would never then take that number and try to say that it means something real. You don't know what it is. And you would never take that number and say that's a fugitive emission.

Q. As an expert with professional integrity, would you ever base your Opinion on fugitive emissions based on just mass balance calculations?

A. I would never base it on mass balance for lead. There are -- there is validity for sulfur dioxide, but not for lead.

Q. Okay. I want to talk about the Sulfuric Acid Plants.

Is it your understanding that DRP just sat on its thumbs for six or seven years before it decided to work on the Sulfuric Acid Plants?

A. No.

Q. Can we look at the next slide.

And before we get into this, I'm going to represent this is an excerpt from Mr. Neil's testimony, and he's talking about the modernization and the construction of Sulfuric Acid Plant. Which comes first, the chicken or the egg, when it comes to modernization and a Sulfuric Acid Plant?

A. You have to modernize in order to build the Acid Plant, but they're so intertwined that the chicken and the egg were kind of hanging out together.

Q. I mean, for example, does the type of acid plant affect the modernization?

A. No.

Q. Okay. But the modernization has to be built around that type of acid plant?

A. Yeah. The modernization has to happen in order to produce the gas at a sufficient concentration to be managed by the Acid Plant.

Q. All right. You said it better than I did.

And does -- is your understanding that Mr. Neil is essentially saying that in this question and answer?

A. Yes.

MS. GEHRING FLORES: Could Counsel -- I think we've been pretty tolerant. You've got a lot of leading questions there.

MR. SCHIFFER: We can critique each other's performance later.

MS. GEHRING FLORES: Mr. Schiffer, I was conducting a cross-examination, you are doing redirect of your own Witness. I'm asking that you refrain from leading your own Witness.

MR. SCHIFFER: May I continue, Mr. President, please? I'm not going to engage with opposing Counsel directly. That was the mistake I made earlier. I won't repeat it. I'll just talk to the Chairman.

If I could continue please. I mean, I'm just asking if he understands that that's what Mr. Neil testified to, and we can all read it.

THE WITNESS: Yeah, I heard his testimony. I understood it. We can continue.

BY MR. SCHIFFER:

Q. All right. Let's go to Slide 44 of your presentation. Can you walk us through this.

A. Yes. This slide extracts information from the

Report of Dr. Partelpoeg, and the point that he's making, that I tried to underscore as well, is that the allegation that these engineering companies messed around for several years, coming up with different permutations of design, and then ultimately went back to the original design, is factually incorrect. As he points out in his Report, the type of technology that was considered originally was the reverberatory furnace called a "CMT brand," also called "el teniente" (in Spanish) out of Chile. But, ultimately, it was determined that that scheme was not going to work for the purpose of sulfuric acid -- I mean, SO2 capture, and they switched to a very different reactor called an "ISASMELT." They're very different. And he explains that in his Report. The fact is that it was not the same.

Q. And was DRP doing this themselves, or were international Experts working on this?

A. They had some really huge engineering companies on this.

Q. Yeah. Do you know how much DRP spent on figuring out that the original technology wouldn't work?

A. They spent $14 million by the end of 2005, and there were some, you know -- there was some movement in that road, where their thinking already evolved over time, but this is what they settled on.

Q. And if we can look at the next slide, this also comes out of your direct. Are these all the things that were happening with respect to the Sulfuric Acid Plants, beginning in 1997 through 2009?

A. Yeah. These are major milestones. There were more things going on in the engineering reports, but these are major milestones where they had learned enough to redesign and say, "well, now it's going to cost 107,000, now it's going to cost -- 107 million. Now, it's going to cost 152 million." So they're thinking and their knowledge is expanding, and they're getting a better sense of what they need to do and how much it will cost.

Q. So I'll represent the Respondents' position is that DRP did nothing until it was too late. Do the facts support that position?

A. I don't believe so, and, hopefully, I explained that today in my testimony.

Q. Yeah. Let's look -- I promised I'd go back to the SVS Report and the governmental Report that came out of that.

A. Yes.

Q. So I want to turn to R-314, and I want to look at the last page.

So after SVS did this enormous study and they looked at the sulfuric acid readings and they did what they

did, do you remember seeing this in the last paragraph of the Government Report to DRP?

A. Yes.

Q. I'm going to read it out loud because it's important. And it's referring to DRP, "must bear in mind that, if it does not take the necessary measures to mitigate and control the situation of environmental risk that has been evidenced in the special examination, it would be incurring in damage to the environment and in greater risk of affecting the population, a fact to be verified in a next environmental audit. And if the situation persists, it would be sanctioned in accordance with the Environmental Code."

Have you seen anywhere in the record where DRP was sanctioned in accordance with the Environmental Code in connection with the study by SVS?

A. I didn't find anything of that nature in my view.

Q. Have you gone through -- to what percentage do you think you've gone through all the documents in this case?

PRESIDENT SIMMA: I didn't understand what you said when you were laughing and speaking at the same time.

MR. SCHIFFER: Yeah. I know. I'm sorry. I mean, I'm asking him how thoroughly he has reviewed the record in reaching his opinions and writing his Report in

this case.

THE WITNESS: Between my colleagues and self, we've looked through thousands of documents, and we have paid special attention to the factual documents where they were logging what was happening at different times. So you never know what you don't know, but we made a great effort and looked at a lot of documents.

BY MR. SCHIFFER:

Q. Okay. Just have two more topics to cover, and then you're finally free, I think -- well, except for the Tribunal's questions.

You mentioned earlier about the -- characterizing the Missouri Plaintiffs' Claims and what they were arguing in their case.

Have you looked at the Plaintiffs' Environmental Experts' Opinions in Missouri?

A. Yes.

Q. And let's put up a slide. This was in my Opening. I'm sorry. Wrong -- okay.

I quoted this in the Opening, and I'll read it: "I want to make sure that I understand. Your Opinion at its core, much like Dr. Cheremisinoff" -- I can't say names -- "is that Doe Run Perú should have addressed fugitive emissions at the Plant more quickly than it did; right?"

And his answer is: "Yes, much more quickly."

Is that consistent with your understanding of their position?

A. Jack wrote a report to that -- in that regard, and a number of the other -- Cheremisinoff had said it as well, that they could have achieved these benefits more quickly.

Q. Do you have an educated opinion of why the Government of Perú put the Sulfuric Acid Plants last on the list of priorities?

A. Yes.

Q. Would you tell us what your educated Opinion is?

A. Well, I went through a lot of those records. I read them, and there was a history of complaints from the community about the water supply. When the CMLO went into operation, it devastated those rivers, and a lot of communities relied on those rivers downstream.

I think that Ms. Gehring Flores asked one of the other folks, perhaps Dr. Schoof, were people drinking that water? Well, today, they're not. In fact, the Plant gets it water far upstream from the river and they have to bring it in by pipeline. But, back in the day, they did, and it devastated the farming community to not have access to that water any more. And this was, apparently, a difficult political situation that drove the Parties to prioritize

that. And there were some statements also that I read from the Mayor, or one of the people in the Government, saying -- insisting that this be addressed immediately. It's a very visible problem because the damage to that water were brilliant in terms of the colors and in terms of wiping out all the wildlife. So that -- it was -- it had been a long-standing sore point for a lot of people.

Q. Well, let me put this way: If you're faced with lead emissions and sulfur emissions, and you have to prioritize which you're going to try to tackle first, which would you choose and why?

A. Oh, lead emissions.

Q. Why?

A. Because the health criteria are more critical and sensitive for lead that -- and in this case, they had, by 1999, developed information that said that they had a very serious problem with the children in the region, and that is a big driver. That's the whole purpose of what we do.

SO2 doesn't have that type of acute effect on children, and lead is a real driver for environmental action throughout the world.

Q. Okay. Lastly -- and I know that you offered to do this calculation several times on your cross-examination. I'm going to turn you loose, but let me just set the table. You were asked about whether dust -- I

mean, dirt on the mountain or particles from emissions, which would affect the babies -- I believe, the babies, or the children of La Oroya, and what the mothers would care about. And to summarize what I believe you said, you said it was predominantly the hill, but there was some contribution from the emissions.

Did I --

A. Correct. That's right.

Q. Okay. And by the way, did Dr. Proctor say that -- you know, you showed that heading. Did she say it was exclusively the emissions, or did she say "predominantly"? I mean, her view.

A. Yeah, I don't think she ever goes out to say that it's exclusively one part or the other. I think her conclusion is that she thought it was predominantly emissions.

Q. Right.

A. But not exclusively.

Q. Right. And is -- well --

A. That's my interpretation. She'd have to say for herself.

Q. Right. So -- but you said that you can do calculations to show -- to support your point?

A. Yes.

Q. Can you explain to the Tribunal your

calculations?

A. Yes.

Q. Do you need pen and paper?

A. I'll try to do it without a pen and paper. I'll describe it conceptually. The difference between the lead content in the soils on the hill and the lead content in the dust on the streets is 15 to 25 percent. The dust on the streets has a little bit more lead in it. The lead that Ms. Gehring Flores talks about coming down from the sky is those particles which are too small to see. They contain 30 percent lead, 30 percent lead. That's 300,000 parts/million in those tiny particles.

In the soil, we have about 3,000, and maybe 3,500. There's a very small difference between the hill and the stuff on the streets. The stuff that's coming as fresh deposits makes up that difference; right? It makes it a little bit higher. So when you look at what is accounting for that difference, and you say, accounting for the difference is the fresh deposit, how much fresh deposit is in there; right?

I had the soil and the street were the same, so the emissions fell on it, and one of them got a little bit higher. How much emissions is in that increased street dust? You can do that calculation; right? I've done that calculation. If you know the concentration coming down

with the emissions, you know the concentration of the hill and on the street. Knowing those three things, you can calculate how much of that dust from the sky is in that street. And it turns out that, if you want to know how much is the emissions from the stack versus the dust on the hill, the calculation comes out to be that it's over 99 percent dust on the hill -- from the hill -- the soil on the hill.

PRESIDENT SIMMA: Just a quick question. How did you obtain tools, let's say, samples of the dust? Did you go there? Did your team go there, or did you get it handed over and say this comes from --

THE WITNESS: I relied on -- there were several sources of that data. The Government of Perú went out and collected data a number of times, different consulting firms did that, Integral did some data, and I pulled all those together into a database.

They're in the record, and they tell us what the average concentration is in the dirt on the hill, and the average concentration of the dust on the street. And those are the numbers I put into is that calculation.

BY MR. SCHIFFER:

Q. I think my last question. So we talked about the snow or the whatever -- the acid rain, you know, coming down on your house and garden. Now, talking about sulfur

separately from lead, what -- the people who are breathing that dust, that cloud, predominantly, what are they breathing?

A. They are probably breathing air.

Q. I know, but of the gases that are out there?

A. You mean the SO2, the particulates?

Q. Yeah. Yeah.

A. Well, the SO2 is the gas that affects your breathing.

Q. Right.

A. The dust is a very tiny amount. Inhaling the dust isn't what is considered the health risk.

Q. Right --

(Overlapping speakers.)

A. It is super tiny stuff.

Q. So if I'm trying to create this image of, like a whiteout, a snowstorm coming down on me, are we talking about sulfur? Are we talking about you're getting lead in your body?

A. You'd be talking about sulfur dioxide. There is not that many particulates in there.

Q. Okay. Right. So is it the stuff on the ground, the dust and dirt on the ground that then, when ingested, goes to lead poisoning?

A. Yes.

Q. And so --
A. Workers get it different ways, but in terms of in the town, the children are picking it up off the ground.
Q. Okay. So can it be consistent that you've got, you know, this vision of a snowstorm coming down on you, basically a blizzard coming down on you, and your opinion that 99 percent of the dirt and dust in the town is from the hill?
A. Yes. It is. Yeah.
Q. Okay.
MR. SCHIFFER: That's all I have. Thank you.
PRESIDENT SIMMA: Thank you very much. Let me take the opportunity to correct something in my own intervention.
I used the term "particulate," but what I meant was "concentrate." I'm sorry. So my question was, the only effect that would concentrate come from somewhere. Could there have been another source, et cetera, et cetera. So not particulates, it's concentrates. Maybe this could be taken care of later. Thank you.
THE WITNESS: That was a perceptive comment, that if the concentrate had less sulfur, that would affect it, but I don't know if that was the case.
PRESIDENT SIMMA: So we get two questions from the -- not from the audience. From Chris? Mr. Thomas?

QUESTIONS FROM THE TRIBUNAL

ARBITRATOR THOMAS: Good afternoon, Mr. Connor.

THE WITNESS: Good afternoon.

ARBITRATOR THOMAS: I'm actually interested in just following up from questions that were posed to you by both sides, actually.

There were references to the Missouri Litigation and your role as an expert in that litigation. And I don't -- obviously, I'm not asking you to disclose any privileged information, but I am interested in what exactly you have done as an Expert in that litigation.

Can you tell us about that?

THE WITNESS: Yes. The role I've played in that litigation is as an expert that is responding to certain claims regarding the nature of the contamination over time, the source of contamination, the types of Projects that were done, and the effects of those projects on the pollution in the area.

And I have presented very much the same type of information that I presented here in this proceeding: To show what the PAMA was, what Projects were done in the PAMA and outside the PAMA, what the effect of those were on various environmental media, and also what was seen in regard to the child blood lead over time.

I presented that information, and I responded to

certain positions taken by Experts on the side of the plaintiffs.

ARBITRATOR THOMAS: Have you done one or two Reports? How many Reports have you done?

THE WITNESS: I know I have done at least one Report. There may have been a second Rebuttal Report or response to something. I don't quite remember. It's been quite a long time.

ARBITRATOR THOMAS: Okay. I'm not an American lawyer, so I don't understand exactly how the process proceeds in the United States. Is this testimony that is being provided in writing, or have you been subject to a deposition, or have you testified in court?

THE WITNESS: Well, I don't know all the rules exactly either. This is -- I think it is in Missouri State Court, so the rules for the Expert are a little bit different.

You write a report. You present that to the Court and to the counterparts. There is an exchange among the technical folks, but your actual testimony is in the courtroom. Your Report, to my understanding, is not really testimony. It is providing the other side the opportunity to know the basis for your Opinions.

And you do a deposition as well before the trial so the other side has an opportunity, not to just read your

Report but to ask you questions about it, understand your position and, if they choose, to challenge it.

ARBITRATOR THOMAS: Okay. Just a note to you, Mr. Schiffer. At some point I would like to understand what the procedural posture of the Missouri Litigation is. Has it actually gone to trial, or we're still in pretrial, wrangling with the appeals to the Court of Appeal?

But you don't have to answer that question now, but it is something that may be posed to you as a question from the Tribunal later on.

MR. SCHIFFER: I can tell you what I know now, and if you want more information I can get it.

ARBITRATOR THOMAS: It may be better for you to deal with that separately.

MR. SCHIFFER: Okay.

ARBITRATOR THOMAS: Let me check my notes because I want to make sure that -- I think you've already indicated that there's a fairly substantial overlap between the subjects which you have addressed in Missouri, and the subjects which you addressed in your two Expert Reports in this procedure?

THE WITNESS: The subjects do overlap. They kind of -- the questions being answered are very different.

ARBITRATOR THOMAS: That is understandable, due to the difference in causes of action and the type of

claims being formulated here.

Okay. I think I'll leave it at that. Thank you very much, Mr. Connor.

THE WITNESS: Thank you.

PRESIDENT SIMMA: So Professor Grigera Naón does not have questions. That means it brings to an end your Expert witness examination. Thank you very much.

Some kind of legal, let's say, long -- it was a remarkable exercise for both sides involved. Really. And we learned a lot. Thank you very much.

THE WITNESS: Thank you very much.

PRESIDENT SIMMA: You are released from --

THE WITNESS: Thanks to your questions to the folks in Perú.

MS. GEHRING FLORES: Thank you, Mr. Connor.

(Witness steps down.)

PRESIDENT SIMMA: So that leaves us about one hour, and I think we have no choice but to have Mrs. Proctor and have her at least do the direct.

MR. PEARSALL: Dr. Proctor is ready.

(Brief recess.)

DEBORAH M. PROCTOR, RESPONDENTS' WITNESS, CALLED

PRESIDENT SIMMA: I recognize the presence of Madam Proctor. Is your mike -- can you just turn on your mike?

THE WITNESS: I can. I think that works. Correct.

PRESIDENT SIMMA: It is on the right lower part is something which says mike on/off.

THE WITNESS: Okay.

(Overlapping speakers.)

PRESIDENT SIMMA: Oh, now it's on.

THE INTERPRETER: It is working.

PRESIDENT SIMMA: So welcome, Ms. Proctor.

THE WITNESS: Thank you.

PRESIDENT SIMMA: Would you be so kind and read out the Expert Declaration that you should have in front of you?

THE WITNESS: I solemnly declare, on my honor and conscience, that I shall speak the truth, the whole truth, and nothing but the truth, and that my statement will be accurate in accordance with my sincere belief.

PRESIDENT SIMMA: Thank you very much.

And I give the floor to Ms. Gehring Flores for the direct -- directing you in this examination.

Ms. Flores, you have the floor.

MS. GEHRING FLORES: Thank you, Judge Simma.

Members of the Tribunal, President, I introduce Ms. Deborah Proctor, Respondents' toxicology Expert in this proceeding.

Ms. Proctor offered two Expert Opinions dated March 31, 2022, and September 1, 2023. Ms. Proctor is a managing principal health scientist at ToxStrategies with 35 years of experience in toxicology, specializing in exposure and risk assessment of metals and air pollutants.

Throughout her career, Ms. Proctor has routinely conducted site-specific evaluations of metals emissions from industrial emissions, and the modeling of blood lead and other inorganics.

Ms. Proctor?

THE WITNESS: Thank you.

DIRECT EXAMINATION

BY MS. GEHRING FLORES:

Q. Good afternoon. Just some questions for you.

First, I believe you have some notes to assist you during your Direct Presentation with you; correct?

A. Yes. But I don't really need them, thank you.

Q. Okay. I think -- in accordance with the Procedural Order, I think you can have them -- you can have them during your presentation.

A. Okay.

Q. But after you'll have to -- you'll have to relinquish them.

A. Okay.

Q. Okay. And then before you do give your

presentation, I just wanted to ask you if you have any corrections or amendments to make to the two Expert Reports that you presented in this case?

A. I do have a correction. In my First Report, I represented that Dr. Schoof was the author of the Gradient risk assessment that was done in 2004. It was my misunderstanding. I knew that she had been at Gradient, and I assumed that she had done that work. But I understand, from her testimony, that she did not.

Q. Okay. Thank you.

Do you have any other corrections or clarifications?

A. None that I can think of.

Q. Well, thank you. And you may begin your presentation.

A. Thank you.

DIRECT PRESENTATION

THE WITNESS: So, I have seven main Opinions, and -- but first I want to start out with an analogy. The Claimants have made an analogy of the CMLO as a bubble machine, and I was somewhat inspired to see if I could improve upon that.

So let's go. The PAMA required that Doe Run Perú meet air quality standards for lead and SO2. Air quality had been a significant problem in La Oroya due to the

operations of the smelter. The Government did not have the ability to fix it on its own, and so they brought in extra assistance. So air quality is my burning house in this analogy.

The Experts they brought in were firefighters, with a lot of knowledge and capability, who should be able to help put out the fire. And there was an Agreement made called the PAMA. The PAMA had a list of tasks to be done to put out the fire and improve air quality. So these PAMAs -- these Projects included 16 original Projects, the most significant one was Project 1. It had the greatest ability to improve air quality.

The other Projects were important, but they were less effort, and not really specifically addressed air quality. So I understand that the PAMA prioritized Number 1 because it is the one which have had the biggest impact on the air quality, but that Project wasn't really started, really, until 2006.

And I will note that, you know, in the PAMA itself, the copper circuit was to be worked on from 2003 and 2004, and the lead and zinc circuit from 2005 and 2006, as has already been reviewed with Mr. Connor.

In 1998, Fluor Daniels, who are engineers in the United States, created a master plan, which improved upon the plan to build the Sulfuric Acid Plants. Their plan was

to start in 2002 and finish in 2006, but that didn't happen either.

So air quality worsened in La Oroya. DRP did not meet the PAMA Project 1 objectives, and, in addition, used dirtier concentrates and increased production with old equipment which resulted in worse air pollution.

Now, I equate that to fighting a fire with gasoline, and my gasoline has three ingredients: Failure to modernize the equipment, increase production, and using dirty concentrates.

Now, this may not be the most perfect analogy, but I think it's better than the bubble machine analogy, because bubble machines don't make fugitive bubbles, and bubbles made by the CMLO were toxic: Lead, sulfur dioxide, and other heavy metals like arsenic.

I wanted to just take a couple moments to address the comments of Dr. Schoof and Mr. Connor. With regard to Dr. Schoof, first, I think her work is tremendous, her risk assessments were foundational for this area, and she should be really proud of them. I believe they are -- I completely agree with them. She noted that she didn't use the EPA model IEUBK, which is a blood lead model, which predicts how lead moves in the body once you take it in from various sources.

And when she did her work, the current version of

the model at that time was Version .99, but in Version 2.0, which was released in 2001, and used in my evaluation, you can input soil separately from indoor dust, and separately from outdoor dust. The earlier versions, you could not do that. So, when I used IEUBK to reproduce her work, I was able to include each of those sources of lead exposure, individually.

Secondly, I wanted to note that there was a question as to whether U.S. EPA was concerned about fugitive emissions from primary lead smelters, and in my Second Report I note that, in 1999, EPA issued what is called a NESHAP, which is a rule for lead smelters, and that rule specifically addresses emissions from fugitive sources as well as stack emissions.

With regard to Mr. Connor, I just want to make a couple things clear. Doe Run Perú did not complete the PAMA. Project 1 was unfinished when they left La Oroya. The risk assessments that I have seen do not conclude that 99 percent of outdoor dust is from soil, but I will qualify that those risk assessments were done while Doe Run Perú was emitting large amounts of dust from the stacks in their operation.

I don't agree that, as long as you get to a lower value in the end, you have met your objectives. I think that the conditions at the end of Doe Run Perú's

operations, which did extend beyond the original PAMA Period, which ended in June 2007, are not -- is not really the measure by which we should be judging whether they did better or whether they did worse.

I want to make it clear that toxicologists do risk assessments. I've been doing risk assessments for 35 years, Dr. Schoof is a toxicologist. She's been doing risk assessments longer than I have. He seemed to communicate that all toxicologists do is dose response. That's not correct. We do use environmental engineers from time to time, to help us with modeling, but I just want to make it clear that toxicologists are the Experts in risk assessment.

I also have -- or actually, I had a couple days ago added the '99 blood-lead data for children from La Oroya Antigua, which is a total 39 children from five schools. So Mr. Connor's Exhibit 5 of his First Report provides one point with the highest blood-lead levels from one school closest to the CMLO, and his Table 2-22 indicates that his history represents eight children.

I think this is an estimate because the Report itself doesn't actually say how many children, but this is about what you would get it you have 39 kids in five schools. So I just wanted to clarify these points before I moved forward with my main Opinions.

First, Doe Run Perú's emissions created a public health crisis, internationally recognized public health crises, and operations worsened -- their operations worsened air quality in La Oroya. First, I want to talk about SO2. So there are both short-term effects and long-term effects from SO2. First, I want to talk about the short-term effects, and I've made, like, a thermometer-type graph.

At the bottom, I have the Peruvian air quality Standard of 365 μ/m^3, and below that the AEGL-2, which is the value that Dr. Schoof used in her risk assessment to judge sulfuric dioxide air quality. And it's about 2,000 μ/m^3. And as the concentrations go up, you can see that there are additional health effects associated with exposure to sulfur dioxide. All the way up to a dose that could be life-threatening, 78,600, which is the AEGL-3.

Now AEGL stands for acute exposure guideline levels, and those are established by the U.S. EPA National Academy of Sciences.

Now, I need to talk about the SO2 monitoring data, and this is probably not the first time that you've seen this graph today, but the data from the Doe Run Perú monitors that was installed in '99 through 2006 have a sensor or a ceiling above which they couldn't measure. So there's a cutoff of where the upper bound of SO2 measures

could be measured. However, they are -- once they took off that ceiling in 2006, the airborne concentrations, as you can see, went up considerably.

But it still provides valid -- I mean, it still provides data that's useful, because as you can see, the AEGL-2, the acute guideline level, is well below the 6,000 µg/m3 limit. These are daily maximum SO2 levels reported at the Sindicato monitoring station. That's in la Oroya Antigua from 2000-2009. So from the Integral Risk Assessments, Dr. Schoof's risk assessments, she reported that in 2004 they exceeded the AEGL-2 up to six hours per day. In 2008, at the Sindicato monitor, they exceeded the SO2 AEGL-2 for up to 17 hours per day.

So as you can see, these are exposures that created a burden to the community.

So now, I'm going to talk about the air monitoring data from the Integral Risk Assessments. Here, on the left-hand side, and I'll start at the bottom with the data from 2004, which have the limit, the ceiling, and you can see that the range of monthly maximum values is quite close to the ceiling, 5500, 5400. From -- in 2007, the range is quite a bit higher, 10,000 to 19,000.

So these are exposures that are considerably above thresholds for health effects, and then in 2005, they collected one day's worth of data. Ironically, I guess,

nine years ago today -- 19 years ago today, at a monitor called Sindicato 2, and the levels at 15-minute averages range from 25,000 to 33,500. So either that was a really bad day in La Oroya, or maybe that was what happened on a pretty regular basis.

But the point I want to make is that respiratory irritation occurred constantly in La Oroya while Doe Run Perú operated the Facility. So there are also long-term health effects from SO2, and I couldn't follow the discussion at the very end of Mr. Connor's testimony, but I thought it was said that very small particles aren't harmful from SO2, but maybe I misunderstood.

So what happens to SO2 in the ambient air? It turns into sulfuric acid. It also does that when it reacts with water in your lungs, and it creates PM2.5, which are particles that are 2.5 microns in diameter, which are extremely small. And so they can get very deep in the lung, and they cause all manner of mostly cardiovascular-related effects.

The PM2.5 also would come from other CMLO emissions, but it's not really specific to the metal. It could be some lead or other metals mixed in with that.

And now you can see here the pollutant levels in 2007 for SO2 and PM2.5. This is the annual average in 2007, 706 μ/m^3, but the standard is 80. That's the

Peruvian Air Book Quality standard, which was also the U.S. standard, and the level of PM2.5 was 37 μ/m^3, which is far above the standard -- the World Health Organization standard of 5 μ/m^3.

So I think this is really important: Children and asthmatics are the most sensitive to these -- this exposure because it causes bronchial constriction. So when your lungs breathe in SO2, and it is very irritating because it forms sulfuric acid, your bronchiales constrict, and that constriction can cause shortness of breath, and it's just basically, like, if you touch something hot, you would immediately pull your hand back away from it without even really thinking about it.

That's basically what your lungs are doing. They're saying: "I don't want to breathe this air."

We know that there are people being treated for sulfur dioxide exposure in the 2007 MINSA Report-- that is, like, the Ministry of Health -- they were directing a sulfur dioxide serve program, and they saw 115 individuals. So obviously, even late in the ownership of Doe Run Perú, there were significant health concerns with SO2.

Long-term exposures can cause bronchitis, increased susceptibility to respiratory disease, nose and chest burning, and SO2 exposures can increase mortality risk. PM2.5, you can actually do a risk assessment and

calculate the increased mortality associated with exposures to PM2.5.

And I did the math in my First Report, and I found that 27 percent and 20 percent, respectively, in La Oroya Antigua and Nueva would be the increased risk of mortality associated with the exposures of PM2.5 in those cities. So that's like two to three in 10. That's a very significant impact.

I'm going to talk about blood lead as well. We all know that blood lead is a significant health burden. We don't need to belabor this fact. Children are more sensitive because their neurological systems are developing. The most sensitive effects occur at low mcg/dL exposures of lead in blood, and they include reduced IQ, hearing loss, growth retardation, down to low levels. So every year when the lead levels in air, and the lead levels in blood were elevated, affected the children of La Oroya.

I want to talk about this graph where I did include the '99 blood-lead data here in the particular graph. These are primarily the data that were presented in the Integral Risk Assessments. I do want to represent that this does not mean that in 1999, this represents blood lead from Centromín's operations. Blood lead clears relatively quickly in children.

The 2004 measurements, you know, they're lower

than average for the time, and then the last two bars are not measured data. They are the predictions from the Integral Risk Assessments, for what it should have looked like in 2009 and 2011. I think this has been represented as actual measured data, but it isn't. What I'd like to do is look at my Figure 16, which is a more complete picture of the blood-lead levels.

So here is the figure that you all have all seen before. I did add the 1999 blood-lead levels, and I did add that for the 39 children of La Oroya Antigua, because the rest of these samples are for La Oroya Antigua. And what you can see is that the 2004 sample was low relative to the others, but 2005, 2006, 2007 levels were high. So, you know, it could be that it's just a mixture of different kids in each sample. Maybe there were more older kids in some samples, more younger kids in others.

These are the data from children less than six years old with two exceptions. The 1999 data include children up to 10 years old, but they don't provide the data that would really allow you to do 0 to 6. And the data from 2000 was from children 0 to 3, but I wanted to point that out first.

Secondly, what I want to point out is that there is -- a significant change in blood-lead levels occur when the -- when significant changes in lead and air occur,

which is noted in 2007, because, in 2007, the lead furnace baghouse was finally operating.

And then, also in 2010, Doe Run Perú stopped operations. Well, they stopped in 2009. You can see that, once they stopped operation, the blood-lead levels dropped again. So it does not take a long time for children's blood-lead levels to respond to exposures from lead in air.

So I've taken the data for kids 0 to 6, with the exception of adding in the '99 data, and I've made a heat map, which shows -- if you look on the bottom, the cooler colors, blue and green, are levels below 20 mcg/dL. The blue ones are below 10. And then, as the yellow are higher levels, the peach are even higher, and the red ones are samples with over 70 mcg/dL. So as we can see that there's a significant change that really occurs starting around -- right after 2007. And before that, primarily blood-lead levels were above 20 mcg/dL, and very few were below 10 mcg/dL. There is very few -- there's not a lot of green bars prior to November 2007. But from 2009 to 2012, we see a significant difference. The blood-lead levels are primarily less than 20 mcg/dL, none were above 45 mcg/dL, and many were below 10 mcg/dL. So I do see that, when you make major changes or when you stop operating the Facility, blood-lead levels change pretty quickly thereafter.

So my second main opinion is that, in all of the

risks assessments that have been done, ongoing emissions pose the greatest hazard, and all of these risks assessments were done while Doe Run Perú operated the CMLO.

So just real quickly, how did Dr. Schoof do her analysis compared to how I did my analysis. This is a mocked-up version from the table she showed you yesterday, which have the different parameters that go into the model, and then, what went into her model, the ISE model, is the distribution type, the mean value, the standard deviation.

Now, I wanted to reproduce her work, but I wanted to use the IUEBK model, so I used just the point value or the mean. I wasn't trying to include the -- develop the distribution, I'm only looking at the average.

So how did this work out? So for each of the conditions that Dr. Schoof modeled, conditions in 2004, 2007, and what she predicted to be the conditions for 2009, my blue bars are really close to her green bars, and this comparing mean to mean. So I was able to reproduce her mean values using a different model, and part of the reason is because the model that is available in 2021 has greater capabilities than that which was available when she did her risk assessments.

The other thing that you can see here is that outdoor dust in 2004 was the most significant source of blood-lead in children. It also is in 2007, and that which

is predicted for 2009 or post-2009.

The indoor dust is about second, and soil is about third. So now that I know I can reproduce her results, I can pull these things apart. And exposures from air and diet and indoor dust and outdoor dust on the left side of the graphs are really related to contemporaneous emissions in her risk assessment. So Dr. Schoof assumed that most lead exposures related to ongoing dust emissions, and here are some of the quotes from her risk assessment, that metals in air, outdoor dust, indoor dust, and food, are assumed to be principally due to current smelter emissions.

The dominant exposure pathway is ingestion of outdoor dust. These estimates of reduction in median concentrations are based on professional experience and working at other smelter sites. I'm not arguing with her. I think she's right.

I'd also like to point out that another risk assessment was done by Intrinsik in 2009, and Intrinsik was doing -- was looking only at soil, but even though they were looking only at soil, they highlighted that the most important source of lead exposure is not through the intake of outdoor soil but, rather, through the intake of outdoor dust. Which is a main function of the continuous deposition of particles from current emissions from

smelting and fugitive gases.

So everyone is agreeing, in the time, that, while the CMLO was operating, the dust that rains down in the community is the driver for blood-lead levels. The CDC also came down to La Oroya, in 2004 and 2005, and they also noted that the on-going air emissions of lead were the primary exposure source -- by the U.S. CDC, Center for Disease Control and Prevention, and Integral agreed. I don't need to review these because, I think, Dr. Schoof already reviewed this text when she did her testimony.

So my third main point is that soil contributed negligibly to child blood-lead levels while Doe Run Perú operated the CMLO.

So contamination by on-going emissions were, by far, the largest contributors to childhood blood-lead while they were operating the CMLO. Integral assumed that the lead dose from air, outdoor dust and indoor dust, was primarily due to the contemporaneous emissions.

So when I take my model and I compare for the three time periods, 2004, 2007, and that predicted for 2009, how do exposures from air, indoor dust, and outdoor dust, compare to only soil? And you can see that the soil-only exposures are below 10 mcg/dL. This is reproducing Dr. Schoof's analysis. And from the other sources related to the emissions of the Facility, air,

indoor, and outdoor dust, they are consistently above.

I will note, just so everyone is aware, that there is no blood-lead data for children, that I'm aware of, for the time period when Centromín was operating the Facility. So we don't have a point-in-time comparison for conditions, blood-lead levels in children, unfortunately, that date back.

So my fourth point is that soil data support that Doe Run Perú's emissions were more significant than that of Centromín. And why is that?

So we've been talking about dust and we've been talking about soil, and the dust data from the Integral Risk Assessments are in gray, and, in orange, are the soil data from the Integral Risk Assessment. And this isn't necessarily all of the data. But these are the data that were considered the exposure point concentrations, meaning these are the concentrations that were put into the Risk Assessment.

And the concentrations of lead and outdoor dust, in gray, quite obviously much higher in 2004 than the levels in soil. Things did improve in 2007. Emissions went down, outdoor dust levels went down. Soil levels didn't change very much. Again, the emissions drive the outdoor dust.

So now, Mr. Connor wants to say that 99 percent

of the dust is soil. Now, if that was true, then all of these bars would be the same height because the soil would be -- and the dust would be 99 percent the same. And things wouldn't change from 2004 to 2007 because, if it's all blowing off the hills, one would assume that continues to happen year after year. But, no, that is not what is observed in the risk assessments.

So there's also data with depth of soil. So when you collect a soil sample, you punch a tube into the ground and pull it out, and you get a cut of soil. And what is done is people look at different cuts of soil, and the 0 to 2 centimeters, that's -- you know, that's a pretty small cut -- of soil, had higher levels, 15 percent higher, not dramatically higher, but 15 percent higher, in the 0 to 2 percent than in the 2 to 10 -- I said percent, but I meant centimeters. In the 0 to 2 centimeters, was 15 percent higher than the 2 to 10 centimeters. And I do think this is informative data because soil is considered a zinc; lead does not go away with time. So the dust that rains down builds up over time. And Mr. Connor showed his picture of soil contamination with a shovel in it. It looked like several feet of soil contamination. That's probably because it had been piling up over time.

There is also dust on the near-surface soil. Now, Intrinsik, who was charged with doing a soil-only risk

assessment, measured the amount of lead in that very fine dust on top of the soil, the top two millimeters, and found that it contained 16,000 mg/kg. And he included it. Mr. Hamilton included a picture with it.

So, secondly, in the 2006 Expert Panel Report, Dr. Clark, who was the toxicologist, noted that the lead levels in the dust in the streets were as high as 16,000 mg/kg of lead. So this dust is very concentrated and it gets all over the place; right? You know, this is hazardous waste in the United States, I'll point out, you know, 16,000 mg/kg.

Number 5, Doe Run Perú did not achieve the air quality objectives of the PAMA. I'll start with lead. So here are the lead monitoring data by month. So the monitors collected samples every month. So when you see a data point that is annual lead levels, there's 12 data points that go into that one point on the graph. But I think it's informative to look at how variable it was across time.

Now, what I've shown in purple is when Doe Run Perú began its operation in October 2007. And you can see that the airborne concentrations went up pretty much immediately. In fact, in 1997, while Centromín was operating the Facility, the average level of lead in air was 3.5 $\mu g/m^3$, January to September. However, once Doe Run

Perú started operating, the average concentration was 6.1 µg/m³. So I think that the impact of the operational changes that they made pretty much immediately drove up lead in air.

The goal of the PAMA -- one of the goals of the PAMA -- PAMA Project 1 was to meet air quality standards. As you can see, here is the monthly air quality standard for Perú, and, really, they never met it, over time.

I do think that the increase between '97 and '99 is important. I also went through every single one of those air monitoring reports. Every monthly report, from 1994 through 1997, for the Sindicato monitor, that's the one that's in La Oroya Antigua, and there are no remarkable changes. They change the pump that pulls air through the system at one point, but, other than that, there was really no change in how they collected the samples. There were not comments about analytical problems, about sampling problems. There certainly were for some of the other monitors, but I think these are valid data, and I just wanted to point it out that these data do support the conditions were not great, but they were probably better, at least air quality, while Centromín was operating as compared to Doe Run.

Of course they did not meet the SO2 standards as we have already talked about in detail, and as I

mentioned -- I think Dr. Schoof agrees because she said in her risk assessment that sulfur dioxide and sulfuric acid releases cause effects that place a burden on the majority of the population of all of the communities. So there were significant SO2 and sulfuric acid problems, as well as PM2.5.

So I will agree because I went through the earlier monitoring data prior to 1999 for SO2, and there are a lot of data that don't seem to be reliable.

But once Doe Run Perú put in the new monitors in 1999, those which had a ceiling, the 6,000 µg/m3 ceiling, we started to get valid data, at least up to that level, but I wanted to point out that that is still a really high level, 6,000 µg/m3. And then when they fixed the monitors, SO2 levels went up.

I don't know if that is because they really went up or because the monitoring equipment could finally measure it, but you can see how the levels go up with time and then really don't come down again until 2009.

What happened in 2009? Built the Lead Sulfuric Acid Plant. These were the most important Projects for improving air quality.

Number six, I believe that the Claimants are relying upon main stack data, at least in their Experts' Reports, to argue that conditions improved. However, in my

Opinion, this argument fails because it does not consider the very serious impact of fugitive emissions and how it has an even greater impact on the community. As I said, the CMLO was not a bubble machine. Where a bubble machine sprays out bubbles from one port. It was spraying out bubbles in all directions. I don't believe that this infamous lie now that you have probably seen 10 times from Mr. Connor, where he shows the total mass of emissions from 1922 still in the air 70 years later. How does that compare to the total emissions from Doe Run Perú? Is this -- does this make sense? Because we all know that the particles land on ground. And when lead lands on the ground, it becomes a bigger hazard. So I find this to be just inappropriate to suggest that total mass emissions is equivalent to any exposure metric that a toxicologist would use in a risk assessment. The CDC, Intrinsik, Gradient, and Integral, Dr. Schoof all identified the dust from the contemporaneous emissions as the primary source of ongoing exposure. So now let's compare below here the pie chart from Dr. Schoof's 2005 Risk Assessment. And we can see the indoor and outdoor dust there in gray are 82.5 percent of the lead dust -- of the lead exposure; the soil, 4.9 percent.

In fact, Dr. Schoof says in her 2005 Risk Assessment that lead and soil contributes 5 percent to the

total lead dust, and in the 2008 Risk Assessment, lead in soil contributes 12 percent to total dust. So when I do my analysis, it shouldn't be shocking because that's what she said would happen.

Historic emissions deposited on the soil with the current emissions had the most highest influence on dust concentrations. And I'm not saying there was no dust from Centromín in La Oroya, but the analyses that have been done would support that the contemporaneous emissions are the most important.

So stack emissions don't tell the whole story. So here is a picture of stack emissions on the right. That's the main chimney, fugitive emissions on the left, and fugitive emissions are ones that just come out -- and I think at one point someone said you couldn't see them, but you can definitely see the fugitive emissions from La Oroya. They were relatively close to the city. They deposit close to the ground. You can see they are quite black, which basically means they are highly concentrated. And even though the total mass is lower in the fugitive emissions compared to the stack, they are more impactful. So this was a known fact, even back in 1996 when Knight and Piesold did their Report. They specifically call out that fugitive sources that are not processed through the Trail precipitators are an important piece of information. So

they knew in '96 that the fugitive emissions were important.

In 2005, the modelers -- Dr. Schoof has referenced McVehil and the Monnett Associates, also called out the impact from the fugitive emissions. It says in their First Report: "The major mitigation of impact is found after elimination or reduction of fugitive sources, and fugitive sources are responsible for the major portion of local impacts, especially in La Oroya Antigua and Nuevo."

So these are -- the fugitive emissions were well-recognized to be a problem here for many years. So I find that Doe Run Perú did not focus on improving air quality and protecting public health, and I thought that Ms. Gehring Flores might get to this Project, but I don't think she made it through her entire list of Projects. So this -- this one is one that I just really want to point out. This is the lead baghouse, the furnace baghouse, and this is from Mr. Connor's interactive tools, Slide 102, with some emphasis added by me.

So on the left we can see the condition of the furnace completely uncontrolled in 2006. That would be nine years after Doe Run Perú started operating in the Facility at increased production, but they did build an enclosure and a baghouse in the time frame of 2006 to 2007,

and you note from my earlier slide how much of a change that had on child blood lead. Why would that be?

Well, because the dust emissions, according to Mr. Connor, are half of a megaton of lead every day, half of a megaton. That is a lot of lead. So we have air data, we have soil data, and I have to admit, it is difficult to try and determine were conditions better, or were conditions worse under Centromín and Doe Run Perú?

So I looked for news reports because the Claimants brought out this Newsweek Report from 1994 where a reporter from America came to La Oroya and said, "This is hell."

However, what he didn't do is come in 1999 and say: "Wow, things are a lot better now." So what does that mean? Does that mean things are better or worse?

We don't know from that Report. However, I have looked through, you know, news reports trying to find this type of information that exists from the community, and we are talking about exposure levels that people could sense; right? They don't need a monitor to know that their respiratory tract is burning. So found one from 2007 in Elmundo, yes, translated into English where it says: "A visit to the mining hell, La Oroya, where children are born with lead in their blood. The bad wind, as they call it, brought a cloud with yellowish fringes that unrolled like a

carpet from the top of mountain to the bed of the Mantaro River." Sulfur is yellow.

"The sulfur dioxide they could see. The masks we wore protected us from the ash, but not the breath with a taste of gunpowder that stuck to our pallet, our clothes and our hair. After only two days did we feel the taste of food again."

Do you know what gunpowder is? It is lead and sulfur. So these individuals still in this time frame were experiencing significant exposure that they could sense themselves -- and this is the most important part of the article. It says: "Since the foundry was taken over by the American company, Doe Run Perú in 1997, emissions of gases and heavy metals have increased to gigantic portions," says a neurologist at the local hospital, which has been treating patients for 25 years.

So here is an individual who knows what it was like when Centromín was operating and knows what it is like when Doe Run Perú was operating. I also show here a picture of fugitive emissions and stack emissions from more than a decade's wait for justice in La Oroya Perú. And you can see the fugitive emissions are very dark and black. They land close to the ground, and that is why they are the most impactful for the community; whereas, the stack emissions blow up, disperse in the atmosphere.

So in my summary, I would like to I say that I feel like Doe Run Perú started late and never finished the most important PAMA Project, which was Number 1. And, as a result, public health suffered to the point where La Oroya communities were recognized internationally as part of a health crisis. The contemporaneous emissions of the CMLO while it was operated by Doe Run Perú were well-recognized at the time to pose the greatest lead hazardous and the entire SO2 hazard.

So for nearly 10 years while Doe Run Perú operated the Facility, the health crisis in La Oroya worsened, and the available air data, soil data, and historical reports support this position.

And that's my testimony.

PRESIDENT SIMMA: Thank you, Ms. Proctor.

Do any of the Parties want to make a -- say something in preparation for tomorrow maybe? Otherwise, it is just 6:03.

MR. FOGLER: I just want to say that I took a lead from Mr. Pearsall, and I gave her a little grace to go past the 45 minutes.

MR. PEARSALL: Just one second. Just on her testimony, we appreciate the one-minute grace that we received. Thank you.

And we are going to get you hard copies of those

presentations. Apologies. We had a printer issue.

PRESIDENT SIMMA: Ms. Proctor, you'll have to spend the rest of the evening and until tomorrow without talking about the case with any person from the -- well, either team probably, more your team. And thanks for today, and we look forward to tomorrow.

THE WITNESS: Thank you.

PRESIDENT SIMMA: Thank you.

So we will see each other at --

SECRETARY DOE: The time.

PRESIDENT SIMMA: Oh. Yeah, time. Yes.

SECRETARY DOE: Sure. Up until this point we have 11 hours 36 minutes for the Claimant, and 17 hours and 42 minutes for the Respondent.

PRESIDENT SIMMA: Thank you very much. And see you tomorrow at 9:30.

MR. FOGLER: If it would be helpful -- and I haven't consulted with my team about this. I'm just going to volunteer, we would be happy to start at 9:00. I know Mr. Thomas and Mr. Grigera are always here early, and it if we need to get extra time in, I'm happy to start earlier.

PRESIDENT SIMMA: It's going to be 9:00 in the morning sharp. Thank you. Thank you very much. That is helpful.

(Whereupon, at 6:07 p.m., the Hearing was

adjourned until 9:00 a.m. the following day.)

POST-HEARING REVISIONS

CERTIFICATE OF REPORTER

I, Dawn K. Larson, RDR-CRR, Court Reporter, do hereby attest that the foregoing English-speaking proceedings, after agreed-upon revisions submitted by the Parties, were revised and re-submitted to the Parties per their instructions.

I further certify that I am neither counsel for, related to, nor employed by any of the Parties to this action in this proceeding, nor financially or otherwise interested in the outcome of this litigation.

Dawn K. Larson