

IN THE MATTER OF AN ARBITRATION BEFORE A TRIBUNAL
CONSTITUTED
IN ACCORDANCE WITH THE TREATY BETWEEN THE U.S.A. AND THE
REPUBLIC OF ECUADOR CONCERNING THE ENCOURAGEMENT AND
RECIPROCAL PROTECTION OF INVESTMENT, SIGNED AUGUST 27, 1993
(THE "TREATY")

and

THE UNCITRAL ARBITRATION RULES 1976

- - - - -x
 In the Matter of Arbitration :
 Between: :
 :
 CHEVRON CORPORATION (U.S.A.), :
 TEXACO PETROLEUM COMPANY (U.S.A.), :
 :
 Claimants, : PCA Case No.
 : 2009-23
 and :
 :
 THE REPUBLIC OF ECUADOR, :
 :
 Respondent. :
 - - - - -x Volume 9

TRACK 2 HEARING

Friday, May 1, 2015

The World Bank
700 18th Street, N.W.
J Building
Conference Room JB1-080
Washington, D.C. 20003

The Hearing in the above-entitled matter convened
at 8:59 a.m. before:

- MR. V.V. VEEDER, Q.C., President
- DR. HORACIO GRIGERA NAÓN, Arbitrator
- PROFESSOR VAUGHAN LOWE, Q.C., Arbitrator

Registry, Permanent Court of Arbitration:

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Additional Secretary:

MS. JESSICA WELLS

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1 PROCEEDINGS
2 PRESIDENT VEEDER: Good morning, ladies and
3 gentlemen. We will start Day 9 of this Hearing. I
4 understand there's no housekeeping matters to be raised by
5 either side. We'll come to those later.
6 So, we welcome our next witness. If you could
7 state your full name, and if you were willing to do so,
8 please read the words on the Declaration before you.
9 ROBERT E. HINCHEE, CLAIMANTS' WITNESS, CALLED
10 THE WITNESS: I'm Robert Eric Hincree, and I
11 solemnly declare upon my honor and conscience I shall speak
12 the truth, the whole truth, and nothing but the truth, and
13 that my statement will be in accordance with my sincere
14 belief.
15 PRESIDENT VEEDER: Thank you very much.
16 As you probably heard already, everything that
17 you're saying and what counsel is saying is being
18 transcribed, so you need to speak slowly, and please don't
19 overspeak counsel; they will not overspeak you. And
20 secondly, all this is being translated into Spanish by an
21 interpreter and then being put into a Spanish-language
22 Transcript, and that needs time for which we need a break,
23 a pause between the beginning of each question and the
24 beginning of each answer. It's hard to remember, but try
25 and bear that in mind, and please don't speak too fast.

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09:01 1 THE WITNESS: Yes, sir. I'll do my best.
2 PRESIDENT VEEDER: We'll start with questions from
3 the Claimants.
4 MS. WOOD: Thank you, Mr. President, Members of
5 the Tribunal. I just had a few preliminary questions for
6 Dr. Hincree, and then he's prepared to make a presentation.
7 DIRECT EXAMINATION
8 BY MS. WOOD:
9 Q. Good morning, Dr. Hincree?
10 A. Good morning.
11 Q. Were you involved in the Lago Agrio Litigation?
12 A. Yes, I began working on it in 2006. My
13 involvement included addressing issues such as Chevron's
14 Judicial Inspection, TexPet's RAP remediation, cost of
15 remediation in Ecuador and the Reports of Mr. Cabrera and
16 the Plaintiffs.
17 Q. Thank you.
18 Now, you have authored three Expert Reports in
19 this BIT proceeding; correct?
20 A. Yes.
21 Q. And just for the record, the dates of those are
22 May 31, 2013; May 9, 2014; January 11, 2015.
23 And you have those Reports in front of you at the
24 table today?
25 A. Yes, I do.

09:02 1 Q. Dr. Hincee, are these three Reports an accurate
2 and complete summary of your opinions in this arbitration?
3 A. Yes, they are.
4 Q. Do you have any corrections to make to your three
5 Expert Reports?
6 A. No, I don't.
7 Q. Okay. And just very briefly, what is the subject
8 matter of your direct testimony today?
9 A. I'll be talking about remediation, remediation
10 costs in the former Concession Area, and particularly how
11 it applies to the Judgment.
12 Q. Thank you.
13 With that, Mr. President, Dr. Hincee is prepared
14 to make a presentation.
15 PRESIDENT VEEDER: Please continue.
16 THE WITNESS: Thank you.
17 I'm Rob Hincee. I hold a Ph.D. in civil and
18 environmental engineering. Since my first professional
19 work assignment 40 years ago, which was studying the
20 impacts of inshore-onshore impacts of outer continental
21 shelf oil development in Louisiana. I have been involved
22 working exclusively in the environmental field, primarily
23 in the areas of petroleum hydrocarbons and the remediation
24 of petroleum hydrocarbons in soil and water.
25 In addition to having worked at thousands of sites

09:03 1 worldwide, actual remediation sites, I've worked in the
2 area of research. I've developed technologies that are now
3 being applied to hydrocarbon remediation. That research
4 work was funded by Government agencies, predominantly U.S.
5 agencies such as the EPA as well as by the Mexican
6 Petroleum Institute.
7 I've authored numerous peer-reviewed articles on
8 the subject. Additionally, I was the founding editor of
9 the Bioremediation Journal, a peer-reviewed journal which
10 publishes papers related to oil and hydrocarbon
11 remediation.
12 Additionally, I have co-authored or co-edited more
13 than 30 books related to hydrocarbon remediation, some of
14 which were peer-reviewed.
15 Two specific remediation experiences I want to
16 talk about, because they will be coming up later in my
17 presentation are first the Trecate blowout. This is the
18 largest terrestrial onshore oil spill in western European
19 history. Trecate is located just north of Milan, and an
20 oil well blew out there. You see a photograph of it here,
21 kind of a grainy black and white, shooting oil several
22 hundred meters into the air which then fell back to earth
23 over an area of about seven square kilometers in places up
24 to a meter deep. I was the Technical Director involved
25 from beginning to end on that project.

09:05 1 Additionally, I worked for Kuwait in the--worked
2 on the world's largest oil spill that resulted from the
3 Iraqi invasion of Kuwait, and provided support in
4 determining the cost and appropriateness of remedial
5 technologies. In doing that, I testified twice before the
6 United Nations Compensation Commission.
7 In addition to having worked for many oil
8 companies and government agencies, I've worked for a number
9 of national oil companies similar to Petroecuador. The
10 Trecate work was done for AGIP, the Italian national oil
11 company; there are some other examples on the slides.
12 This is a summary of my opinions in the case, and
13 today I'm going to focus on the First Opinion. The
14 Judgment, 6 billion dollar soil and groundwater remediation
15 Award simply is unreasonable and can't be supported either
16 by information in the Lago Agrio record or information
17 provided by Ecuador and its BIT experts.
18 To understand the situation in the former
19 Concession Area in the Oriente, you have to understand
20 what's happened since the time of TexPet's departure from
21 the Consortium operations in 1990. Petroecuador has
22 continued to operate and substantially expand the oil
23 field. This is a picture from your mapping tool, and what
24 you can see here at the bottom, Sacha 65, is the original
25 footprint of the TexPet era Concession's operations. One

09:07 1 oil well in green, less than a hectare in size.
2 After the end of the Concession, Petroecuador, as
3 part of its continued operation of the oil field, has
4 substantially increased both the footprint of the operation
5 to well over three hectares and drilled ten new wells. In
6 your tool, you can flip back and forth and see other years
7 and see a lot of this activity going on.
8 The two yellow outlines that you see here
9 represent pits that were remediated by TexPet as part of
10 the RAP. And you could see that Petroecuador actually has
11 built a platform over one of those pits.
12 Another thing that I'll be talking a lot more
13 about that you need to understand is that Petroecuador has
14 been, and is, remediating pits and spills in the former
15 Concession Area. This is an example from Shushufindi 38.
16 I put this photograph in because this is one of the sites I
17 visited and witnessed the ongoing Petroecuador remediation
18 of these pits, the platform itself is near the green icon.
19 The pits are immediately south of that. These are two pits
20 that were remediated by Petroecuador in 2010 and 2011.
21 These were non-RAP pits that were remediated by
22 Petroecuador.
23 Now I'm just going to focus on the Judgment, and I
24 want to point out that the Judgment's \$6 billion Award
25 ignores reality, and it ignores reality on many different

09:08 1 levels. Perhaps one of the most important is that it
 2 ignores Petroecuador's ongoing remediation of the very pits
 3 and spills upon which the Judgment makes its Award.
 4 Petroecuador is not complete with the remediation of the
 5 non-RAP pits and spills, but much work has been done. This
 6 is confirming that Petroecuador is stepping up and taking
 7 responsibility for the non-RAP features. It's reducing the
 8 number of non-RAP pits and spills in need of remediation.
 9 And most importantly, I'll be talking about in a minute, it
 10 provides us with detailed information as to how these pits
 11 are being remediated and what standards are being used, and
 12 what it costs to remediate these pits. And all of this is
 13 simply ignored in the Judgment.

14 There are literally hundreds of documents
 15 available that describe Petroecuador's remedial effort.
 16 Many of these documents are and were in the Lago Agrio
 17 record. I have a few examples here, and I want to point
 18 first to the PEPDA 2007 Annual Report. If you choose one
 19 document to read in the record concerning Petroecuador's
 20 remediation, this should be the document.

21 The quote from the Report says. "Petroecuador
 22 essentially is in charge of remediation and cleanup of
 23 environmental liabilities in the Amazon district." Now,
 24 you'll see the term, "environmental liabilities," used in
 25 these documents. That's defined by the Government of

09:10 1 Ecuador's Ministry for the Environment, DINAPA, as being
 2 contamination both historic, the non-RAP TexPet era
 3 contamination, and current, the contamination created by
 4 Petroecuador. Petroecuador is in charge of cleaning these
 5 up.

6 This 2007 report also provides substantial
 7 information as to pits that had been remediated as of that
 8 time, what it cost, what standards were being met. And
 9 importantly, it forecast the cost of remediation to
 10 complete the necessary remediation of the Concession.

11 The other five reports are examples of detailed
 12 reports issued by Petroecuador following its remediation of
 13 individual pits. These are something like hundred-page
 14 reports. They contain a great deal of information as to
 15 how the pits were remediated, concentrations both before
 16 and after remediation. There's a five-page appendix,
 17 average of five-page appendix near the back of most of
 18 these Reports that in detail describes the costs. All of
 19 these, everything pictured in this slide as well as many
 20 other reports were available to the Lago Agrio Court and in
 21 the record, and were simply ignored.

22 There are many other documents that describe what
 23 Petroecuador was doing, and the example here, I've got a
 24 couple of pictures from a slide show showing remediation
 25 ongoing at Sacha 14. You can see in this photograph--this

09:11 1 is a pre-remediation photograph. This is an oil pit. And
 2 I heard in Ecuador's opening remarks that somehow I had
 3 suggested there was no contamination in need of cleanup in
 4 the former Concession Area. That's simply not true. I
 5 recognized in my Reports from the beginning in this case
 6 that there are non-RAP features that require remediation.
 7 Sacha 14 is a good example. This in 2005 required
 8 remediation. This pit was subsequently remediated by
 9 Petroecuador. Here's a slide--again, this is from the
 10 Petroecuador presentation that describes the pit after it
 11 was closed, and it's in Spanish, but what's important here,
 12 this pit was created in 1971. That was during the
 13 Concession operation period. This was a non-RAP pit that
 14 was subsequently remediated and closed by Petroecuador,
 15 just one example of it.

16 We've heard suggestion from the Government of
 17 Ecuador that somehow these pit remediations are incomplete
 18 or interim or something of that kind, and that simply isn't
 19 true. All you need to do is look at these detailed reports
 20 that I described--and there are 18 of them in the BIT
 21 record. In the back of those is a certificate issued by
 22 the Ecuadorian Ministry of the Environment, and they all
 23 have similar wording and wording to this effect are in all
 24 of them. Petroecuador performed the work of cleaning up
 25 and eliminating the pit, and all Ecuadorian standards--and

09:13 1 they're referring to Decree 1215--were complied with. If a
 2 pit is cleaned up to the point that it complies with all
 3 standards, that's not an interim remediation. There is no
 4 need to go back and re-remediate these pits.

5 It wasn't just Chevron and Chevron's experts
 6 telling the Lago Agrio Court this. Gerardo Barros was an
 7 independent expert appointed by the Court working for the
 8 Court, not for Chevron, not for the Plaintiffs, who issued
 9 a series of reports to the Court. And these are some words
 10 from one of his Reports: "Unremediated pits and spills are
 11 Petroecuador's responsibility given that TexPet completed
 12 the part of the remediation assigned to it under the RAP.
 13 Petroecuador should remediate all the accumulated
 14 environmental liabilities."

15 And "accumulated environmental liabilities," again
 16 this refers to the environmental liabilities, and
 17 "accumulated," that's the word used in Ecuador to describe
 18 the historic, the non-RAP pits from the TexPet era.

19 Petroecuador has issued numerous estimates of the
 20 costs to remediate or complete the remediation in the
 21 former Concession Area. The best detailed cost that was
 22 available in the Lago Agrio Court was in this PEPDA 2007
 23 annual report that I mentioned. And in that Report, they
 24 estimated it would cost \$121 million to complete
 25 remediation in the Amazon region. Now, the former

09:15 1 Concession is only a part of the Amazon region. The part
2 of the Amazon region include the former Concession they
3 estimated would cost \$70 million to remediate.
4 Petroecuador, as quoted here in 2011, has
5 continued to issue similar estimates and similar figures.
6 2011, Marco Calvopiña, the General Manager of Ecuador
7 (sic), made a statement that they planned to invest
8 \$70 million more or less to clean up the environmental
9 liabilities in the former Concession. Again, this applied
10 not just to the former Concession Area, but the entire
11 Amazon region applying both to Consortium and Petroecuador
12 era contamination. Rather than using or recognizing these
13 numbers which Petroecuador had provided and were in the
14 Lago record, the Court determined to make its own
15 calculation of remediation costs, and that calculation
16 ignores reality at every step. This is the formula that
17 was used: For soil remediation, a unit cost times the
18 volume, times the number of pits, 5.4 billion dollars. For
19 groundwater remediation, \$600 million. In total \$6 billion
20 was the Lago Court's Award for remediation.
21 I'll walk through these calculations, and I'll
22 explain this. These calculations are flawed at every step.
23 Beginning with the unit costs for remediation, the
24 Lago Court knew what it was costing Petroecuador to
25 remediate these same soils, and they knew what

09:17 1 Petroecuador's unit costs were. There are a number of
2 different datasets that could have been looked at by the
3 Lago Court. The highest average unit cost I could find in
4 those datasets was \$67 a cubic meter. Many of the costs
5 are less than that.
6 Now, if the Court had questioned Petroecuador's
7 costs for remediation, all they needed to do was look at
8 information in the record about what it costs to remediate
9 crude oil contaminated soil elsewhere in the world. And
10 these are just some examples from the Lago record, but it's
11 clear that Petroecuador's actual remediation cost is
12 consistent with what it costs to remediate crude
13 oil-contaminated soil elsewhere in the world.
14 Rather, essentially out of thin air--and my Report
15 provides more details--the Lago Court chose a value more
16 than ten times what it should have known Petroecuador is
17 actually spending to remediate these soils.
18 Likewise, the Lago Court substantially
19 overestimates the volume of soil requiring remediation.
20 Using two planning documents which describe no pit which
21 was ever actually constructed, the Lago Court determined
22 that an average of 8,400 cubic meters of soil per pit
23 required remediation. Again, in the record the Lago Court
24 had available to it considerable information from
25 Petroecuador from actual remediations, not estimates, which

09:18 1 told them how much soil per pit was being remediated. And
2 there are again a number of different sources from
3 Petroecuador, all of these substantially below the soil
4 volume determined by the Lago Agrio Court.
5 At this point, the Lago Agrio Court could have
6 stepped back and done another reality check because again
7 in the record there was substantial information as to what
8 it cost to clean up the average pit in the former
9 Concession Area. This is a summary of some of that
10 information. The first two costs you see here, those that
11 are over \$100,000, were from the earlier days of the
12 Petroecuador remediation. In the 2007 report, Petroecuador
13 explains that over time they had learned how to more
14 efficiently remediate pits and that, as of 2007, based on
15 having remediated over a hundred pits, knowing what these
16 pits looked like and what it cost to remediate them, the
17 reasonable cost to remediate a pit was \$85,000 per pit.
18 This information was all in the Lago record, and yet the
19 Judgment awards \$6.1 million per pit, two orders of
20 magnitude above the actual pit remediation cost in the
21 former Concession Area.
22 Now, we've heard from the Government of Ecuador
23 that somehow these costs are not all inclusive, and I don't
24 think that's true. All you need to do is look at the
25 detailed cost information provided by Petroecuador that was

09:20 1 in the Lago Agrio record to see what was included in these
2 costs. This is a summary from the Sacha 14, the same site
3 that I showed you photographs of earlier from the detailed
4 report. I've taken the five pages in the Appendix in the
5 back and condensed them to this table just to illustrate
6 these costs are all inclusive. They include labor,
7 professional labor, management. They include the
8 equipment, materials, and supplies, fuel used by the
9 equipment. Land farming is the process that Petroecuador
10 uses to treat the soil that it's unable to wash to
11 standards on-site. Laboratory costs, soil and water
12 testing before and after remediation is included,
13 documentation, reporting's included, even community
14 relations are included. The Lago Court had this
15 information. They knew that for this particular pit the
16 full cost of remediation was \$80,000, not \$6.1 million.
17 You'll hear a lot about the number of pits which
18 were dug or created or constructed in the former Concession
19 Area during TexPet's operation period. That's not really
20 the important number. The important number is the number
21 of pits that require remediation. And again, Petroecuador
22 provides us and the Lago Court with the best count of the
23 number of pits requiring remediation.
24 In 2007, after having operated for 15 years on
25 these sites, knowing these sites well, being out there

09:22 1 every day and having already remediated over a hundred
 2 pits, Petroecuador determined that there were 370 pits in
 3 need of remediation within the former Concession Area.
 4 Now, we know that also includes pits that were
 5 created by Petroecuador after TexPet's operation period, so
 6 we know that the right number of pits, the number of
 7 non-RAP pits that remained in the former Concession Area
 8 was something less than that 370. To arrive at an 880 pit
 9 count you have to count pits that don't need remediation,
 10 water pits, storage--borrow pits, pits that aren't
 11 contaminated, or you need to include pits that have already
 12 been remediated. We know that TexPet remediated more than
 13 150 pits. We know that Petroecuador had been remediating
 14 pits. The 880 count simply is not supportable.
 15 Additionally, the Government of Ecuador
 16 has--despite the fact the Government of Ecuador has set
 17 remediation standards under Decree 1215, their law which
 18 was passed after the RAP had already taken place, setting
 19 standards for soil cleanup in the former Concession Area.
 20 You can see those numbers here. They vary according to
 21 land use.
 22 The most commonly applied standard in the former
 23 Concession Area is the agricultural standard: 2500
 24 milligrams per kilogram of TPH (Total Petroleum
 25 Hydrocarbons). That's the standard that Petroecuador most

09:25 1 kilogram standard as reasonable. In doing so, they cite
 2 standards from a number of States in the United States in
 3 the range of 100 milligram per kilogram for TPH cleanup.
 4 Those standards are not for crude oil-contaminated soil
 5 cleanup. Those are for cleanup of refined product:
 6 Gasoline, diesel, that kind of thing. Refined product is
 7 more problematic than crude oil, and typically does have a
 8 lower Cleanup Standard. What they do not provide you is
 9 any standard which is being applied to crude
 10 oil-contaminated soil.
 11 The only exception that I've been able to find in
 12 all of the Government of Ecuador's discussions is Trecate,
 13 the site on which I worked, I was technical Director, the
 14 Trecate blowout in Italy, I was there within a few days of
 15 the blowout through completion. And although initially a
 16 50 milligram per kilogram screening standard was set, it
 17 was used primarily for delineation purposes, that was not
 18 the concentration to which the soil in Trecate was
 19 remediated.
 20 At the time that the Italian authorities accepted
 21 the site as clean, certified the remediation complete, and
 22 allowed return of unrestricted use of the land, there were
 23 residual concentrations of petroleum hydrocarbons, much of
 24 the soil over a thousand parts per million, even over 5,000
 25 parts per million in places, that's the concentration to

09:23 1 commonly cleans up to. And yet the Judgment uses a
 2 standard which it provides no real support for of 100
 3 milligrams per kilogram, 25 times lower than the standard
 4 to which these pits are actually being cleaned up.
 5 And if the Lago Court had questioned whether the
 6 2500 standard was appropriate, again, all they needed to do
 7 was to look into the record, look at these Reports that
 8 were issued by Petroecuador; and, in those, there is a one
 9 page in the back--I've already talked about it
 10 once--certificate from the Ecuadorian Ministry of the
 11 Environment declaring the pits clean, and this is some of
 12 the wording, and you'll find wording similar to this in all
 13 the certificates: "According to the lab results, permitted
 14 limits for agricultural-use soils--that's the 2500
 15 milligrams per kilogram--have been met; therefore, the pit
 16 no longer contains harmful or contaminating materials." If
 17 the pit no longer contains harmful or contaminating
 18 material, there is no need for additional remediation, no
 19 need to remediation to a lower standard.
 20 In their early reports, Ecuador's experts appear
 21 to agree that the 100 milligram per kilogram standard in
 22 the Judgment wasn't reasonable--this is a quote from LBG's
 23 First Report. I have seen, though, in their more recent
 24 reports, particularly 2015, the Government of Ecuador's
 25 experts are now trying to defend the 100 milligram per

09:27 1 which Trecate was actually cleaned up, not 50 micrograms or
 2 milligrams per kilogram, not a hundred. Thousands.
 3 As I've said, the Judgment's calculation of soil
 4 remediation is simply flawed at every step. It ignores
 5 reality. It makes no sense. The Judgment then awards
 6 \$600 million for groundwater remediation without providing
 7 any real basis, no explanation, no unit costs, nothing like
 8 what's provided for soil remediation. When, in fact, the
 9 evidence tells us that groundwater remediation is not
 10 needed in the former Concession Area. The groundwater data
 11 confirms this, and this isn't a surprise. As I explain in
 12 my report, groundwater remediation at oil field sites is
 13 rare. Oil field sites, the primary concern is crude oil,
 14 crude oil that's spilled on the surface of the ground.
 15 It's more viscous than refined product, it doesn't spread
 16 as far, it creates fewer problems. As a result, we know in
 17 the United States that less than 1 percent of our oil field
 18 sites have contamination that requires remediation.
 19 Ecuador is no exception.
 20 We know that HBT Agra, the company that was hired
 21 jointly by the Government of Ecuador and by TexPet, did an
 22 investigation before the RAP to determine that groundwater
 23 remediation wasn't necessary. The court expert Gerardo
 24 Barros that I spoke of earlier agreed.
 25 Maybe more importantly, despite being assigned

09:29 1 responsibility for groundwater concerns, under Decree 1215,
2 the Ecuadorian law, Petroecuador, in the hundreds of
3 documents that I've reviewed, I see no evidence
4 Petroecuador is undertaking any groundwater remediation or
5 plans any groundwater remediation. And appropriately so.
6 There simply is no need for groundwater remediation.
7 You'll always hear considerable discussion--and
8 the Government of Ecuador's reports about contamination
9 migrating or spreading in groundwater. There simply is no
10 evidence that that's occurring. First of all, no completed
11 pathway--there are no completed pathways in groundwater
12 from the pits to the streams or drinking water. You will
13 see a cartoon conceptual model in some of the Government of
14 Ecuador's Expert Reports showing a pit showing a stream and
15 a connection. Simply isn't there.
16 Now, the Government of Ecuador's experts have
17 placed some monitoring wells between pits and stream and
18 claimed to have observed petroleum hydrocarbons in those
19 monitoring wells. For some of the reasons that Dr. Douglas
20 explained earlier, I think that it's questionable how real
21 those detections are, but even setting that aside, and
22 assuming they're real, those are single digit part per
23 million or lower concentrations of petroleum hydrocarbons
24 they claim is in groundwater.
25 In order to require remediation, sediment in the

09:30 1 stream has to have more than a thousand part per million in
2 petroleum hydrocarbons. You can't get from a part per
3 million in groundwater to a thousand parts per million in a
4 stream. It's physically impossible. You can't get there
5 from here. There is no connection.
6 You will also hear the Government of Ecuador talk
7 about mobility. The fact that there may be some residual
8 viscous oil on this site does not mean that it's mobile or
9 that it's migrating. There is no evidence of that
10 migration in the field data. There are, however, some well
11 developed tests that we used to assess whether or not oil,
12 free-phase oil, is migrating or mobile. LBG, the
13 Government of Ecuador's Experts, undertook none of those
14 tests. They simply declared the oil to be migrating and
15 mobile.
16 The most important reason for groundwater
17 remediation is protection of drinking water supplies. We
18 know from over 10 years from the Judicial Inspection
19 through the recent Government of Ecuador investigations
20 that the groundwater, drinking water supply wells on the
21 site are free of oilfield-related contamination that
22 requires remediation.
23 Now, that doesn't mean these wells are safe to
24 drink from--they're not. It's unfortunate that there are
25 people drinking from these hand dug wells. They have

09:32 1 bacteriological contamination. It's unhealthy water to
2 drink, but that has nothing to do with oilfield operations.
3 The Government of Ecuador claims that the
4 groundwater remediation Award is somehow supported by the
5 need for sediment remediation. This makes no sense. First
6 of all, the Judgment provides no estimate of the extent or
7 volume of sediment remediation, no specific cost. Sediment
8 remediation has been understood and has been addressed for
9 quite some time in the former Concession Area. TexPet
10 remediated sediments as part of the RAP. Petroecuador
11 continues to remediate sediments, and Petroecuador's cost
12 estimates in the 2007 Report I spoke of include the costs
13 for sediment remediation. Sediment remediation--there is
14 need still for more sediment remediation, it's understood,
15 and its cost has been estimated by Petroecuador.
16 And, finally, we hear a lot of discussion
17 concerning produced water discharges. It is true TexPet
18 discharged produced water during its operations. Produced
19 water is simply the water that comes up with the oil and is
20 separated from the oil. Produced water is a very salty
21 brine water with trace levels of Petroleum Hydrocarbon in
22 it. When it's discharged to a stream, the brine, the salty
23 material, quickly dilutes and is washed downstream. Those
24 trace levels of oil rapidly biodegrade, and we know that
25 for a couple of reasons.

09:34 1 First of all, that's simply the nature of oil
2 ideal conditions for biodegradation. But there are also
3 tests--and I cited them in my Report--conducted by
4 Greg Douglas where he evaluated the biodegradation of the
5 oil in that produced water and found that it biodegrades
6 with a half-life of days. There is nothing left from
7 TexPet's discharge water discharged 25 years ago in those
8 sediments today that requires remediation, and there is
9 nothing in the Reports produced by the Government of
10 Ecuador that provides any evidence that sediments are
11 contaminated as a result of produced water discharge.
12 Sediments are contaminated. They were contaminated by oil
13 spills, not produced water.
14 Once arriving at the \$6 billion figure, the
15 Judgment could have looked to see how that compared to what
16 it actually cost to clean up or remediate an oilfield.
17 There are thousands of oilfields around the world, many of
18 which have been remediated or are in remediation. It's not
19 hard to compare those numbers to the real cost. Again, the
20 Petroecuador 2007 estimate was \$70 million to remediate
21 both the TexPet era non-RAP features and the more recent
22 Petroecuador pits and spills. The Lago Agrio Court had
23 available to it information from other oilfields, and I'll
24 talk about Schoonebeek. Schoonebeek was one of the largest
25 oilfields in Western Europe, in The Netherlands, operated

Sheet 9 1900	1902
<p>09:35 1 from the early 1940s into the 1990s when it was closed. 2 When it was closed, it was remediated. This is a 599 well 3 oilfield, roughly the same size as the former Concession at 4 the time of the Petroecuador 2007 Report, larger than the 5 oilfield that had been operated by TexPet. 6 Remediation of Schoonebeek cost less than 7 \$100 million. 8 Now, Schoonebeek was not only remediated, the 9 decision was made to return the land to its pre-industrial 10 condition to remove all evidence that oil operations had 11 ever been there. All equipment was removed, all wells were 12 plugged and abandoned, all tanks were removed, buildings 13 removed, pipelines--a thousand kilometers of pipeline were 14 removed. The total cost for that entire effort was 15 \$261 million. This isn't something that the Government of 16 Ecuador is likely to want to do in the former Concession 17 Area because it would mean cessation of their oil 18 production. None of these numbers are anything close to 19 the \$6 billion awarded by the Lago Agrio Court. 20 I'm going to talk to you about a case where there 21 was need for exceptional remediation cost. The only 22 terrestrial oil spill I'm aware of with a cost anywhere 23 close to the cost of the Judgment, and that was in Kuwait. 24 After the Iraqi Army was--invaded Kuwait, when they were 25 withdrawing, Saddam Hussein ordered the destruction of</p>	<p>09:39 1 perspective. This is a to-scale map, you can see 2 30 kilometers on the scale, about 80 kilometers right to 3 left. That purple square in the lower left-hand corner 4 represents 3.1 square kilometers, which the Judgment says 5 needs to be remediated in the former Concession. It's not 6 hard to compare that purple square to the Burgan oilfield 7 and see that it is far, far smaller. 8 I can tell you, I was there, I saw the Burgan 9 oilfield, you could drive for kilometers and see nothing 10 from horizon to horizon but oil-covered land, not a bit of 11 clean soil, not a bit of unimpacted soil from horizon to 12 horizon. You will see nothing like that in Ecuador. 13 In Kuwait, we know there were 385 square 14 kilometers of land covered with 100 percent oil. 15 Essentially, up to a million parts per million of oil. In 16 contrast, the Judgment's exaggerated volume or area of soil 17 requiring remediation in the former Concession Area was 18 only 3.1 square kilometers, and that's to 100 parts per 19 million. Kuwait didn't map the contamination to 100 parts 20 per million. There was really no reason to, but had they, 21 their number would have been far larger than 385 square 22 kilometers, and yet the Judgment awards more than twice the 23 cleanup cost in Ecuador for the former Concession than the 24 United Nations Compensation Commission determined were 25 necessary to clean up Kuwait.</p>
<p>1901</p> <p>09:37 1 every oil well in Kuwait, the blowing up of every oil well, 2 every pipeline, every tank, opening of every valve, the 3 creation, the intentional creation, of the largest oil 4 spill and the largest oil-related disaster in history. 5 The United Nations reviewed this case, claims were 6 made by Kuwait, and the United Nations determined that the 7 cost to clean up this, the world's largest terrestrial oil 8 spill--the world's largest oil spill--should be 9 \$2.5 billion. 10 Just for scale, this is a satellite photo of a 11 portion of Kuwait taken shortly after the Iraqi war. In 12 the upper right-hand corner, the dark area, is the Persian 13 Gulf. You can see three of Kuwait's oilfields, the Burgan 14 oilfield is the largest--Burgan oilfield is one of the 15 largest oilfields in the world. It alone produces more oil 16 than all of Ecuador. 17 You can also see parts of the Umm Gudair and the 18 Al Wahfra oilfield. There were many more oilfields in 19 Kuwait that are not in this photograph. This is only part 20 of the damage. You can see that blackened area in the 21 Burgan field. That's oil covered soil. The Judgment 22 determined that the area of contamination in the former 23 Concession that required remediation was 3.1 square 24 kilometers. Now, I disagree with that number, I think it's 25 greatly exaggerated, but put the Judgment's Award in</p>	<p>1903</p> <p>09:41 1 This is an appropriate comparison. Those are both 2 terrestrial oil cleanups. You've heard the Government of 3 Ecuador compare the Judgment to marine oil spills, 4 specifically in their opening to the Exxon Valdez and to 5 the BP spill in the Gulf of Mexico. Those are not 6 comparable numbers. Marine oil spills are a very different 7 problem. A marine oil spill can very rapidly spread over 8 very large areas, very difficult to contain and remediate, 9 and as a result the costs are substantially higher for 10 cleanup of marine oil spills. 11 What you haven't heard from the Government of 12 Ecuador is a single comparison to what it cost to clean up 13 an oilfield or an oil spill on land, a terrestrial oil 14 spill, an easier oil spill to clean up. That would be 15 comparable. This is comparable in terms of its costs, 16 certainly not in terms of its size. 17 You heard in the opening remarks Ecuador's Experts 18 have estimated that there are 3.4 million barrels of oil 19 still in the soil in the former Concession Area. I 20 disagree with those calculations. As explained in my 21 Report, I believe they are founded on bad statistics, and 22 they use the TEM estimate of Petroleum Hydrocarbons which 23 is an exaggeration. I think they're grossly exaggerated. 24 Setting that aside, 3.4 million barrels, if it was 25 true, is still less than the 1 percent of the oil released</p>

09:42 1 in Kuwait. The Judgment simply makes no sense, and is not
 2 supported by Ecuador's Experts' Reports.
 3 In summary, the Judgment ignores reality. The
 4 Judgment ignores the actual cost per pit to remediate the
 5 soil. They ignore the actual volume per pit. The Judgment
 6 ignores the pit count, it uses an unrealistic remediation
 7 standard, it awards remediation costs for groundwater when
 8 none is required. The result is that the Lago Court awards
 9 a number which is order of magnitude--orders of magnitude
 10 higher than costs determined by Petroecuador, Ecuador's own
 11 oil company.
 12 Thank you.
 13 PRESIDENT VEEDER: Thank you very much. Any
 14 further questions from the Claimants?
 15 MS. WOOD: No questions, Mr. President.
 16 PRESIDENT VEEDER: There will now be questions
 17 from the Respondent.
 18 CROSS-EXAMINATION
 19 BY MR. BLOOM:
 20 Q. Good morning, Dr. Hinchee. How are you?
 21 A. Good morning, fine, thank you.
 22 Q. I'm Eric Bloom, I will be asking you the questions
 23 on behalf of the Respondent this morning. You testified
 24 that you were at the site at ground zero within days after
 25 the Trecate spill?

09:44 1 A. Yes, that's true.
 2 Q. And the cleanup efforts and the investigation
 3 began even before you got there?
 4 A. Yes, began almost immediately.
 5 Q. And in Kuwait there were efforts almost
 6 immediately to investigate the damage caused by the
 7 destruction of the oil wells there?
 8 A. There were efforts that began early on. It took
 9 longer in Kuwait to begin what you think of as
 10 characterization of the oil spills. There were more
 11 immediate problems to deal with.
 12 Q. Given the war conditions?
 13 A. Yes.
 14 Q. Now, TexPet operated in Ecuador from the 1960s
 15 through the early 1990s; is that correct?
 16 A. I'm not sure when--I don't recall exactly the date
 17 that the operations began. I understand it ended
 18 June of 1990, yes.
 19 Q. The operatorship ended in June of 1990 and they
 20 left in 1992; do you understand that?
 21 A. The operatorship ended in 1990. I think there was
 22 still some ownership after that.
 23 Q. And the issue right now is remediation, some 25
 24 years after that operatorship ended; correct?
 25 A. Yes.

09:45 1 Q. Now, sir, you testified or it's in your Report
 2 that you worked for Integrated Science and Technology; is
 3 that correct?
 4 A. Yes.
 5 Q. If I could return for one moment in the Kuwait
 6 example that you gave. It's true, is it not, that Kuwait
 7 is currently asking for more money than the 2.5 billion;
 8 isn't that right?
 9 A. I'm sorry, I couldn't hear all of your question
 10 over all the noise behind you.
 11 Q. Certainly, I will repeat.
 12 Kuwait is currently asking for more than the
 13 \$2.5 billion; isn't that correct?
 14 A. I don't know what Kuwait is currently asking for,
 15 no.
 16 Q. Okay. Now, sir, you're a principal at Integrated
 17 Science and Technology?
 18 A. Yes.
 19 Q. And your title is...
 20 A. Principal Engineer.
 21 Q. And you have an ownership in that, do you not?
 22 A. Yes, I do.
 23 Q. And what is that ownership interest?
 24 A. Approximately 11 percent.
 25 Q. And to be clear, you're not an Expert in

09:46 1 toxicology; is that right?
 2 A. I know something about toxicology as we apply it
 3 in remediation, but I'm certainly not a toxicologist.
 4 Q. You're not representing yourself as an Expert in
 5 toxicology; correct?
 6 A. No, I'm not a toxicologist.
 7 Q. Nor are you representing yourself as an Expert in
 8 epidemiology; is that also right?
 9 A. Yes, I'm not an epidemiologist, no.
 10 Q. Nor are you a medical professional?
 11 A. No, I'm not a medical professional.
 12 Q. And you have not been qualified by a court to act
 13 as an Expert in the field of impacts of crude oil on human
 14 health?
 15 A. That is right, I have not.
 16 Q. And you have never been qualified by a court to
 17 act as an Expert in the field of risk assessments; correct?
 18 A. I've certainly testified to risk assessment. I
 19 don't know that I have ever been specifically qualified by
 20 a court to address risk assessment. Risk assessments often
 21 are an integral part of remediation.
 22 Q. Now, you've testified that you've had a
 23 relationship with Chevron and, before that, with TexPet as
 24 it relates to the Lago Agrio Litigation; isn't that right?
 25 A. I've had a relationship with Chevron. I didn't

09:48 1 have a relationship with TexPet.
 2 Q. And you have also been offered as a witness in the
 3 New York RICO proceeding?
 4 A. Yeah, that's possible. I don't know whether I was
 5 offered or not. I wrote a report.
 6 Q. Okay. Now, your relationship with Chevron extends
 7 back to what date?
 8 A. With Chevron anywhere?
 9 Q. Yes.
 10 A. Oh, sometime in the mid-Eighties.
 11 Q. So, it's about 30 years?
 12 A. Approximately, yes.
 13 Q. Now, to be clear, you never served as an Expert on
 14 Chevron's behalf at a Judicial Inspection; correct?
 15 A. That's right, that's right.
 16 Q. But you are aware that in preparation for the
 17 Judicial Inspections, Chevron had prepared two documents as
 18 both a Sampling Plan and an Analysis Plan.
 19 A. Yes, I have seen those.
 20 Q. Now, you didn't draft either one; correct?
 21 A. No, and I want to be clear: It wasn't simply
 22 Chevron that prepared those. Those were prepared jointly
 23 with the Plaintiffs, but no, I was not involved in their
 24 drafting.
 25 Q. But you reviewed them in connection with the 2006

09:49 1 Report that was submitted to the Lago Agrio Court; is that
 2 not right?
 3 A. Yes, I did.
 4 Q. And I will be referring to this Report. So, let's
 5 hand out some binders.
 6 And if you want to at any time refer to that
 7 Report, it's at Tab 4. And you may want to confirm that
 8 Tab 4 is, in fact, your 2006 Report that was submitted in
 9 Lago Agrio.
 10 A. Yes, I see this.
 11 Q. And I will represent to you that at Page 16, you
 12 do represent that you relied on both the Analysis and
 13 Sampling Plans.
 14 A. Page 16?
 15 Q. Correct.
 16 A. Yes, I see the reference.
 17 Q. Now, this Report was entitled "Evaluation of
 18 Chevron's Sampling and Analysis Methods"; correct?
 19 A. Yes.
 20 Q. So, those two documents were, indeed, the
 21 essential pieces of your review; no?
 22 A. They were an essential part, yes.
 23 Q. And you went on to write seven additional reports
 24 in the Lago Agrio Litigation; isn't that also right?
 25 A. I believe the count--your count is right, yes.

09:51 1 Q. Now, you've testified a number of times, both at
 2 trial and at deposition, have you not?
 3 A. Yes, I have.
 4 Q. About 20 or 30 times you have been deposed?
 5 A. Approximately, yes.
 6 Q. And you've also testified at trial and in
 7 arbitrations?
 8 A. Yes, I have.
 9 Q. And you've testified on behalf of Exxon?
 10 A. Yes.
 11 Q. On behalf of Plantation Pipeline?
 12 A. Yes.
 13 Q. On behalf of Kinder Morgan?
 14 A. Yes.
 15 Q. And Kinder Morgan is an oil-and-gas company?
 16 A. Primarily a pipeline, an oil-and-gas transport
 17 company.
 18 Q. Can you tell us how many times you've actually
 19 testified against an oil company?
 20 A. Against an oil company? I've testified adverse to
 21 Chevron.
 22 Q. When was that?
 23 A. Two years ago.
 24 Q. And what case was that?
 25 A. It was a case before the California Public

09:52 1 Utilities Commission concerning rates, shipping rates.
 2 Q. And the nature of your testimony in that
 3 proceeding?
 4 A. I was working for Kinder Morgan, the company
 5 who--the shipper, and Kinder Morgan had spills, done
 6 remediation work, and I was testifying as to the
 7 reasonableness of the remediation work being done by Kinder
 8 Morgan.
 9 Q. Have you ever testified against an oil company
 10 when it was not on behalf of another oil company?
 11 A. Not that I recall.
 12 Q. Doctor, could I ask you to turn to Tab 3 of your
 13 binder.
 14 A. I would like to point out that my testimony in
 15 Kuwait was against the country of Iraq, but the costs that
 16 were being incurred, that were being paid to Kuwait, were
 17 coming from the Iraqi oil company, so that could be
 18 interpreted as adverse to the Iraqi oil company.
 19 Q. You're at Tab 3 now?
 20 A. Yes.
 21 Q. Now, this is an e-mail from John Connor to
 22 Doug MacKay, Pedro Alvarez, and to yourself; correct?
 23 A. Yes.
 24 Q. And can you, for the Tribunal's sake, can you
 25 identify who Doug MacKay and Pedro Alvarez are.

Sheet 12 1912	1914
<p>09:54 1 A. Yes. Doug MacKay and Pedro Alvarez were also 2 Experts who worked with me and co-authored several of my 3 Expert Reports in the Lago matter. 4 Q. And this e-mail is from August 2006, about three 5 weeks before you submitted your First Report; isn't that 6 right? 7 A. Yes. 8 Q. In the first line of this e-mail, Mr. Connor says 9 that he had reviewed the latest draft of your Report. 10 Do you see that? 11 A. Yes. 12 Q. And, in fact, this e-mail is about Mr. Connor's 13 comments to your First Report; right? 14 A. Yes, it appears to be. 15 Q. And you were shown this document in your 16 deposition; do you recall that? 17 A. Yes, I do. 18 Q. And you read your deposition in preparation for 19 today's proceeding? 20 A. I did. 21 Q. So, on this e-mail, Ernie Baca and Sara McMillen 22 are on the cc line. Could you identify who Ernie Baca and 23 Sara McMillen are? 24 A. Yes, Ernie Baca is an employee of GSI. He was one 25 of the Judicial Inspection Experts on a number of sites,</p>	<p>09:57 1 Q. So, did you accept his--strike that. 2 Did you ever interview people in connection with 3 this Report who were not affiliated with Chevron? 4 A. If you include as affiliated with Chevron 5 consultants who were working for Chevron, I don't recall 6 interviewing anyone else. 7 Over the course of my work in Lago, I have 8 interviewed other people, so I can't be certain that I 9 didn't interview someone not connected to Chevron for this 10 Report, but I don't recall any of those interviews, as I 11 sit here. 12 Q. I will refer you to your deposition testimony and 13 see if this refreshes your recollection. Your deposition 14 testimony is at Tab 2, and I would refer you to Page 152, 15 beginning at Line 7. 16 A. Yes. 17 Q. And there you say that you interviewed the 18 consultants who did the Judicial Inspections for Chevron 19 and other consultants working for Chevron, as well as Sara 20 McMillen, correct? 21 A. Yes. 22 Q. And you don't recall ever reaching out to anyone 23 who was not being paid by Chevron; is that also right? 24 A. Yes, that is what I said in my deposition. And, 25 as I said, I re-read this and giving it more thought, I'm</p>
1913	1915
<p>09:55 1 and has been working on this case for some time. 2 Sara McMillen is an employee of Chevron, and she 3 also has been working on this case for some time. 4 Q. Now, about halfway down the page you will see a 5 Number 1, and it says "objectivity/independence." 6 Do you see that? 7 A. Yes. 8 Q. Now, in the second paragraph under this heading, 9 Mr. Connor writes: "To the degree possible, I think you 10 need to be more diligent about sources so that you sound 11 objective." 12 Do you see that? 13 A. Yes, I see that. 14 Q. And then he references an attachment that 15 identifies the interviewees as 100 percent Chevron folks, 16 and he says "that begs the same question." 17 Do you see that also, sir? 18 A. Yes. 19 Q. Now, you would agree with me, sir, that there was 20 no--ultimately there was no attachment submitted with your 21 2006 Report; isn't that right? And feel free to take a 22 look, if you wish. 23 A. No, I have written a lot of reports. I have to 24 see what attachments were or weren't included. 25 The only attachment I see are key documents.</p>	<p>09:58 1 not 100 percent sure that I hadn't spoken to someone who 2 was not with Chevron at the time this Report was written, 3 but I believe this is probably accurate. I probably 4 didn't. 5 Q. Thank you, sir. 6 Now, Dr. Hinchee, how many pits did TexPet 7 remediate as part of the RAP? 8 A. I don't recall the exact number. I would have to 9 go to Woodward-Clyde 2000. It was something more than 160. 10 Q. And it's out of how many pits? How many pits did 11 TexPet construct? 12 A. I don't know. I haven't done that calculation. 13 As I said, that's not really relevant. What's relevant is 14 how many need remediating. 15 Q. Did you ever know how many pits that TexPet 16 constructed? 17 A. No, I haven't tried to do that calculation, and I 18 have not seen that number in any of the documents I 19 reviewed. 20 Q. Now, you understand that there were more than 300 21 well sites, I believe approximately 322? 22 A. Yes, that's right. 23 Q. And 22 Production Stations? 24 A. Yes. 25 Q. And given your own knowledge of oil extraction</p>

10:00 1 processes, do you have an educated opinion as to how many
2 pits TexPet reasonably should have constructed to support
3 an operation on this scale?
4 A. I haven't offered opinions concerning oilfield
5 operations. And, as I said, that's not an estimate or a
6 determination that I've made, and I haven't seen any
7 information concerning that in the documents I've reviewed.
8 Q. At any point, has Chevron provided you with
9 comprehensive historical records for the pits that TexPet
10 constructed?
11 A. I have seen historical records concerning the pit
12 TexPet--the TexPet pits, yes.
13 Q. Only insofar as those that were remediated or for
14 all of the pits?
15 A. I have seen information concerning pits that I
16 don't know whether or not were remediated.
17 I'm not sure what your question is.
18 Q. Well, I guess you may have already answered it.
19 If you don't know the universe of pits, presumably you
20 would not have all of the historical information with
21 respect to the universe of pits.
22 A. Right. I focused on the pits that need
23 remediating.
24 Q. And how can you determine which pits need
25 remediating if you don't know the universe of pits?

10:01 1 A. You look to Ecuadorian regulations today. You
2 look to the RAP at the time of the TexPet remediation.
3 There is information concerning pits that were contaminated
4 in the HBT Agra Report I referred to. And probably most
5 usefully is Petroecuador's own determination of the number
6 of pits that required remediating in 2007, so there is
7 substantial information available as to the number of pits
8 which require remediation.
9 Q. But I want to take you back to your work at the
10 Lago Agrio Case before the PEPDA project and go back to my
11 question: How do you know what pits need remediating if
12 you don't know what the universe of pits are?
13 A. Well, you have information, again, from the HBT
14 Agra audit, also Fugro-McClelland, you know which pits were
15 identified in the RAP as needing remediation which were
16 assigned to TexPet for remediation, and you know from
17 Judicial Inspection information that is available, and by
18 comparing those to Petroecuador practice and to Ecuadorian
19 regulations that were applicable at the time, you can
20 determine which pits need remediation.
21 Q. So, you're not getting it from TexPet, you're
22 getting it from other sources to the extent they have the
23 information from what source?
24 A. From having investigated the pits and the sites
25 where pits exist that need remediation.

10:03 1 Q. Now, other than aerial photos, Chevron did not
2 provide the Court with any historical documentation
3 regarding the size or location of the pits they
4 constructed; isn't that right?
5 A. I don't know what documents were provided to the
6 Court from Chevron. I know that the Court relied on for
7 its estimate of size, two documents which were generated by
8 TexPet. I don't know how they came into possession of
9 those documents.
10 Again, though, those didn't actually describe any
11 pit that was ever built.
12 Q. Now, sir, you understand that because you referred
13 in direct to the Judgment. In fact, you were quoting from
14 the Judgment. You understand that the Judgment said that
15 the Court could not apply current standards. It had to
16 apply the standards, the regulatory standards that existed
17 at the time; is that your understanding?
18 MS. WOOD: Objection. If Mr. Bloom is going to
19 refer to the Judgment and ask him about specific statements
20 in the Judgment, he should show him the Judgment and the
21 specific passage that he's talking about. I don't think
22 it's fair to the Witness otherwise.
23 PRESIDENT VEEDER: Well, if the Witness can answer
24 without a reference, so be it, but it's helpful for the
25 Tribunal also, I think, to see the particular passage.

10:04 1 MR. BLOOM: And I will return to that in a little
2 bit more detail in a few minutes, but if I can just--
3 PRESIDENT VEEDER: Just make it clear: If you
4 want to look at the Judgment, you can ask for it and you
5 will be shown the relevant passage.
6 THE WITNESS: Well, in general, the standard that
7 the Judgment was based upon was a 100-milligram per
8 kilogram TPH standard which to my knowledge has never
9 existed in Ecuadorian regulations and has no basis at any
10 time in Ecuadorian regulations.
11 BY MR. BLOOM:
12 Q. And sir, are you a lawyer or are you an expert in
13 Ecuadorian environmental regulations?
14 A. I'm certainly not a lawyer, but I am an engineer
15 who's cleaned up and worked on remediation of
16 oil-contaminated soils in the United States and many other
17 countries around the world. I understand how to read
18 regulations and understand how they apply to remediation.
19 Q. Thank you, sir. We will be returning to the
20 subject, then.
21 Now, Doctor, would you agree with me that
22 generally at oil well sites, at least before remediation,
23 it's possible that some contamination will exist under the
24 ground surface?
25 A. Yes, contamination can exist under the ground

10:05 1 surface.
 2 Q. And, indeed, that's not really uncommon, is it?
 3 A. It's not uncommon to find contamination below the
 4 ground surface. It isn't all immediately on the ground
 5 surface.
 6 Q. And I think for the sake of the Tribunal, I want
 7 to turn to a slide used by Mr. Connor earlier this week.
 8 Keeping in mind the Republic does not agree with all of it,
 9 but for purposes here, once we get it on the screen, I want
 10 to ask you, Doctor, if you understand the depiction here.
 11 And this is not the right slide.
 12 There we go.
 13 You can take a moment to look at this, and first
 14 let us know whether you understand it, and if you don't, we
 15 will move on. If you do, I'm going to ask you to explain
 16 it.
 17 A. Yes, I understand it.
 18 MS. WOOD: Excuse me, Mr. Bloom. Excuse me.
 19 Could you just tell me in the bundle where this is, so I
 20 could look at it closer, in your slides?
 21 MR. BLOOM: I don't know if you have it in the
 22 bundle. Yeah, this is from Mr. Connor's slides.
 23 MS. WOOD: Oh, okay. I just didn't know if--
 24 MR. BLOOM: This is Slide 14 from Mr. Connor.
 25 MS. WOOD: Okay. Thank you.

10:07 1 MR. BLOOM: Sure.
 2 PRESIDENT VEEDER: The trouble is that it's
 3 Slide 13 in our bundle.
 4 MS. WOOD: Yeah. That's what I was confused
 5 about.
 6 MR. BLOOM: So, it's 13 of our bundle, it's 14 of
 7 Mr.--Dr. Connor, Mr. Connor's bundle.
 8 MS. WOOD: Thank you.
 9 BY MR. BLOOM:
 10 Q. So, could you explain this for the Tribunal? And
 11 I want to focus specifically on where the contamination
 12 would have been prior to the remediation.
 13 A. This is a generalized cross-section that
 14 represents a generalized condition in the Oriente showing a
 15 remediated pit, the cross-section. It shows the remediated
 16 material, the bottom of the former pit and probably
 17 over-excavated somewhat, so, it's probably larger than the
 18 original pit, and overlain by clayey soil, clean soil, top
 19 soil, and then vegetation. And then it shows the
 20 predominantly clayey soils around the pit.
 21 Q. And the only point here is the area that was
 22 remediated presumably was once contaminated or else there
 23 wouldn't have been remediation in the first place; would
 24 you agree with that?
 25 A. Right. You remediate contamination.

10:08 1 Q. And would you also agree with me that before
 2 remediation is conducted, there is oftentimes an
 3 investigation of some kind to determine both whether and to
 4 what extent contamination exists?
 5 A. Yes, similar to the HBT Agra audit I discussed
 6 earlier, that's very common.
 7 Q. And are there instances where oil contamination
 8 might be found in the subsurface, even where the
 9 contamination might not be visually observable at the
 10 surface?
 11 A. Yes. It's not always visually observable at the
 12 surface.
 13 Q. And to perform a comprehensive remediation, one
 14 obviously needs to know where the contamination is, and
 15 what the boundaries are of that contamination; would you
 16 agree with that?
 17 A. You need at least some general idea, yes. When
 18 you're remediating oil contamination such as this, oil's
 19 visually apparent. So, as you do the remediation, as you
 20 excavate, you can see where the oil is, and that's the way
 21 it's normally done. You follow the visually contaminated
 22 material.
 23 Q. And that would necessitate exploring the site,
 24 doing some tests?
 25 A. Not necessarily. It's done during the

10:09 1 remediation. It's done observationally.
 2 Q. But would you agree with me that there are times
 3 it is done before remediation?
 4 A. Yes, similar to the work that was done by HBT Agra
 5 and Fugro-McClelland.
 6 Q. And the purpose of such an investigation would be
 7 to determine both the nature and the extent of the
 8 contamination?
 9 A. Yes. You need to understand where the
 10 contamination is that needs remediating and have some idea
 11 as to how much will require remediating.
 12 Q. And you would want to identify the sources of
 13 contamination; right?
 14 A. Well, that's part of understanding where the
 15 contamination is, yes.
 16 Q. And that would also mean creating a plan to sample
 17 the site?
 18 A. That sometimes happens, yes.
 19 Q. And for oil well sites with multiple pits, that
 20 sampling plan could also involve--in fact, probably would
 21 generally involve--sampling more than just one set a site;
 22 isn't that right?
 23 A. Well, not necessarily. In fact, if you look at
 24 how this remediation work was done under the RAP, there
 25 were sites where the Government of Ecuador and TexPet

10:11 1 agreed to begin remediation simply on the visual
 2 observation of oil. If you see oil contamination, you can
 3 agree that it's likely above the 5,000-milligram per
 4 kilogram standard that was set in the RAP for soil that
 5 required remediation and simply begin remediating it based
 6 on visual observation. That's not uncommon, and, in fact,
 7 that was done here.
 8 Q. Nor is it uncommon of undertaking multiple test
 9 samples at a given site to determine the extent of
 10 contamination; would you not agree with that?
 11 A. The number of samples will vary depending on the
 12 remediation program and the sites.
 13 Q. And if we don't know where all the pits are--well,
 14 let me ask this question: Do you believe you have
 15 sufficient information or ever had sufficient information
 16 to know where all the pits are in the Concession Area?
 17 A. Again, as I said, the important question to me is
 18 which pits need remediation. And certainly, as remediation
 19 progresses, you find conditions may vary from what was
 20 determined before remediation began, but we certainly have
 21 a reasonable idea of how many pits need remediating and
 22 where those pits are. They're near the oil well. They're
 23 near the oil platform.
 24 Q. Well, some of the pits have been covered with high
 25 growth vegetation; correct?

10:12 1 A. Yes, there's places there's dense vegetation.
 2 Q. And others with dirt; correct?
 3 A. There are pits that were covered with soil, yes.
 4 Q. And it's not always so easy to find the pits in
 5 the first place; correct?
 6 A. Vegetation certainly makes it difficult to find
 7 the pits. Under the RAP, if there was not visual oil
 8 identified in a pit that had been closed prior to 1990, it
 9 was determined that those pits didn't need remediation by
 10 TexPet.
 11 Q. Now, the Plaintiffs were not Parties to the RAP.
 12 Did you understand that?
 13 A. I don't know that the Plaintiffs were Parties to
 14 the RAP, no.
 15 Q. Okay. Now, you've referred, I believe, to
 16 Woodward-Clyde. Could you explain who they are?
 17 A. Woodward-Clyde was a company hired by TexPet to
 18 essentially conduct or oversee the remediation work that
 19 was done under the RAP.
 20 Q. So, they studied the Concession Area sites in the
 21 1990s; isn't that also right?
 22 A. They studied--yes, they did some studies as well.
 23 That was part of the remedial effort.
 24 Q. And they conducted specifically what's called a
 25 Remedial Investigation; isn't that right?

10:14 1 A. They did some investigations they called Remedial
 2 Investigations, yes.
 3 Q. And what is an R-I, a Remedial Investigation?
 4 A. Remedial Investigation is a term we use to
 5 describe investigation work that's done prior to the
 6 initiation of remediation.
 7 Q. And did Woodward-Clyde specifically investigate
 8 where all the contamination had migrated to or otherwise
 9 determined it hadn't migrated at all?
 10 A. Woodward-Clyde undertook a Remedial Investigation
 11 to determine where the features were and have some
 12 understanding of those features before they began
 13 remediation.
 14 Q. Now, let me ask you to turn to Tab 6 of your
 15 binder, and I'm going to ask you to turn to Table 3-6. And
 16 for both the Witness and counsel and Members of the
 17 Tribunal, the pages at which tables are located are not
 18 paginated; however, it is immediately preceding Page 3-16.
 19 MS. WOOD: You were prepared for our question.
 20 Thank you, Mr. Bloom.
 21 MR. BLOOM: I'm learning.
 22 THE WITNESS: Sorry, what was the table number
 23 again?
 24 BY MR. BLOOM:
 25 Q. 3-6.

10:16 1 A. Yes.
 2 Q. And so that the Transcript is clear, this is
 3 Claimants' Exhibit Number 43.
 4 And Doctor, you're at that table now?
 5 A. Yes, I see the table.
 6 Q. And give you a moment to look at it.
 7 A. This is--is this--which Woodward-Clyde document
 8 does this come from?
 9 Q. This is the 2000 Report.
 10 A. The Remedial Action Report? Unfortunately, it has
 11 the same acronym as the Remedial Action Plan. Is that what
 12 you're talking about?
 13 Q. Yeah, this is post-remediation.
 14 A. Yeah, okay. Yes.
 15 Q. Now, for Aguarico 2, the investigation discovered
 16 a soil sample of 9800 milligrams per kilogram in Pit 3.
 17 Do you see that at the third line of the table?
 18 A. Yes, I see that.
 19 Q. And there were no samples taken for Pits 1 and 2.
 20 Do you see that also in the footnote or the NS?
 21 A. Yes, I see--I think this illustrates exactly the
 22 point I was trying to make that if there was an agreement
 23 between TexPet and the Government of Ecuador that the pits
 24 required remediation and the soil required remediation
 25 based on visual evidence, they simply were remediated. No

10:17 1 need to collect samples before the remediation begins.
 2 Q. So, just to put a fine point to what you just
 3 said, Pits 2 and 3 were not sampled precisely because there
 4 was a determination based on what they saw that there was
 5 contamination that exceeded limits or otherwise required
 6 remediation?
 7 A. That's what this footnote says. I would have to
 8 look elsewhere. You would need to provide me a full copy
 9 of the Report to be certain that these pits actually were
 10 remediated. This may have changed in the course of the
 11 progression of the remediation, but certainly, reading the
 12 footnote on this table, that's what it suggests.
 13 If you want me to tell you if that's what
 14 happened, you will need to provide me with a full copy of
 15 this Report.
 16 Q. Well, my points are going to be a little bit more
 17 limited than that. There were three pits that the Parties
 18 determined exceeded the RAP threshold. My question is, if
 19 you can confirm, there were no samples taken down-gradient
 20 from Pit 1; isn't that right?
 21 A. It appears there were no samples collected from
 22 Pit 1, based on this table.
 23 Q. And there were no samples taken down-gradient from
 24 Pit 2 or from Pit 3?
 25 A. This table tells me about samples taken from the

10:20 1 looking at what the soil--you can see the soil. You can
 2 determine whether or not you have reached the end of the
 3 contamination. It's very common in an excavation,
 4 particularly with crude oil because you can see the
 5 contamination.
 6 Q. Doctor, can you tell the Tribunal what the acronym
 7 PEPDA, which we've been referring to, stands for?
 8 A. It's a Spanish acronym. It's the--I don't recall
 9 it. I would have to look it up. It has to do with
 10 remediation of pits and spills in the Amazon region.
 11 Q. Okay. I will give it a shot then for the purposes
 12 of the Tribunal anyway. It's the project for the
 13 elimination of contaminated pits in the Amazon district.
 14 And that's at Tab 7. It's an exhibit to one of your
 15 Reports.
 16 Now, PEPDA is a non-profit project; correct?
 17 A. I don't know.
 18 Q. You don't know?
 19 A. It's--I understand it's part of Petroecuador. And
 20 I'm not certain that is what the acronym stands for. I've
 21 seen other places where the D is defined as also standing
 22 for "derrames," spills. But I'm not certain what the
 23 acronym stands for. PEPDA is the arm of Petroecuador doing
 24 remediation.
 25 Q. And we will not--

10:19 1 pits, and there were no samples taken from the pits.
 2 Q. And the question is: How does one determine
 3 whether the contamination migrated?
 4 A. It's a very straightforward process when you're
 5 remediating the soil. Again, much of this is based on
 6 visual observation. You can see oil. It's black. You
 7 excavate until you can no longer see black oil, so you
 8 excavate the extent of contamination. That's discussed in
 9 this Woodward-Clyde Report. Again, if you give me a full
 10 copy, I could point out where.
 11 When they observed contamination beyond the pits,
 12 they excavated it. A specific example that's called out in
 13 the Report is when oil migrated through tree root holes,
 14 and they would excavate those tree roots until they reach
 15 the end of the contamination. That's the way it's normally
 16 done. That's the way it was done in this case.
 17 Q. Now, I understand if there is contamination that
 18 is visual or that one can smell, one can deduce remediation
 19 needs to be done.
 20 A. Yes.
 21 Q. The part I'm having difficulty with is, how do I
 22 determine whether the contamination is now subsurface a
 23 couple of meters down?
 24 A. Because when you're doing the remediation, you're
 25 excavating subsurface a couple of meters down, and you're

10:22 1 A. For a time. It's no longer. They haven't--they
 2 have renamed and changed the organization several times
 3 since.
 4 Q. And we're not going to rely on my Spanish skills;
 5 we've already established that.
 6 A. They're no worse than mine.
 7 Q. You would agree, sir, that the Reports describing
 8 PEPDA's activities note its ability to perform tasks more
 9 cheaply than other private contractor remediations; would
 10 you not agree with that?
 11 A. That is--you could find statements to that effect
 12 in the PEPDA 2007 Report, yes.
 13 Q. Why don't we turn to that, and that's at Tab 7.
 14 A. Yes.
 15 Q. And I think we will spend probably a little time
 16 on this document.
 17 And if you turn with me to Page 27--
 18 A. Is the full document here?
 19 Q. It's in--if you want to see the entirety, it's
 20 attached to your Report.
 21 A. Do you have a copy, a full copy of this? If
 22 you're going to be referring to different pieces and asking
 23 me questions about what they say and what they mean, I may
 24 want to look to other parts of the Report.
 25 Q. So, what Tab 7 is, it's the full Report as you

10:23 1 provided it to us, as attached to your Report.
 2 A. I don't believe so. It's much shorter than the
 3 Report that was Exhibit 1.
 4 The full Report was provided, including the
 5 attachments to my Third Report.
 6 Q. We can check at break, and if you wind up having
 7 trouble, we will take a break early.
 8 A. Okay. All right.
 9 PRESIDENT VEEDER: In the meantime, could the
 10 Claimants help? Come back later, then we'll find out.
 11 MS. WOOD: Yes, he did--there is one, as Dr.
 12 Hinchee cited, that was an updated version with more of the
 13 Report if not all of the Report translated attached to his
 14 Third Expert Report.
 15 And I would just object for the record, if--since
 16 the Witness is asking for a full copy of the Report in
 17 order to respond to Mr. Bloom's questions, I would ask
 18 maybe we could get that on a break, and you could move on
 19 to a different set of questions right now.
 20 MR. BLOOM: Well, and just for the record, since
 21 this is what he did provide to us, and that's been
 22 reaffirmed to me in connection with this First Report, I'm
 23 certainly entitled to ask the Witness about his Report as
 24 he provided it to us.
 25 PRESIDENT VEEDER: Please continue. In the

10:25 1 meantime, could the consultants dig out what they think is
 2 the fuller Report; and as soon as they have done that,
 3 signal to us.
 4 MS. WOOD: Yes, sir.
 5 PRESIDENT VEEDER: If you have trouble answering
 6 the question because you haven't got the full Report, do
 7 tell us, but let's see how this goes.
 8 THE WITNESS: Yes, sir.
 9 BY MR. BLOOM:
 10 Q. And the first question is not going to be
 11 difficult. If you can just read for us what's highlighted
 12 at Page 27, referring to the cost for PEPDA.
 13 A. Yes: "The difference is basically due to the
 14 social commitment that PEPDA maintains with the community
 15 and also the fact that PEPDA is a non-profit project,
 16 unlike other companies responsible for environmental
 17 remediation."
 18 Q. Now, you have stated in your 2015 Report--and if
 19 you want to look at that, that's at Tab 18, and I'm
 20 referring to Page 13--but you state: "Petroecuador's 2007
 21 PEPDA Annual Report makes clear that the \$70 million
 22 Petroecuador estimates"--I'm sorry--
 23 A. I'm sorry, that's--yeah, at page--Tab 18 is not my
 24 Report.
 25 Q. Tab 8.

10:26 1 A. Tab 8. Okay. What page?
 2 Q. Page 13.
 3 A. Yes. Yes, I see this.
 4 Q. All right. And you say that Petroecuador's 2007
 5 PEPDA Annual Report makes clear that the \$70 million--makes
 6 clear that the \$70 million Petroecuador estimate--includes
 7 much more than pit remediation.
 8 A. Yes.
 9 Q. Okay. And that's towards the top of the page
 10 under 3.4?
 11 A. Yes.
 12 Q. And then you specifically have stated that the
 13 \$70 million estimate actually includes sediments and
 14 spills.
 15 Do you see that at the end of the first paragraph?
 16 A. Yes.
 17 Q. So, I would like to discuss spills with you.
 18 And would you agree with me that a truly
 19 comprehensive cleanup of spills is not very easy unless you
 20 know where the spills occur?
 21 A. You need to know where contamination is in order
 22 to clean it up, yes.
 23 Q. And would you also agree with me that it's not
 24 always clear where the spill has occurred, especially when
 25 you're looking years after the event, after the spill

10:28 1 itself?
 2 A. As I said, particularly with spills where's it's
 3 surficial contamination, you can typically see oil. Over
 4 time you have vegetation that grows, you have to disturb
 5 the vegetation to look for it, but it can be seen.
 6 Q. In all instances can it be seen?
 7 A. Well, there's--yes, most instances. There's
 8 certainly some conditions under which it can't be seen.
 9 And that's the reason, when you're doing remediation of a
 10 pit or a spill, that you take confirmatory analysis to
 11 verify that, in fact, you've excavated and that you've gone
 12 far enough to completely clean up to the standards the
 13 spill or the pit that you're remediating.
 14 Q. So if, 30 years ago in 1985, in the Oriente,
 15 TexPet spilled oil at a site, did not report it, did not
 16 record it or preserve the record, and let's say that spill
 17 occurred to the side of the platform and went into the
 18 rainforest-covered stream, you wouldn't necessarily see any
 19 remnants of that spill today, 30 years after the fact,
 20 would you?
 21 A. You might or you might not. It depends on the
 22 nature of the spill and the area that it was spilled into.
 23 Q. And you would presumably also agree that it's not
 24 uncommon, especially on marshy surfaces, that with the
 25 passage of time, contamination above ground will diminish

10:29 1 or be obscured?
 2 A. It's possible that the oil will become less
 3 visible over time, yes.
 4 Q. And would you also agree with me that
 5 contamination can migrate beneath the surface?
 6 A. Yes, contamination migration beneath the surface
 7 is possible.
 8 Q. And have you ever investigated how accurate
 9 TexPet's records are with respect to spills?
 10 A. I have not, no.
 11 Q. Please look at Tab 10, which for the record is
 12 Respondent's Exhibit 201.
 13 A. I have it.
 14 Q. And hopefully we have a slide, so we don't have to
 15 strain our eyes on this one.
 16 And it says--and this is an internal memo within
 17 TexPet, and it says, in part: "No reports are to be kept
 18 on a routine basis and all previous reports are to be
 19 removed from"--is that "field"?
 20 A. Where are you reading?
 21 Q. I'm sorry, (c). Yeah:
 22 "From field and division offices and destroyed."
 23 A. I see that, yes.
 24 Q. You see that?
 25 A. Yes.

10:31 1 Q. And the only point here is the records may not be
 2 perfectly accurate, and this was back from 1972.
 3 A. Yes. Records, particularly from this era, were
 4 typically not very accurate.
 5 Q. Now, to be clear, is it your understanding that
 6 PEPDA is intended to clean up all soil and sediment damage
 7 by TexPet spills prior to 1990?
 8 A. No. TexPet was assigned a very specific
 9 responsibility or Scope of Work under the RAP which defined
 10 its share of the remediation to be cleaned up. That did
 11 not include all oil--all spills or all pits.
 12 Q. So, the premise--let me ask you that this way:
 13 Has the premise of all of your work for Chevron in
 14 connection with Lago Agrio and the arbitration been
 15 premised on the underlying assumption that Chevron had no
 16 obligations to the Plaintiffs beyond the RAP?
 17 MS. WOOD: Well, I'm going to object to that. It
 18 calls for a legal conclusion. Also, I don't believe that
 19 was a correct characterization of the RAP.
 20 PRESIDENT VEEDER: You can ask the question. If
 21 you can't answer the question, please say so.
 22 MR. BLOOM: Yeah. I'm essentially asking him for
 23 the scope of what he performed. I'm not asking him for a
 24 legal conclusion.
 25 THE WITNESS: No. Most of the work that I have

10:33 1 done has been independent of who was responsible for the
 2 cleanup. For example, almost all of the costs that I
 3 presented in my presentation this morning included costs
 4 that were for pits and spills not assigned to TexPet under
 5 the RAP. And, in fact, the \$70 million cost I talked about
 6 includes pits and spills that occurred after TexPet
 7 departed the country and were as a result of Petroecuador's
 8 operations. So, no, that's not--wasn't the predicate of
 9 most of the work that I have done.
 10 Q. Okay. Thank you for that clarification.
 11 Now, you've testified--and if you want to, you can
 12 look at it or you can take my word--it comes from your
 13 deposition, which is at Tab 2, Page 263--but I'm not sure
 14 this is going to be controversial for you, but certainly
 15 for counsel, Tribunal, Page 263, Line 15.
 16 And sir, if you can just tell me when you're
 17 there?
 18 A. I'm there.
 19 Q. Okay. You say: "I don't see any need for
 20 remediation beyond the pits and spills because there is no
 21 evidence of the need for remediation of these other media."
 22 Do you see that?
 23 A. Yes, I see that.
 24 Q. Okay. And that's still your position today?
 25 A. Yes. I think I explained in my presentation there

10:35 1 was no need for groundwater remediation, for example.
 2 Q. Now, I would like to turn to the second component
 3 which you say is included in the \$70 million PEPDA
 4 estimate, and that's sediments.
 5 A. Yes.
 6 Q. Can you please describe what sediments are.
 7 A. The way the term "sediments" are being used in
 8 this case refers to essentially soil that's below surface
 9 water, underneath a stream or a wetland, a marsh, something
 10 like that. There is some confusion, however, over the term
 11 because, technically, we often use the term "sediment" to
 12 refer to soil samples collected from depth and terrestrial
 13 samples, and in Ecuador I have seen no evidence that the
 14 term "sediments" have been used either by TexPet or by
 15 Petroecuador. They simply call all of the remediation soil
 16 remediation.
 17 But as I have been using it, and I believe most
 18 people in this case have been using it, it refers to soil
 19 beneath water.
 20 Q. And sediments can also mean the material that
 21 sometimes collects in the bottom of my red wine glass?
 22 A. Yes, I'd call that sediment.
 23 Q. Okay.
 24 A. It probably doesn't need remediating.
 25 Q. I'll remediate that.

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<p>10:36 1 Sir, you say that the estimate was for remediation 2 of all contamination in the former Concession, including 3 sediments and spills. Is that your position? 4 A. Yes. Yes. 5 Q. So, I would like you to look at the 2007 PEPDA 6 Annual Report at Tab 7, and if you turn to Page 9. 7 A. Yes. 8 Q. You are there? And do you see the bold with the 9 heading "Project Objectives"? 10 A. Yes. 11 Q. And there were four objectives listed there; 12 right? 13 A. Yes, yes. 14 Q. Could I have you read out loud the 15 fourth objective. 16 A. "To apply decontamination treatment to sediments 17 from tanks of production stations, of water reinjection and 18 treatment plants; and final containment of solid waste." 19 Q. So, the sediments in the tanks, were those 20 sediments similar to the sediments in the bottom of my wine 21 glass? 22 A. Hopefully not. 23 Q. I knew you were going to say that. 24 A. They are sediments--the material had settled to 25 the bottom of a tank somewhat the same way that your</p>	<p>10:39 1 A. No. PEPDA is part of Petroecuador. It's the 2 other way around. 3 But I talk about Petroecuador remediation because 4 Petroecuador is the parent or the owner of all of these 5 organizations, or--that do remediation. And we have a 6 number of PEPDA Reports. Although PEPDA only survived for 7 a few years before it was reorganized and a new name was 8 given to it, there are quite a few Reports with the PEPDA 9 name on them. But they're Petroecuador. 10 Q. And ultimately here what we're talking about is 11 what are the components of the PEPDA estimate; correct? 12 A. Yes, yes. 13 Q. And we have what the four objectives are, do we 14 not? 15 A. Well, those are four objectives that are 16 identified on this page, yes. 17 Q. And the only reference in the objectives to 18 sediment is in the fourth point here, which refers to 19 sediments from tanks of Production Stations? 20 A. Yes. 21 Q. Correct? 22 A. Right. You have to look at the more detailed 23 costs deeper in the Report to see that they include 24 sediments. 25 Q. Now, is it your understanding that PEPDA is</p>
1941	1943
<p>10:38 1 sediments in your wine glass settled out. 2 Q. And more specifically, what you just read is not 3 describing the cleanup of sediment down at the bottom of a 4 lake or stream; isn't that right? 5 A. No, that wasn't what I was referring to when I was 6 talking about cleanup of sediments. 7 Q. Okay. Here, at least, we're only talking about 8 sediments from tanks of Production Stations. And again-- 9 A. This does refer to Production Stations, yes. 10 Q. Yeah. Now, if you're looking--if you can take a 11 moment to look at the other three project objectives, you 12 won't see or find the word "sediment" in any of these other 13 objectives, will you? 14 A. No, sir. As I said, the term "sediment" in 15 Ecuador, either by Petroecuador or TexPet, doesn't tend to 16 be used the same way that we use the word in this case. 17 Q. Well, in your Report, you don't cite to any source 18 other than the PEPDA Report in support of your proposition 19 that PEPDA was intended to cover the cleanup of sediments; 20 correct? 21 A. I do cite to this Report. I also provide other 22 reports as attachments to my Expert Report that are 23 examples of sites where sediments were cleaned up by 24 Petroecuador. 25 Q. But that's not part of PEPDA, is it?</p>	<p>10:40 1 intended to clean up every stream--I think you already said 2 no--that was impacted during TexPet's operations? 3 A. Well, PEPDA, as I quoted in my presentation, and 4 as I can find here if you give me a few minutes, is 5 assigned responsibility for cleanup of all the 6 environmental liabilities, which would include both 7 TexPet-era non-RAP features as well as more current 8 contamination, more current features. 9 MR. BLOOM: Mr. President, would now be a good 10 time for a break? 11 PRESIDENT VEEDER: It certainly would. 12 Let's take a 15-minute break, and we'll come back 13 at 11:00. Thank you. 14 (Brief recess.) 15 PRESIDENT VEEDER: Let's resume. 16 MS. WOOD: Thank you. 17 Just to clear up that one issue about the full 18 PEPDA report that Dr. Hinchee was asking about, I conferred 19 with Mr. Bloom during the break. We both recognize that 20 there was an updated translation, but it is 234 pages. 21 We're printing a copy. I believe Mr. Bloom is printing a 22 copy. I don't know that we can very quickly print seven 23 copies, but we will both have one in the event it becomes 24 necessary. 25 PRESIDENT VEEDER: Is it paginated?</p>

10:59 1 MS. WOOD: I do not know. I assume so.
 2 PRESIDENT VEEDER: If we need it, we'll get to
 3 that.
 4 MR. BLOOM: It's probably one very long sentence
 5 for 234 pages.
 6 BY MR. BLOOM:
 7 Q. Turning to a new subject right now, Dr. Hinchee,
 8 as part of your review during the Lago Agrio Litigation or
 9 in this arbitration, have you ever had a chance to review
 10 the Lago Agrio Complaint filed by the Plaintiffs?
 11 A. Yes, I have seen it.
 12 Q. And you understand that the Plaintiffs were asking
 13 for, among other things, that the works be carried out to
 14 restore the natural characteristics and features of the
 15 land?
 16 A. I don't recall the exact wording, but that seems
 17 to be consistent with my recollection, yes.
 18 Q. Now, in your Report, in your 2013 report, which we
 19 have at Tab 5, at Page 4--and maybe you can turn to that
 20 now. And again, Tab 5, Page 4.
 21 A. Yes.
 22 Q. In the middle paragraph, you say that the Judgment
 23 bases the soil remediation Award on a 100 milligrams per
 24 kilogram Total Petroleum Hydrocarbons standard, TPH
 25 standard, without providing any scientific basis."

11:00 1 And then you go on and say: "In my experience, no
 2 similar site anywhere has ever been cleaned up to 100
 3 milligrams per kilogram TPH standard."
 4 Do you see that?
 5 A. Yes.
 6 Q. And you testified about that this morning, did you
 7 not?
 8 A. Yes, this is my opinion.
 9 Q. And then you also testified this morning about
 10 your involvement with the Trecate blowout?
 11 A. Yes, I did.
 12 Q. And in your role there your job entailed
 13 overseeing the characterization and remediation of the
 14 blowout; correct?
 15 A. Yes.
 16 Q. So, if you turn with me now to Tab 18--and I will
 17 represent that Tab 18 is an LBG exhibit to its
 18 December 2013 report, and it's an article on the Trecate
 19 site.
 20 You've previously read this article, did you not?
 21 A. Yes, I did.
 22 Q. And if you turn with me to Page 5--and this is
 23 described as a map showing the area corresponding to the
 24 three remediation zones; correct?
 25 A. Yes, it is.

11:02 1 Q. And we also have it up on a slide, if that's a
 2 little bit easier for you.
 3 Now, the largest surface area is the area inside
 4 the blue square or circle; correct?
 5 A. Yes.
 6 Q. And you can see in the chart below the map that
 7 the surface size for Zone 1 is 700 hectares; correct?
 8 A. Yes, about seven square kilometers.
 9 Q. And the area of the former Concession that
 10 Claimants admit being occupied or used by TexPet operations
 11 was a little over 4400 hectares; correct?
 12 A. I don't know what the size is. That's not what's
 13 relevant. What you need to look is the area contaminated,
 14 and certainly there is not that much area contaminated.
 15 Again, Trecate, if we had measured the entire oil
 16 field and the inhabited area around it would have been far
 17 larger than this.
 18 Q. Well, if you can bear with me just for one moment,
 19 and you could disagree as to the relevance, but would you
 20 agree with me that the Concession Area is approximately six
 21 times larger than at least the affected parts of the
 22 Trecate blowout area?
 23 A. The Concession Area is larger than the area
 24 affected by the Trecate blowout; I believe that's true,
 25 yes.

11:03 1 PRESIDENT VEEDER: Just pause one moment. We have
 2 a technical problem.
 3 ARBITRATOR LOWE: Simply that there's material
 4 coming up on the screen, which I think is not being read
 5 into the record, and I've now got an extract from
 6 Claimants' Memorial on the Merits, 23, and there's going to
 7 be no record of this in the Transcript unless somebody
 8 mentions it.
 9 MR. BLOOM: I think your screen is different than
 10 my screen.
 11 ARBITRATOR LOWE: It's now gone back to the map.
 12 MR. BLOOM: Thank you.
 13 BY MR. BLOOM:
 14 Q. And just to clean up the record, the area of the
 15 former Concession that Claimants admit being occupied by
 16 TexPet operations was in excess of 4400 hectares; do you
 17 agree with that?
 18 A. I don't have that--I haven't seen that number, or
 19 at least it doesn't come to mind.
 20 Q. Okay. We'll move on, then.
 21 Now, keeping with this map, you can see that the
 22 chart below--and again, that's also on the screen--lists
 23 the TPH concentration standards in this zone, meaning
 24 within the blue zone, at less than 50 parts per million;
 25 correct?

11:05 1 A. Yes.
 2 Q. And just for clarity and for the Tribunal's
 3 information, parts per million is equivalent to milligrams
 4 per kilogram; right?
 5 A. Yes, yes.
 6 Q. So, that 50 parts per million is the same thing as
 7 50 milligrams per kilogram?
 8 A. Yes.
 9 Q. Now, the Republic has pointed this out before, and
 10 in response you stated that Trecate was not remediated to
 11 50 milligrams per kilogram, and I think you said that again
 12 today; right?
 13 A. Yes, that's true, the more contaminated soil,
 14 certainly.
 15 Q. You said for the final soil concentrations
 16 accepted by the Italian authorities varied up to and
 17 exceeded 5,000 milligrams per kilogram?
 18 A. Yes, that's true.
 19 Q. Now, turning back to the article, if you could
 20 turn to Page 9--
 21 A. Yes.
 22 Q. --at the bottom of the page, you can see it says
 23 "land forming reduced surface soil TPH concentrations from
 24 excess of 10,000 milligrams per kilogram to approximately
 25 50 milligrams per kilogram soil, the designated target

11:08 1 A. Are you reading from somewhere in this article?
 2 Q. No, I'm just asking you.
 3 A. Yes.
 4 Q. The blowout occurred in February of 1994; correct?
 5 A. February, early March, something like that.
 6 Q. And the point is the efforts to clean up began
 7 immediately; correct?
 8 A. Yes. And the institute you referred to is
 9 Battelle. That's who I worked for. And I was at the time
 10 working with the European Group, and that's why I was on
 11 site so shortly after the blowout.
 12 Q. Would you agree with me that a remedial process
 13 occurring one month after the contaminating event is far
 14 more preferable than a remedial process occurring many
 15 years later?
 16 A. I don't know about "preferable." In this case it
 17 was certainly necessary. Oil had been sprayed into the
 18 atmosphere, and had fallen on farmland. It was in March.
 19 They were about to begin their spring plowing and planting.
 20 It also fell onto communities and homes. That needed to be
 21 cleaned off, so it certainly made sense to act quickly.
 22 Q. Now, you were also once deposed in relation to a
 23 hydrocarbon contamination case in the state of Mississippi?
 24 A. Yes, that's true.
 25 Q. And that was on behalf of an oil company; no?

11:06 1 cleanup level."
 2 Do you see that?
 3 A. I see that. You have to understand this was
 4 written by people who had no involvement in the
 5 remediation. They cite nothing for this, and I can tell
 6 you that statement is wrong.
 7 Q. And this Report also says that, by January 1998,
 8 98 percent of the initially impacted surface returned to
 9 agriculture for agricultural use; correct?
 10 A. Yes, and I can't speak to the percentage.
 11 But you have to understand that the seven square
 12 kilometers, the area that we called, "initially impacted,"
 13 was determined based on visual observation of oil droplets.
 14 It turned out that much of that area was at or below 50
 15 milligrams per kilogram without remediation, without the
 16 need for remediation. So, simply stating that a large
 17 percent of the land had been returned to agricultural use
 18 doesn't suggest that it was actually remediated to those
 19 concentrations. In places it was below those
 20 concentrations to begin with.
 21 Q. In March of 1994--it was about a month after the
 22 blowout--the oil company responsible for Trecate hired the
 23 European section of the Battelle or Battelle-ee (phonetic)
 24 Memorial Institute to work out an Environmental Monitoring
 25 Plan in a remediation project; right?

11:09 1 A. Plantation Pipeline.
 2 Q. And you offered an expert report in that case?
 3 A. Actually, I was involved in more than one case
 4 with Plantation Pipeline, so I'm not--you'll have to be
 5 more specific.
 6 Q. Well, then, do you recall opining on the adequacy
 7 of remediation by Plantation Pipeline in Mississippi?
 8 A. Not specifically, but I may have. It's been a
 9 number of years.
 10 Q. I'm going to ask you to turn to Tab 20 in your
 11 binder. It's an EPA document. This is also an exhibit to
 12 LBG's 2015 Report?
 13 A. Yes.
 14 Q. And it contains a summary of cleanup standards for
 15 various U.S. states for hydrocarbons from 1993--this is
 16 alphabetized.
 17 A. Yes.
 18 And you'll note on the very first page this was
 19 developed for EPA's Office of Underground Storage Tanks.
 20 They regulated--they regulate refined product
 21 releases--gasolines, diesel, that kind of thing--not crude
 22 oil, so these are not crude oil.
 23 Q. And we will get to that in a moment, actually.
 24 If I can have you turn, again it's alphabetized,
 25 so if you can take a look at Mississippi, and again I

11:11 1 apologize for the lack of page numbers. And if you could
 2 kindly tell me when you're there.
 3 And you'll see two charts on this page that should
 4 be to your left there.
 5 A. Okay. I see Mississippi now, yes.
 6 Q. And one of the charts is a summary of Mississippi
 7 cleanup standards for hydrocarbon-contaminated groundwater,
 8 and the other is for soil.
 9 Do you see that?
 10 A. Yes.
 11 Q. And if you'd look at the chart of soil
 12 contamination, you'll see in the left-most column it lists
 13 the crude oil products, either gasolines, diesel or waste
 14 oil; do you see that too?
 15 A. Well, certainly gasoline and diesel are crude oil
 16 products. So, waste oil, it doesn't always come from crude
 17 oil.
 18 Q. Okay.
 19 A. I don't know what the definition of waste oil is
 20 here.
 21 Q. And then you also see the column for action level
 22 for each of these product types?
 23 A. Yes, I do.
 24 Q. Now, during the Lago Agrio Litigation, when
 25 Chevron tested crude, they also tested for gasoline range

11:14 1 term "fraction" used in this context.
 2 A. I think Dr. Douglas explained what crude oil was
 3 earlier. Crude oil is a mixture of hydrocarbons that vary
 4 from very light hydrocarbons, really as light as methane,
 5 and then the GRO range tends to be the lighter range, all
 6 the way through heavier hydrocarbons and out to eventually
 7 resins and asphaltics.
 8 So, the whole range of crude oil is quite broad.
 9 Within that crude oil, there are fractions that correspond
 10 to the diesel range organics, fractions that correspond to
 11 the gasoline range organics, and it's a part of what's
 12 found in a total crude oil mixture.
 13 Q. Now, during the Lago Agrio Litigation, when
 14 Chevron tested for DRO or GRO, those are the same
 15 constituents that make up gasoline and diesel; right?
 16 A. Not exactly, but they're the same carbon range,
 17 yes.
 18 Q. They're measuring the same class of compounds?
 19 A. The same carbon range, yes.
 20 Q. So, this chart indicates that in the early 1990s,
 21 the action level for these oil products was 100 milligrams
 22 per kilogram for the state of Mississippi; am I right? Can
 23 you confirm that for me?
 24 A. That is specifically for diesel, which is not the
 25 same thing as the diesel range organic fraction for crude

11:12 1 organics also known as GROs; correct?
 2 A. Yes.
 3 Q. And Chevron also testified for DROs which is an
 4 acronym for diesel range organics; right?
 5 A. Yes.
 6 Q. Now, DRO, for example, tests the hydrocarbon
 7 organics that are in diesel; right?
 8 A. Yes. They're the same range of hydrocarbons as
 9 are commonly found in diesels.
 10 Q. And diesel is also a component of crude; is that
 11 right?
 12 A. Well, diesel is distilled from crude.
 13 Q. Something to the order of 40 or 50 percent?
 14 A. It depends on the crude.
 15 Q. What's the ballpark, if you know?
 16 A. That would be a reasonable estimate for the
 17 Oriente Crude. I've seen crudes that vary considerably.
 18 Q. Okay. And so, when DRO results showed 200
 19 milligrams per kilogram, that shows that there is that much
 20 diesel fraction; right?
 21 A. If your result is 200 milligrams per kilogram DRO,
 22 then the fraction that corresponds to the fraction found in
 23 diesel is there at that concentration. It doesn't tell you
 24 that it's necessarily diesel.
 25 Q. Can you, for the Tribunal's sake, also explain the

11:15 1 oil, but for diesel the refined product, which is much less
 2 viscous and more mobile in the environment and more
 3 problematic than most crude oils, a standard of 100
 4 milligrams per kilogram or parts per million was set as an
 5 action level, which isn't really thing as a cleanup
 6 standard.
 7 Q. But it's made up of the same hydrocarbons class,
 8 is it not?
 9 A. There are--yes, they're some of the same
 10 hydrocarbons present in diesel as you find in crude oil.
 11 Q. And they have the same toxic components, do they
 12 not?
 13 A. The distilled material may have more of the
 14 polyaromatic hydrocarbons, particularly gasoline range
 15 organics. They have certainly more of the benzene than
 16 crude oil does. Concentrations are higher.
 17 Q. But not in all circumstances?
 18 A. No, that's a general rule, not in all
 19 circumstances.
 20 Q. Everything in the diesel comes from the crude oil,
 21 does it not?
 22 A. Not all diesels, there are bio diesels, but the
 23 majority of diesel products come from crude oil, yes.
 24 Q. And under the action level for gasoline, this also
 25 notes that the standard is 100 parts per million; correct?

11:17 1 A. The action level is 100 parts per million, yes.
 2 That's actually not the level to which, in my experience,
 3 most gasoline in Mississippi is actually cleaned up. What
 4 this simply tells you is you need to address the
 5 contamination if you find more than 100 parts per million,
 6 and then down the road, if remediation is pursued, you may
 7 set a standard.
 8 Q. Now, if we can go to that last column, the cleanup
 9 level. Do you see that?
 10 A. Yes.
 11 Q. And you see the two stars, and that takes you
 12 below the chart. What do the two stars mean?
 13 A. The reference is 100 PPM or less if no sensitive
 14 environmental receptors present.
 15 Q. Okay, thank you.
 16 And, Dr. Hinchee, you've had remediation
 17 experience in climates found similar to that found in the
 18 Oriente?
 19 A. Yes.
 20 Q. You would agree with me that Louisiana's
 21 environment is similar to the environment in the Oriente?
 22 A. It has similarities, yes.
 23 Q. And that's what you've testified previously;
 24 correct?
 25 A. Yes.

11:18 1 Q. So, I ask you now to turn back to the same
 2 document, the EPA document, summarizing the hydrocarbon
 3 contamination standards in U.S. states. At Tab 20, at
 4 Page 17.
 5 Okay, let's do this alphabetically. Let's look up
 6 Louisiana. And you can see these are the standards for
 7 groundwater and soil for Louisiana.
 8 Do you see that?
 9 A. Yes, for petroleum products, not for crude oil.
 10 Q. And what is the standard?
 11 A. For what?
 12 Q. For the petroleum products that are listed here.
 13 A. There are a whole variety of them listed here.
 14 Q. If I can take you to the soil at the bottom chart.
 15 A. Yes.
 16 Q. Okay. And you see for gasoline, and what we can
 17 go down this item by item, but for gasoline, what does it
 18 say?
 19 A. Gasoline, BTEX that stands for benzene, toluene,
 20 ethylbenzene, xylene, and it provides an EPA method number,
 21 notification level any amount, cleanup site-specific less
 22 than 100 parts per million.
 23 Q. Okay. And then the next line?
 24 A. TPHg, that would be Total Petroleum Hydrocarbons
 25 gasoline range organics, and it provides a reference to a

11:20 1 California method, site-specific less than 300 parts per
 2 million.
 3 Q. And then for diesel?
 4 A. For diesel, TPHd (diesel) California,
 5 site-specific less than 300 parts per million.
 6 Again, these aren't what are applied in Louisiana
 7 to crude oil contaminated soils. These are for refined
 8 products.
 9 Q. And then if I can direct your attention to the
 10 same chart, to the fifth column, the notification level.
 11 A. Yes.
 12 Q. There is a requirement for notification under what
 13 circumstances for gasoline?
 14 A. Any amount.
 15 Q. And is that also true for diesel?
 16 A. Yes.
 17 Q. And then if you look at the top chart dealing with
 18 groundwater contamination, you'll confirm for me that the
 19 notification level for these same products, gasoline and
 20 diesel, is triggered at any amount as well; correct?
 21 A. That's what the chart says.
 22 There is a note here pointing out that Louisiana
 23 is currently revising their cleanup levels to reflect
 24 risk-based levels, so these were standards that were
 25 applied at one time, but have been revised.

11:22 1 Again, all of these are for refined product, not
 2 crude oil. Louisiana has separate regulations for crude
 3 oil which don't appear to be in this document.
 4 Q. Okay. Turning to a different subject, sir, you
 5 state that PEPDA's remediation standard is to clean up--I
 6 think you did this on direct--to 2500 milligrams per
 7 kilogram; is that correct?
 8 A. That's the most commonly applied standard. It's
 9 not uniform. Sometimes you can find sites that they use
 10 the 4,000 for commercial, and sometimes a sensitive
 11 ecosystem standard of a thousand. They always follow the
 12 Decreto 1215 standards that are applied, most often 2500.
 13 Q. And this standard is in the Ecuadorian regulations
 14 that the RAOHE Standards for agricultural land? Do you
 15 know that?
 16 A. Yes, that was issued in 2001, I believe, 2002,
 17 sometime after the RAP was complete.
 18 Q. Now, you're aware that Dr.--I'm sorry, you're
 19 aware that Mr. Connor testified in a different arbitration
 20 about the remediation costs of oil sites in the Oriente;
 21 correct?
 22 A. Are you referring to the Burlington Case? I don't
 23 know exactly where those sites are, but I know they are in
 24 the same general region, yes.
 25 Q. And one of the subject matters you've addressed

11:23 1 already in this arbitration is remediation costs?
 2 A. Yes.
 3 Q. And you've reviewed Ecuador's discussion of the
 4 expected remediation costs associated with the TexPet
 5 Concession Area; correct?
 6 A. Yes.
 7 Q. And you've had an opportunity now to review
 8 Ecuador's discussion relating to the Burlington costs?
 9 A. Yes, I've seen Ecuador's discussion of the
 10 Burlington costs in this case.
 11 Q. And, in fact, in your Report, you rejected any
 12 application of the Burlington evidence because in your
 13 opinion, it was better to rely on PEPDA's projected costs
 14 for its project; correct?
 15 A. That's one of the reasons I reject the Burlington
 16 costs. There are a number of others.
 17 Primarily, Burlington was not to remediate oil or
 18 at least most of the remediation wasn't oil-contaminated
 19 soil. Most of the remediation that that cost was based on
 20 was to clean up barium, barite, which is not being cleaned
 21 up by Petroecuador, there was no requirement that it be
 22 cleaned up under the Decreto 1215 you mentioned, and so
 23 there is no experience in Ecuador on which the Burlington
 24 costs could have been developed. Those are simply
 25 projected costs built up using as discussed in the material

11:25 1 you provided, high end costs which, in Mr. Connor's report
 2 in Burlington he points out would actually be lower if it
 3 were bid and done in Ecuador.
 4 So, they're not comparable. They're for a
 5 different kind of cleanup, and in a situation where there
 6 is no prior experience in Ecuador on which to base an
 7 estimate for cleanup.
 8 Q. Now, barium is not a component in TPH, is it?
 9 A. No, it is not.
 10 Q. And you understand that Mr. Connor, in connection
 11 with the work done in Burlington, measured TPH?
 12 A. Yes, he did.
 13 Q. Okay. I want to walk you through a couple of
 14 things, and if you could indulge me, and certainly feel
 15 free to look at Tab 12, which is an excerpt from
 16 Mr. Connor's 2010 Report. It's a map of the Burlington
 17 blocks and the Concession Area. Here we go.
 18 A. Which tab? I'm sorry.
 19 Q. It's Tab 12, sir.
 20 A. Tab 12. Yes, I see it.
 21 Q. Okay. So, this is a map both of the former
 22 Concession Area and the oil blocks at issue in Burlington,
 23 and you will see that Block 7 is to the west of the former
 24 TexPet Concession.
 25 Do you see that?

11:26 1 A. I see Block 7, yes, to the west of the former
 2 Concession Area.
 3 Q. And Block 21 is to the west and the south;
 4 correct?
 5 A. Yes, I see that.
 6 Q. And they're both actually adjacent to and border
 7 the Concession Area?
 8 A. I see those blocks do, yes.
 9 Q. And in Burlington, Mr. Connor applied the
 10 Ecuadorian RAOHE Standards; correct?
 11 A. That was not the only standard he applied. I
 12 don't know what his basis was for his barium standard.
 13 That's certainly not a cleanup standard in Decreto 1215.
 14 And I don't know for certain that these blocks are
 15 the Burlington blocks.
 16 Q. The RAOHE Standard is also the standard that PEPDA
 17 applies; correct?
 18 A. Yes, that's right, and that's why PEPDA doesn't
 19 remediate barium barite.
 20 Q. Now, if you'd look at Tab 14, which, for the
 21 record, is Respondent's Exhibit 1248, it is a spreadsheet
 22 listing the cost estimates done by Mr. Connor in
 23 Burlington.
 24 Is there a way of making the slide larger?
 25 At the bottom, it says, and we have it

11:28 1 highlighted, "total estimated cost of Block 7 and
 2 Block 21."
 3 Do you see that?
 4 A. Yes.
 5 Q. And then right next to it, it gives an estimate of
 6 a little bit under \$10 million; would you agree?
 7 A. As I recall, some of the information on this table
 8 was added by the Republic of Ecuador. The original table
 9 in John Connor's document did not include these last two
 10 columns with the numbers in red. If you could provide me a
 11 copy of John Connor's actual table, I might be able to more
 12 accurately answer your questions.
 13 Q. Well, I appreciate that, and I agree with you so
 14 that the record is clear, and I was actually going to
 15 represent that, and we will go to that, that we have added
 16 those last two columns, but I promise you I will get to
 17 that.
 18 In fact, you will see on the slide itself at the
 19 bottom in red, we say "all text in red not in original
 20 table but added by the Republic of Ecuador."
 21 Do you see that, sir?
 22 A. Yes, I do.
 23 Q. So, that there's no misunderstanding, only the
 24 material in red is from the Ecuador. Everything else is
 25 from the original Connor. Do you understand?

11:29 1 A. I will accept your representation of that.
 2 Q. Thank you, sir.
 3 And based on this spreadsheet, there were 21 sites
 4 that were included in Mr. Connor's estimate?
 5 A. Yes.
 6 Q. And TexPet drilled and operated at approximately
 7 344 sites; correct?
 8 A. Yes.
 9 Q. So, for these 21 Burlington sites, Mr. Connor
 10 estimates remediation costs to be almost \$10 million, and
 11 using just a little bit of rough math, it comes out
 12 relatively on average about two sites per million dollars
 13 or a little bit less than \$500,000 a site. Would you agree
 14 with my rough math?
 15 A. Yes. This average is about \$500,000 per site, but
 16 if you look in the last column in black, you can see that
 17 more than half of the cost is associated with just one
 18 site, and many of the other sites are a lower cost.
 19 Q. Now, the Republic, as we just talked about, added
 20 some information to this spreadsheet--and again, that is in
 21 red.
 22 A. Yes.
 23 Q. We added the impacted volume for each site.
 24 Do you see that?
 25 A. Yes, I see that.

11:31 1 Q. And neither Claimants nor Mr. Connor to date has
 2 disputed that we've accurately listed the volume for each
 3 site, and just for purposes of the questions, I'm going to
 4 ask you to assume that the volume is correct. So,
 5 according to our calculations, when we add up all the
 6 sites, we have total volume of 33,415 cubic meters.
 7 Do you see that?
 8 A. Yes, I see that.
 9 Q. And I will also represent for you that if we take
 10 the total cost here of about 9.8 or \$9.9 million, divide
 11 that by the total volume, we get \$295 per cubic meter.
 12 A. Yes, I see that.
 13 Q. Okay. And that will be for--I will withdraw that.
 14 To be clear now, Ecuador's position in Burlington
 15 is that Mr. Connor's estimate was much too low, and we
 16 don't have to get into that here, but you would agree with
 17 me that his calculation here--and I understand that you
 18 want to make distinctions, but that his calculation here
 19 was \$295 per cubic meter, which is more than four times the
 20 \$70 per cubic meter that you cited to by PEPDA; correct?
 21 A. The \$295 figure, which is very much apples to
 22 oranges, is larger. It's still well below the \$730 figure
 23 assumed in the Judgment.
 24 Q. And both of these Cleanup Standards or estimates
 25 were aimed at achieving RAOHE Cleanup Standards; isn't that

11:32 1 right?
 2 A. No. Much of the cost involved in this was aimed
 3 at achieving some cleanup standard for barium or barite
 4 which is not included in Decreto 1215.
 5 There is--there is oil in some of these pits, and
 6 those pits, I assume, were to be cleaned up to the Decreto
 7 1215 Standard or some of these sites. These sites don't
 8 all have pits, but the predominant cost here, the driver,
 9 is the barium cleanup, which is not a cleanup being done by
 10 Petroecuador, not cleanup required by Decreto 1215, so
 11 these costs are not based on clean up to the Government of
 12 Ecuador standards as I understand them.
 13 Q. Barium is used for drilling, is it not?
 14 A. Barium is an additive in drilling mud, yes. It
 15 helps increase the density of the drilling mud.
 16 Q. And, in fact, TexPet used barium when it drilled
 17 in the Concession Area; isn't that right?
 18 A. Right, barium sulfite, barite, a naturally
 19 occurring mineral, which I understand certainly is
 20 regulated as non-toxic, so therefore, Ecuador doesn't have
 21 a Cleanup Standard for it in Decreto 1215.
 22 Q. And in Burlington, the company did not drill most
 23 of the sites there; isn't that also right?
 24 A. I don't know that.
 25 Q. Okay. Now, of course, the Lago Agrio Judgment set

11:34 1 the cleanup level for soil at something more stringent,
 2 more protective, than the RAOHE Standards; correct?
 3 A. Yes.
 4 Q. Because it set it at 100 milligrams per kilogram;
 5 right?
 6 A. Yes.
 7 Q. And the Court's 100 milligrams per kilogram
 8 standard is about ten to 25 times lower than the standards
 9 used by the PEPDA cleanup; wouldn't you agree with that?
 10 A. Yes, as I said in my presentation, 25 times lower
 11 than the standard typically applied to Petroecuador, PEPDA
 12 and declared as free of harmful contamination by the
 13 Government of Ecuador's Ministry for the Environment. It
 14 is much lower.
 15 Q. And also much more restrictive than Mr. Connor's
 16 Burlington estimates?
 17 A. I don't know for certain. I guess what
 18 Mr. Connor's estimate in Burlington was for Cleanup
 19 Standard.
 20 Q. But you would agree with me, sir, that the
 21 standard to which a party is required to remediate can
 22 impact the cost of remediation?
 23 A. Yes, it can impact the cost of remediation,
 24 certainly not to the extent of going from \$100 million to
 25 \$6 billion.

11:35 1 Q. I want to flesh out your answer. You would agree
2 that if you remediate to a lower standard, sometimes that
3 means you've got to remediate a larger volume of soil?
4 A. Yes, you often do.
5 Q. Sorry, and that can drive up the price?
6 A. Yes, that increased costs.
7 Q. And sometimes by trying to remediate to a lower
8 standard will also require the use of a different
9 technology?
10 A. Not necessarily. The way that Petroecuador does
11 its remediation is it excavates to the Cleanup Standard.
12 Its remediation is done off-site, and I don't know to what
13 standard, but off-site remediation of that kind often is to
14 a different standard than the standard applied to the site
15 because it's in a different place.
16 Q. My question was whether it may necessitate a
17 different technology, and you were asked this in deposition
18 and I believe you then said yes?
19 A. Yes, if your intention is to reduce the
20 concentration in the excavated soil, certainly.
21 PRESIDENT VEEDER: Just to be clear, in his
22 deposition, and it's in your Slide 53, I think he said
23 sometimes using a different technology.
24 MR. BLOOM: Right. And that's why my question
25 used the word "can," can require the use of different

11:39 1 page, third line, you say here: "This oil would have been
2 visible if it had been present during the TexPet
3 remediation and would have been cleaned up, as remediation
4 of visible surface contamination was a requirement of the
5 RAP.
6 Do you see that?
7 A. I see those words.
8 Q. Do you want to take a moment to read that
9 paragraph?
10 A. Yes, this asphalt mat, had it been present and
11 visible at the time of the RAP would have been something
12 either that would have been required to be remediated or
13 the Government of Ecuador could have added it to the RAP
14 because they could see it, they were making those
15 decisions, they were adding things to the RAP as they were
16 cleaning up these sites. That wasn't--if it wasn't cleaned
17 up, that wasn't done.
18 Q. But you're essentially presuming that any visible
19 contamination here would have been cleaned up because
20 that's really what should have been done; correct?
21 A. No. What should have been done was what was
22 agreed to by TexPet and the Government of Ecuador, and that
23 included, as I said, pits closed prior to 1990 where
24 visible oil was present, and any other soil or pits that
25 were observed to be contaminated during the RAP process and

11:37 1 technology.
2 BY MR. BLOOM:
3 Q. Now, you conclude in your Report that any
4 contamination that was visually observable at any of the
5 sites for which TexPet was obligated to remediate under the
6 RAP would have been remediated; right?
7 A. What are you referring to specifically?
8 Q. Let me just ask it this way: Do you believe that
9 any contamination that was visually observable at any of
10 the sites for which TexPet was obligated under the RAP to
11 remediate would have been remediated?
12 A. TexPet was obligated to remediate the
13 contamination that was assigned to it under the RAP,
14 specifically for the pits that were closed prior to 1990,
15 that included pits where there was visual evidence of oil
16 contamination. And during the remediation process, the
17 Government of Ecuador added additional pits and spills to
18 the remediation requirement as they were discovered, I
19 believe, based on visual evidence.
20 Q. And I think I may not be as precise as I would
21 like to be in my questions.
22 In your 2013 Report, which is at Tab 5, and I will
23 ask you to turn to Page 19.
24 A. Yes, I'm on Page 19.
25 Q. And if you would look at the second bullet on that

11:41 1 added by the Government of Ecuador.
2 Q. Right, but you're still, I think, saying the same
3 thing, are you not? Because it should have been cleaned
4 up, you assumed it was cleaned up.
5 A. I'm not just assuming that. The Government of
6 Ecuador issued Actas accepting these sites as cleaned up,
7 accepting that TexPet had met their obligation site by
8 site, and then in the end issued a final Acta stating that
9 TexPet had met its obligation. The same Government of
10 Ecuador who had inspectors on these sites, adding
11 contamination as it was seen, and they believed that it
12 needed to be remediated.
13 Q. But even that is presuming that Ecuador got it
14 right back between 1995 and 1998; is that not correct?
15 A. Well, if you couldn't--if they couldn't see it and
16 didn't know it was there, it may not have been added.
17 Q. And, in fact, isn't it true that the remediations
18 were essentially blessed and confirmed, if 15 days passed
19 and there was simply no objection?
20 A. I'm sorry, ask that question again.
21 Q. Certainly.
22 You said that Ecuador, Petroecuador had the
23 opportunity to review and bless and issue Actas for each of
24 the remediations; correct?
25 A. Yes.

11:42 1 Q. And under the RAP, if they did not object within
2 15 days, that means that TexPet didn't have any further
3 obligation at that specific site; isn't that correct?
4 A. I don't recall that detail. What I can tell you
5 is that the Government of Ecuador issued Actas on every one
6 of these sites agreeing that TexPet had met its obligation.
7 Q. And I guess my question is: What does that have
8 to do with the Plaintiffs' lawsuit against Chevron?
9 MS. WOOD: I would object to that.
10 MR. BLOOM: I will withdraw that. I beat you to
11 it. I objected to my own question.
12 BY MR. BLOOM:
13 Q. Sir, could you please turn to Tab 22, which is the
14 Fugro-McClelland Report.
15 A. Yes.
16 Q. Now, you're familiar with this Report, are you
17 not?
18 A. Yes, I am.
19 Q. The Report was issued in 1993?
20 A. Well, the copy you have here is dated
21 October 1992.
22 Q. Fair enough.
23 And Fugro-McClelland conducted its work giving
24 rise to this Report, obviously, on or before that date;
25 correct?

11:44 1 A. Yes.
2 Q. And Fugro was hired by TexPet to audit the joint
3 auditor that TexPet and Petroecuador jointly hired?
4 A. I don't know that that was the case. I know they
5 were hired by TexPet.
6 Q. And if I could have you turn to Page 6-61, and
7 there is a Bates stamp in the lower-hand corner that is
8 CA111, ending in 4387.
9 MR. BLOOM: And for the record, this document is
10 Claimants' Exhibit 12.
11 THE WITNESS: Yes.
12 BY MR. BLOOM:
13 Q. Sir, I'm going to ask you to look at the table
14 where it says A.G. 06, Aguarico 6.
15 A. Yes.
16 Q. You see that line there?
17 A. Yes.
18 Q. And under the heading remarks for Aguarico 06, it
19 says: "pits recently closed. Seeping oil"; correct?
20 A. Yes, I see that.
21 Q. Now, you've not only read this document, you've
22 relied on this document for some of your work; isn't that
23 right?
24 A. Yes, I've cited this document.
25 Q. Now, how do you read this remark by the Fugro

11:45 1 auditors "seeping oil?" They saw visual evidence of oil
2 seeping from the pit; isn't that right?
3 A. That appears to be the case, yes.
4 Q. And these pits were declared NFA; correct?
5 A. You need to let me look into Woodward-Clyde to
6 verify that, but this pit that was closed by Petroecuador
7 after TexPet's departure in June of 1990, the pits were to
8 be declared NFA, so it certainly fits the description of
9 what was agreed to between TexPet and the Government of
10 Ecuador.
11 Q. Well, if I can ask you to turn to the next tab,
12 which is Respondent's Exhibit 610?
13 A. Yes.
14 Q. And I'm going to ask you to turn to the page,
15 again using the Bates stamp at the bottom of page, ending
16 in 0894.
17 A. Yes.
18 Q. I don't know how well the copy came out, but the
19 reason why these were designated no further action was
20 because the RAP stated they were closed after 1990 by
21 Petroecuador.
22 A. I'm sorry, where are you reading?
23 Q. If you look in the last column, it says "closed
24 post June 30, 1990."
25 A. Yes, yes, you're right. That means it was closed

11:47 1 by Petroecuador after TexPet's departure.
2 Q. And, therefore, no further action was required by
3 TexPet under the RAP; correct?
4 A. That's correct.
5 Q. But please turn with me at Tab 24, which is an
6 exhibit. It's an LBG exhibit, it's the GSI Aguarico 6 site
7 summary.
8 MS. WOOD: Mr. Bloom, I'm sorry to interrupt, but
9 there is some question as to whether this is in the record.
10 MR. BLOOM: It had better be.
11 It's an exhibit to LBG's 2013 site investigation.
12 MS. WOOD: The reason why I'm hesitant, Mr. Bloom,
13 is when we had requested to put Respondent's 2013 data into
14 the record, this was one of the documents that was--that we
15 requested to agree to in exchange for putting your 2013
16 data in the record, so that's why--I don't mean to question
17 you, but I'm just hesitant because obviously, if it was in
18 the record already, I'm not sure why we would be requested
19 to grant permission.
20 MR. BLOOM: I have confirmed it is in.
21 Apparently, we were mistaken in the private colloquy
22 between you and counsel. It is part of the LBG Report.
23 MS. WOOD: Okay. I will accept your
24 representation.
25 MR. BLOOM: Thank you.

11:49 1 BY MR. BLOOM:
 2 Q. So, Dr. Hinchee, have you now turned to Tab 24?
 3 A. Yes.
 4 Q. And could you identify this document?
 5 A. The title of the page is "Summary of site-specific
 6 information, Chevron Oriente Region, Ecuador."
 7 Q. Do you know who prepared it?
 8 A. Well, it has a GSI job number on it. That's about
 9 all I know. Perhaps if you let me read through the
 10 document, somewhere else it's more specific.
 11 Q. And you understand that GSI is the company of
 12 which Mr. Connor is a principal?
 13 A. Yes, I do.
 14 Q. Let me ask you to turn to the second page here
 15 where you highlighted a portion at the bottom of the page?
 16 A. Yes.
 17 Q. And you can either read that if your eyesight is
 18 better than mine or you can look at the screen. It says,
 19 the pit appears to have been closed between 1986 and 1990.
 20 And then it goes on to say, the area, which was apparently
 21 marshy and encompassed at least 1500 square meters, became
 22 revegetated by 1986.
 23 A. Is it the second highlighting?
 24 Q. The first and the second.
 25 A. The first talks about Pit 1--portions of the pit

11:52 1 Q. Okay. Let's go to a couple short subjects.
 2 Dr. Hinchee, you have never asked another Expert
 3 to publish an article relating to the environmental issues
 4 in the Lago Agrio Litigation; isn't that correct?
 5 A. You're asking if I have ever asked another Expert
 6 to do that?
 7 Q. Correct.
 8 A. I don't recall ever having done that, no.
 9 Q. But you do know that Chevron has asked Experts to
 10 publish academic articles relating to the environmental
 11 issues in the Lago Agrio Litigation; isn't that right?
 12 A. I understand that Chevron asked Doug MacKay, who
 13 co-authored several reports with me, to consider Authoring
 14 a publication on metal contents of soils, but I do not
 15 believe that article was ever written or published.
 16 Q. Now, Dr. Hinchee, during the Judicial Inspection,
 17 Chevron used a method of sampling called composite
 18 sampling; right?
 19 A. Yes.
 20 Q. And composite sampling is a sample made up of a
 21 composite of several samples mixed together.
 22 A. Yes.
 23 Q. And there is both vertical compositing and
 24 horizontal compositing; correct?
 25 A. Yes. And it's not always several samples

11:50 1 clearly visible--yes.
 2 Yes, I see that.
 3 Q. So, these pits were, in fact, closed by TexPet in
 4 the 1980s? Isn't that right? That's what GSI found?
 5 A. No. Fugro determined that it had been--that it
 6 had been closed by Petroecuador, the pit that it was
 7 referring to. There are two pits referred to here. I'm
 8 not quite sure how these correspond to the Fugro Report,
 9 but one of these pits is described as having been closed
 10 by--during the TexPet operation period, 1986 to 1990.
 11 The second pit, it's not very specific. It seems
 12 to refer back to just simply a previously closed pit, which
 13 could well refer to the pit that was closed by
 14 Petroecuador, but it's hard to tell, you would have to
 15 speculate. I can't match these pits up one for one.
 16 Q. If the pit became revegetated by 1986, doesn't
 17 that mean that the pit was already closed? Or should have
 18 been closed?
 19 A. Large area of cleared vegetation is visible to the
 20 base of the Hill in 1976, although the pit is not--the area
 21 was apparently marshy and encompassed 1500 square meters
 22 and became revegetated. I'm not entirely sure if he's
 23 talking about the pit or the area next to it or some
 24 earlier disturbance in the area that later became a pit.
 25 It's difficult to tell from this description.

11:54 1 combined. Sometimes you take the entire length of the
 2 sample and simply mix it. Sometimes you may skim the
 3 entire length of the sample and do it that way. There are
 4 numerous ways it can be done.
 5 Q. Now, I would like to, just for a minute, focus on
 6 vertical composite sampling.
 7 A. Yes.
 8 Q. Could you describe how it's done for the Tribunal.
 9 A. Vertical composite sample is where a sample is
 10 collected over some length of soil--perhaps a meter,
 11 two meters, it could be much more--and somehow that sample
 12 is mixed and composited and a single sample is analyzed.
 13 Q. And how did Chevron take its vertical composite
 14 samples during the Lago Agrio Litigation, if you know?
 15 A. For the most part, they were taken and mixed in a
 16 bowl, and then the single sample is collected from the
 17 mixed soil.
 18 Q. So, if there are areas of contamination within the
 19 core--actually, let's back up. Could you explain what the
 20 core is?
 21 A. The core?
 22 Q. The core.
 23 A. Oh, I'm sorry. The soil core? It's the way you
 24 collect the sample is you drive, essentially, a hollow pipe
 25 into the ground, and then you open it up and you have a

Sheet 29 1980	1982
<p>11:55 1 soil core inside of it. 2 Q. And within that core, some parts of it might be 3 contaminated; correct? 4 A. It's certainly possible. 5 Q. And sometimes some might be clean? 6 A. It's certainly possible. 7 Q. And by compositing the otherwise clean samples 8 would become less clean? 9 A. Yes. You get an average. 10 Q. And the dirty components will come out less dirty? 11 A. You get an average concentration. 12 Q. And by compositing the level of contamination of 13 dirty samples could be lessened to a level that falls 14 within the acceptable standard, whatever that standard 15 might be? 16 A. Yes. In fact, the--but the standards as written 17 in Decreto 1215 for soils are to apply to composited 18 standards. So, that wouldn't be the case when you're 19 looking at the Decreto 1215, the Ecuadorian standards. 20 Q. I want to use a specific example, if I may. Let's 21 say the standard is 2500 milligrams per kilogram, which is 22 the RAOHE Standard--right?--that PEPDA is using. 23 A. Yes, that is the standard that PEPDA is using. 24 I'm sorry, I don't usually use the term RAOHE. 25 Q. And let's say that I took samples--let's say I</p>	<p>11:58 1 And then this would meet Ecuadorian standards for 2 remediation with agricultural soil, and this is exactly 3 what the standard is written and intended to do. 4 Q. Dr. Hinchee, how many visits did you make to the 5 Concession Area before submitting your 2006 Expert Report? 6 A. I didn't visit the Concession before submitting my 7 2006 Report. 8 Q. How about before your July 2007 Report? 9 A. I didn't visit the Concession until September of 10 2010. 11 Q. So, you had at least four Reports that you 12 submitted to the Lago Agrio Court prior to your visit to 13 the region; correct? 14 A. Yes, yes. 15 Q. How many times have you been to Ecuador? 16 A. That was my only trip to Ecuador. 17 Q. In your view, is it appropriate or possible for an 18 expert to come to reliable conclusions of the kind that you 19 reached without going to the region? 20 A. Yes, certainly it is, particularly since I have 21 seen many other oilfields in many similar settings, and 22 I've evaluated many other datasets very similar to the 23 dataset that I evaluated here. 24 Q. And are you able to comfortably and reliably use 25 data collected by others, let's say, in this case, in the</p>
<p>1981</p> <p>11:57 1 took one sample that shows an exceedance of 8,000 parts per 2 million. And we have that depicted here in red. 3 Do you see that? 4 A. Yes. 5 Q. And, of course, the 8,000 parts per million by 6 itself would exceed the threshold? 7 A. Yes. 8 Q. And then let's say there are three other samples 9 within this core, each at ten parts per million; correct? 10 A. Yes, yes. 11 Q. And then if I average this, we're going to come 12 out with a number that's under 2500; correct? 13 A. Yes, I think you're right. 14 Q. In fact, it's 2007.5, I'll represent. Below the 15 standard. And by compositing in this way and adding, 16 sometimes, a single sample or two exceedances could be 17 reduced to no exceedance at all? 18 A. Right. And this is exactly the way that the 19 Ecuadorian regulations are written for remediated pits. 20 You're required to do this compositing. The 21 regulations in Ecuador are for average concentration, not 22 for the highest concentration in some pocket. 23 Q. My colleague likes this animation. 24 A. That's pretty good. That's fairly accurate, yes. 25 Yes.</p>	<p>1983</p> <p>12:00 1 2004 to 2009 timeframe? 2 A. Yes, as long as that data is--you know, I have 3 documentation as to how the data was collected and how the 4 samples were analyzed, that kind of thing, yes. I do that 5 all the time. 6 Q. I'm going to ask you just to turn to Tab 31. 7 MR. BLOOM: And just for the record, this is an 8 excerpt from Claimants' Annex A--Annex A to Claimants' 9 Track 2 Reply. 10 And I'm just going to focus your attention at 11 Paragraph 4, where they state: "To portray a picture of 12 current widespread environmental problems caused by TexPet, 13 LBG provided not one new sample survey, test or measurement 14 nor even a new photograph to characterize current 15 Concession Area conditions. None of the LBG Experts 16 visited the Concession's operating sites, and three have 17 never traveled to Ecuador. Instead, LBG principally relied 18 upon data collected in 2004 to 2009--14 years or more after 19 TexPet's last operations in Ecuador, and after Petroecuador 20 had been operating the Concession Area throughout that 21 period." 22 A. Yes, I see that. That's what it says. 23 What is this document? I'm not sure I have ever 24 seen this. 25 Q. This was Annex A to Claimants' Reply that</p>

12:02 1 Claimants submitted in this arbitration.
 2 And, sir, I also have a clip, a little video clip,
 3 I would like to show you. If we could do that now.
 4 (Video played.)
 5 MR. BLOOM: I'm sorry, I should preface this.
 6 This is a deposition of one of the LBG Experts, Kenneth
 7 Goldstein, being deposed by counsel for Chevron, just to
 8 give it some context.
 9 THE WITNESS: Yes, I was there. I saw this.
 10 (Video played.)
 11 BY MR. BLOOM:
 12 Q. Now, I take it, Dr. Hinchee, given your prior
 13 testimony, in your view an expert is not disqualified from
 14 offering expert testimony merely because he's not present
 15 at the time samples are taken?
 16 A. That's right. The need to visit the site varies
 17 depending on the individual expert's experience and also on
 18 the kinds of opinions that they're issuing.
 19 Q. Turning to a different subject now, in your most
 20 recent Report, your 2015 Report, which is at Tab 8, at--and
 21 I'm going to specifically refer you now to a table located
 22 at Page 13, so, if you can just take a moment and find
 23 that.
 24 A. What page number did you say?
 25 Q. Thirteen.

12:06 1 A. Yes.
 2 Q. You're there?
 3 A. Yes, I am.
 4 Q. Now, on this table, you say this shows that PEPDA
 5 includes much more than pit remediation in its cost
 6 estimate; correct?
 7 A. Yes.
 8 Q. And if you look at your table which we have on the
 9 screen, you state that your table here, in fact, represents
 10 actual cost data for Petroecuador's cost estimate.
 11 A. These are Petroecuador's cost estimates, yes.
 12 Q. And your footnote here says that this data is
 13 coming from the PEPDA 2007 Annual Report; correct?
 14 A. Yes, it is.
 15 Q. But to be clear, this chart actually has been
 16 modified from the chart that appears in the PEPDA 2007
 17 Annual Report; right?
 18 A. This is a condensation of a much longer chart. If
 19 you give me the Report, I can explain to you how this was
 20 derived. But all of this data comes from the PEPDA 2007
 21 Report.
 22 Q. Well, we're going to do that analysis or that
 23 comparison right now. So we're going to compare your table
 24 here at Tab 8, Page 13, so, I would ask you to keep your
 25 finger on this page, and ask you to turn to Tab 11, Page 3,

12:07 1 and we may have to toggle back and forth just a bit, so, if
 2 you would be patient as we proceed.
 3 Do you have your finger on both of those pages?
 4 A. Yes, I do.
 5 Q. Okay. Now, since you didn't identify the changes
 6 you made for the Tribunal, I would like us to walk through
 7 that together, if I may. And in this respect, I would ask
 8 you first to look at the title of your chart. And what is
 9 the title of your chart?
 10 A. "Environmental Liabilities Requiring Remediation
 11 by Petroecuador."
 12 Q. Okay. And the title that PEPDA used is
 13 "Elimination of Environmental Liabilities"; correct?
 14 A. Yes.
 15 Q. Okay. And then, second, you changed the
 16 right-hand columns; is that right?
 17 A. The right-hand column.
 18 Q. In the original it just listed the amount and the
 19 costs. And then you added columns breaking down costs in
 20 "all of Oriente" and "former Concession."
 21 A. Yes.
 22 Q. Now, looking at the categories of liabilities
 23 listed, it looks like you changed some information here
 24 too. The first category is the same in the original, if
 25 you can confirm that for me. It's listed as "pits."

12:09 1 A. Yes, pits.
 2 Q. And the second category you have here are "dry
 3 pits"; correct?
 4 A. Yes, it's what I call dry pits.
 5 Q. Okay. So, the first two categories you listed,
 6 they're both pits. Different categories, but they're both
 7 pits. Next are what you state is "Emergencies--Cleanup of
 8 Remediation of Spills."
 9 Do you see that?
 10 A. Yes.
 11 Q. And presumably again we're talking about spills
 12 actually known about since it would be very difficult to
 13 remediate for spills we don't know about; would you agree
 14 with me?
 15 A. I don't know whether this was a forecast into the
 16 future cost. Petroecuador had an ongoing history of
 17 spills. I don't know whether this forecasts future spills
 18 or simply applies to known spills. I don't know the
 19 answer.
 20 Q. Okay. Now, staying in that category, sir, you've
 21 added a parentheses that says "includes sediment
 22 remediation."
 23 A. Yes.
 24 Q. But to be clear, this was not in the original
 25 chart; isn't that right?

12:10 1 A. No. You have to go other places within the Report
 2 to see that that's the case. I just simply wanted to make
 3 it clear--and it's because spills--Ecuador is a very wet,
 4 humid climate. There are many surface water features. Any
 5 time you have a spill, you're going to be close to a
 6 surface water. Spills often go across land and into
 7 creeks, streams, wetlands, and so part of many of these
 8 spill cleanups is--includes sediments. If you look
 9 elsewhere in this document, you will see, in fact, that the
 10 two spills they described being cleaned up are both in
 11 rivers, clearly sediment cleanup--sediment contamination
 12 cleanup.
 13 I added the parentheses just to be clear, but this
 14 information all comes from the 2007 document.
 15 Q. We made a copy of the 234-page Report, which we're
 16 handing up.
 17 A. Thank you.
 18 MR. BLOOM: If I may ask Claimants' counsel
 19 whether you got your copy back, too.
 20 MS. WOOD: I do, thank you.
 21 MR. BLOOM: Okay. And just for the record, we do
 22 have copies coming for the Members of the Tribunal. We
 23 don't want to leave you out or feel like we're leaving you
 24 out.
 25 PRESIDENT VEEDER: Not sure we'd mind, unless it's

12:13 1 sediments at other sites, yes.
 2 Again, the only spills referred to in this Report
 3 are sediment sites.
 4 Q. But is that part of the 2007 PEPDA estimate?
 5 A. Certainly. The estimate includes ongoing
 6 remediation, and the Conde River is only 10 percent
 7 complete. So, the balance of the 90 percent of the Conde
 8 River is in that estimate as are any of the other spills
 9 which include sediment remediation.
 10 Q. The documents that you just referenced that you
 11 could pull out, you said you could pull out specific
 12 exhibits that discuss the PEPDA remediation.
 13 A. Or Petroecuador. I don't recall whether it was
 14 PEPDA doing it or some other arm of Petroecuador.
 15 Q. Right. So, I'm trying to confine the question and
 16 the scope of this Q&A to what was included in the PEPDA
 17 remediation as governed by the 2007 Annual Report, which is
 18 what provides the estimate.
 19 A. Right. Yes.
 20 Q. The estimate of the remediation cost.
 21 A. And all of the spills discussed in this Report are
 22 sediments.
 23 Q. What is your evidence of that?
 24 A. The one I just provided to you, Page 24, Chart
 25 Number 2, two spills.

12:12 1 particularly relevant, and it may not be.
 2 BY MR. BLOOM:
 3 Q. Well, Dr. Hinchee, again we're relying on your
 4 Report. You don't cite to any particular page in the PEPDA
 5 Report from which you're getting this information. We have
 6 done a search. We have found nothing that suggests that
 7 sediment is included here.
 8 A. Well, let me point you to where you can find that.
 9 Q. That would be helpful.
 10 A. Look at Page 25 of the Report, Chart Number 2:
 11 This is a description of the ongoing or completed
 12 remediation work. You will see that there are two spills
 13 listed. Only two. Both of those are rivers. Rivers have
 14 sediment contamination. Those are sediments. In fact,
 15 they don't list anything but rivers in this particular
 16 list.
 17 And as I said, in the same document, Petroecuador
 18 takes responsibility for remediation and environmental
 19 liabilities, which under Decreto 1215 includes soils,
 20 surface water and groundwater.
 21 Q. Are there any other rivers or streams for which
 22 PEPDA has committed to remediate?
 23 A. We have documentation, I have documentation in my
 24 Report, and if you give me a minute, I can pull out the
 25 specific exhibits that discuss PEPDA remediation of

12:15 1 Q. Those two. And that's your--the entirety of your
 2 evidence that the PEPDA 2007 Report is intended to cover
 3 all sediment?
 4 A. No. The entirety of my evidence includes PEPDA,
 5 Petroecuador agreeing that it's responsible for cleanup of
 6 all environmental liabilities, and the fact that we know
 7 they cleaned up other spills as evidenced in other exhibits
 8 in my Report. This is where you could find evidence in
 9 this particular document. There are other places to go.
 10 Q. And looking at Page 24, where does it say that
 11 it's cleaning up anything more than the water? That it's
 12 actually extending to cleanup of sediment?
 13 A. On Page 24. Approved cost estimates.
 14 What's your question?
 15 Q. Where in that table does it say that PEPDA is
 16 going to clean up the sediment as opposed to the water?
 17 A. Well, all of the estimates on this table--and it's
 18 only a part of what PEPDA is doing--are for pits, not for
 19 spills. Except for the bottom one. It says: "For 60
 20 environmental liabilities, pits, spills, others in the
 21 Amazon district." As I said, spills contaminate both land
 22 and sediments.
 23 Q. And we're not disagreeing that spills contaminate
 24 both land and sediments. My question is a little bit
 25 different. I'm looking at what you just referred me to,

12:17 1 and it says, under spills, it identifies two rivers, it
2 identifies surface area worked on, and I don't see the word
3 "sediments" there at all. And I did see in your revision
4 of the PEPDA 2007 table that you threw in the words in the
5 parentheses something to the effect of "includes
6 sediments," and I just don't see that in what you're
7 referring to.

8 A. The way that you remediate a river is by cleaning
9 up the TPH contamination in the sediments. You won't find
10 the word "sediment" in this document or in any other PEPDA
11 document I know of referring to river bottoms. What you
12 will find is soil contamination from below the water
13 surface. In some documents you can take the GPS
14 coordinates, look at those GPS coordinates for a soil
15 sample and a water sample, they come from exactly the same
16 location. PEPDA refers to sediments in streams and
17 wetlands as soil.

18 Q. You would agree with me, sir, would you not that
19 sediments are measured in cubic meters?

20 A. You could measure sediments in cubic meters, yes.

21 Q. And water is measured how?

22 A. Water is measured in liters or gallons, cubic
23 meters.

24 Q. You have no idea what the volume of contaminated
25 sediments, do you?

12:20 1 have to read the entire report to understand what these
2 categories are. These are abbreviations. Sediments are
3 included in these categories. It's apparent when you read
4 the full document and when you read Petroecuador's other
5 remediation documents that I have attached to my Report as
6 exhibits.

7 Q. Now, you've testified, sir, that you found no
8 evidence that PEPDA is actually conducting surface water
9 remediation; right?

10 A. I have seen no indication of surface water
11 remediation, that's right.

12 Q. Nor do any of these categories at least explicitly
13 cover stream remediation?

14 A. Yes. The spills do. Sediment remediation in the
15 streams.

16 Q. That's--okay, we have been through that.

17 How can you have stream remediation without
18 surface water remediation?

19 A. The contamination in the stream, particularly from
20 old or historic spills, is in the sediment. The way you
21 clean up the stream is by cleaning up that contamination in
22 the sediment. Surface water flows through quite rapidly.
23 There are times in which you may dam up that surface water,
24 capture it. Perhaps if you mix sediments into that
25 material, that may require treatment. But what you are

12:18 1 A. Most Spill Reports that we get from Petroecuador
2 talk about the surface area of the spill because that can
3 be easily mapped. After the fact, sometimes they report
4 how many cubic meters of remediation that turned into, and
5 that's exactly what you see here, are the surface areas
6 that were contaminated as a result of the spill in square
7 meters.

8 Q. Turning back, sir, to your table.

9 A. Let's see, which tab? Oh, okay. I see it.
10 Page 13 of my Report. Table 1, is that what you're
11 referring to?

12 Q. Yes, sir.

13 The last category there is biotechnological
14 treatment, sewage, and residual water in camps.

15 Do you see that?

16 A. Yes.

17 Q. And if you--if I can ask you to take a look at the
18 PEPDA table, I just want you to confirm for me that you
19 will not see the word "sediments" in any of these Line
20 Items, either for pits, trenches or tanks, contingency
21 cleanup and remediation of spills, cleanup and remediation
22 of solids from pits in API tanks, as well as that last
23 category, biotechnological treatment. You don't see the
24 word sediments there; correct?

25 A. No. You don't see the word soils, either. You

12:22 1 treating are the sediments. That's how you clean--that's
2 how you remediate surface water, as opposed to cleaning up
3 the water itself.

4 Q. Now, sir, you've stated before that you don't need
5 to actually sample at many of the oil sites in the Oriente
6 to find contamination because you can see the
7 contamination. It's visual.

8 A. Particularly someone who has worked on a number of
9 oilfields and is familiar with what oil contamination looks
10 like, visual inspection is very often sufficient. Before
11 you confirm it and begin remediation, you may want to
12 analyze some of those samples to make sure you were right.

13 Q. The more challenging task, in your view, is not
14 finding the contaminated soil but rather determining where
15 the contamination stops; isn't that right?

16 A. Yes, that can be more difficult.

17 MR. BLOOM: With the Tribunal's indulgence, can I
18 just have five minutes? Because I'm going to only have
19 about five or ten minutes left. I want to consolidate.

20 PRESIDENT VEEDER: Take all you need.

21 MR. BLOOM: Five minutes is fine.

22 PRESIDENT VEEDER: Five minutes. Let's break for
23 five minutes.

24 MR. BLOOM: Thank you.

25 PRESIDENT VEEDER: Please don't discuss the case

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<p>12:23 1 or your testimony away from the Tribunal. 2 THE WITNESS: Okay. Can I get up and go for five 3 minutes? 4 PRESIDENT VEEDER: Of course. 5 THE WITNESS: Thank you. 6 (Brief recess.) 7 PRESIDENT VEEDER: Let's resume. 8 MR. BLOOM: That was a very productive five 9 minutes. 10 We have no further questions. 11 PRESIDENT VEEDER: Thank you very much. 12 Are there any questions from Claimants? 13 MS. WOOD: Mr. President, I will have a limited 14 direct, but would it make sense if we took our lunch break 15 now and I could condense my questions? 16 PRESIDENT VEEDER: Actually, it wouldn't be 17 because for other reasons we need to have a later lunch 18 break, but we could have a break now if you need to. 19 MS. WOOD: If we could. There is a question that 20 I've posed-- 21 PRESIDENT VEEDER: Don't worry, don't explain. Do 22 you need fifteen minutes? 23 MS. WOOD: Fifteen minutes is fine. 24 PRESIDENT VEEDER: Let's take 15 minutes and come 25 back at quarter to.</p>	<p>12:44 1 itself is not in the record. And I would object to this 2 document becoming part of the record as well as object to 3 any testimony, any question or testimony given with respect 4 to that document because the document is not in the record. 5 PRESIDENT VEEDER: Mr. Bloom. 6 MR. BLOOM: Thank you, Mr. President. 7 And we have confirmed that that document was 8 inadvertently not provided, but I wanted to provide a 9 little bit of context. 10 Number one, it is a document that we specifically 11 cited to as Footnote 11 to the 2014 LBG Report as part of 12 its Annex A. 13 Number two, there is--and the practice has been 14 very different. When we're talking about either side 15 simply wanting to put new documents in the record for 16 strategic advantages versus a ministerial error, and in 17 just the last two or three minutes we began pulling up 18 e-mails from both within the firm and with counsel or 19 sometimes--it happened on the legal assistant level, where 20 one side or the other has informally, and in every instance 21 either asked for or provided documents that were either 22 cited or miscited or mistranslations, so I have an e-mail 23 of February 4, 2015, internal, can you please ask Chevron's 24 legal assistant tomorrow for this document, and it came 25 from Claimants' Exhibit 2084. The document on the share</p>
<p>1997</p> <p>12:29 1 (Brief recess.) 2 PRESIDENT VEEDER: Let's resume. 3 MS. WOOD: Thank you, Mr. President. 4 Before--I just have a couple of questions for the 5 witness, but I wanted to raise an issue that I have 6 discussed with counsel for Ecuador. 7 I had objected to the document at Tab 24. 8 PRESIDENT VEEDER: Tab 24 of the bundle? 9 MS. WOOD: Tab 24 of Ecuador's Cross-Examination 10 Bundle. 11 PRESIDENT VEEDER: I remember, yes. 12 MS. WOOD: As well as it was cited at Page 58 of 13 their PowerPoint presentation. 14 And it was my understanding that the document was 15 not in the record because when we had asked to supplement 16 the record with LBG's 2013 data, this was one of the 17 documents that counsel for Ecuador said, well, if you let 18 this and other documents in, then we would agree to put our 19 own data in the record. We did not reach agreement on 20 that, and so that was my concern and why I raised it. The 21 representation was made that the document was in the 22 record. The Witness was cross-examined about the document. 23 We then checked and now confirmed with counsel from Ecuador 24 that the document is not in their record. It is referred 25 to in the footnote in their Expert Report, but the document</p>	<p>1999</p> <p>12:46 1 with that number is essentially the wrong document, so it 2 was done informally, if we can turn to another one. 3 Another one attached is the correct translation. 4 The previous one--the previous C-2084 submitted corresponds 5 to C-2007. The Legal Assistant for King & Spalding will 6 submit this document with upcoming translation. 7 So, we would certainly ask that we be allowed to 8 include it. They had certainly been on notice. It is 9 specifically referenced. 10 What's supposed to happen is when either side 11 submits a report, what we do routinely is we gather up all 12 the documents, and you have been burdened with more than 13 your fair share. Both sides have inadvertently left some 14 out. In this particular case, it's actually a Chevron 15 document, so they've had the document. So, we don't 16 believe that they're prejudiced. And again, this is a 17 matter of the practice that both Parties have engaged in 18 for some time. And if there is any hiccup over this, I 19 would like to be heard after we've had a chance and compile 20 all of the e-mails that have gone back and forth over the 21 last couple of years. 22 PRESIDENT VEEDER: Just to ensure we've understood 23 you, this is an inadvertent mistake on your side, it's not 24 a mistake by the Claimants? 25 MR. BLOOM: That is correct. It should have been</p>

12:47 1 submitted along with the LBG Report because the LBG Report
2 specifically cites to this.
3 PRESIDENT VEEDER: What date was that?
4 MR. BLOOM: It was the 2014 Report, in November.
5 MS. WOOD: Mr. President, we definitely have been
6 prejudiced by this document now coming forward and trying
7 to put it into the record. We had a specific discussion
8 with counsel for Ecuador asking if they would put their
9 2013 data into the record because we assumed it was in the
10 record; and, as we started examining the LBG documents, LBG
11 had not put its own data in the record.
12 So, we went to counsel for Ecuador and said, would
13 you please put in the 2013 data and your 2013 data
14 validation reports. The response we received was, we would
15 only do that if you agree to put these other documents into
16 the record. This is one of a handful of documents that
17 they wanted to put into the record.
18 We decided, and withdrew our request to put their
19 own data in the record and, therefore, we had no agreement
20 on this specific document or this other handful of
21 documents going into the record.
22 Because of that, our Experts did not put on in
23 their direct testimony evidence about the LBG 2013 data
24 because the 2013 data was not in the record. So, we
25 clearly have been prejudiced by this. Now they're coming

12:49 1 back and saying one of the documents that they wanted to
2 trade with us to agree to put their own data in the record,
3 is now they're trying to get in another way, so we clearly
4 have been prejudiced.
5 PRESIDENT VEEDER: What would it take to correct
6 the prejudice?
7 MS. WOOD: We would have to re-do direct
8 statements of all of our Experts.
9 PRESIDENT VEEDER: And what is the scope of that
10 exercise? Is it a large, middle or small one?
11 MS. WOOD: Well, with all due respect,
12 Mr. President, I feel like the horse is out of the barn.
13 They have made their presentations to this Tribunal, and I
14 know very specifically some of the Experts wanted to point
15 to problems in the LBG 2013 data. And because the data was
16 not in the record, we advised them you cannot do that
17 because we are not going to put anything and present
18 anything to the Tribunal that is not in the record. So,
19 therefore, they could not make that presentation. Coming
20 after the fact now and supplementing a direct presentation
21 slide does not at all have the effect of them being able to
22 discuss it with you as part of their direct testimony.
23 PRESIDENT VEEDER: We've got a logistical problem
24 at a moment. We have got to finish this Witness' redirect
25 on certain matters which could be done putting this dispute

12:50 1 aside. How long would that take you to do?
2 MS. WOOD: I have two questions for this Witness.
3 PRESIDENT VEEDER: Okay. Could you proceed with
4 those two questions? And then we will adjourn and try and
5 sort things out over lunch.
6 MS. WOOD: Certainly.
7 PRESIDENT VEEDER: Okay. I think if the Witness
8 is not catching a plane at lunchtime. Are you leaving?
9 THE WITNESS: No, I'm not leaving today.
10 PRESIDENT VEEDER: Okay. Then please go ahead
11 with your other questions.
12 MS. WOOD: Thank you, Mr. President.
13 REDIRECT EXAMINATION
14 BY MS. WOOD:
15 Q. Dr. Hinchee, does Decreto 1215 have separate
16 cleanup criteria for sediment versus soil?
17 A. No, the Cleanup Standards are for soil.
18 Petroecuador uses the soil Cleanup Standards whenever it
19 remediates sediments. There are no separate standards.
20 Q. Okay. And no separate discussion of sediment in
21 1215?
22 A. No, no, the soil standards in 1215 are routinely
23 applied to sediments.
24 Q. Could we pull up Slide 37 of your direct
25 presentation.

12:52 1 Now, Mr. Bloom asked you a series of questions
2 about the Burlington matter, the Burlington arbitration,
3 and cost estimates in that arbitration. And I'm pointing
4 you to Slide 37 and would like to ask you this question:
5 Why do you believe that the Petroecuador costs and data
6 presented on your Slide 37 is the most relevant comparison
7 to the Lago Agrio Judgment?
8 A. Because Petroecuador is remediating the very pits
9 and spills the Judgment is awarding costs to remediate.
10 These are the same environmental liabilities, the same pits
11 and spills as the Judgment uses to award damages. And in
12 the case of unit cost, the actual cost incurred by
13 Petroecuador for remediating those pits and spills is \$67 a
14 cubic meter, not what's in Burlington, not what's in the
15 Judgment. The Burlington is for a different kind of
16 remediation. I can provide more detail on that if
17 necessary. The reality here is how much volume of soil
18 actually requires remediation based on Petroecuador's
19 experience, how many pits require remediation based on
20 Petroecuador's knowledge, the fact that groundwater is not
21 undergoing remediation because Petroecuador is also not
22 doing groundwater remediation, despite being given that
23 responsibility because it's not necessary.
24 And, finally, the total cost Petroecuador provides
25 is less than 10 percent of the cost in the Judgment to

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12:53 1 remediate the TexPet portion of the former Concession.
 2 Petroecuador is doing the remediation, we know what it
 3 cost, they know what it cost, and the Lago Court knew what
 4 it cost.
 5 Q. Thank you, Dr. Hinchee.
 6 No further questions.
 7 PRESIDENT VEEDER: Well, for the time being, no
 8 further questions, but we may want to see you again, so
 9 thank you very much for assisting the Tribunal, but you may
 10 leave the table.
 11 THE WITNESS: Thank you.
 12 (Witness steps down.)
 13 PRESIDENT VEEDER: I think he could be released as
 14 a witness rather than being put in purdah as a contingency.
 15 I think there is no objection from either side?
 16 MR. BLOOM: No.
 17 MS. WOOD: And with respect to when I was talking
 18 about Experts who wanted to rely on the 2013 data, I'm not
 19 talking about Dr. Hinchee. I was talking about witnesses
 20 who have already appeared and who have been let go.
 21 MR. BLOOM: Can I just address that one point?
 22 PRESIDENT VEEDER: You know, we would rather come
 23 back to it. Just give us time to digest what we've heard
 24 so far and we'll come back.
 25 We're going to need a bit of time to do that, so

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12:55 1 could we have an extra 15 minutes for lunch? We could come
 2 back at 2:15?
 3 MS. WOOD: That's fine.
 4 PRESIDENT VEEDER: I take it we're on time? There
 5 is no concern that--
 6 MR. BLOOM: I had hoped to finish this morning and
 7 I think we're done.
 8 PRESIDENT VEEDER: So, 2:15, thank you very much.
 9 (Whereupon, at 12:56 p.m., the Hearing was
 10 adjourned until 2:15 p.m., the same day.)
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1 AFTERNOON SESSION
 2 PRESIDENT VEEDER: Let's resume.
 3 First, the Claimants.
 4 MS. WOOD: Mr. President, I just wanted to let you
 5 know that the Claimants are withdrawing our objection to
 6 the document that was used with Mr. Hinchee, the one behind
 7 Tab 24.
 8 PRESIDENT VEEDER: I'm glad you spoke first
 9 because we were about to make our ruling, subject to
 10 hearing Mr. Bloom once more.
 11 MS. WOOD: I defer to Mr. Bishop.
 12 MR. BISHOP: Yes, we've had some discussions over
 13 lunch between the Parties, and we've reached an
 14 accommodation. We are withdrawing the objection as
 15 Ms. Wood mentioned, and we're offering another document
 16 that we've agreed between the Parties will go into the
 17 record which will be Exhibit C-1545A--R-1545A, which will
 18 be a supplement to the record that was reviewed by
 19 Mr. Juola; and as I said, so the Parties have agreed to
 20 that, and so we've reached an accommodation, and I think
 21 that we have resolved the issues the Tribunal would have
 22 had to grapple with otherwise.
 23 PRESIDENT VEEDER: Is the document relevant for
 24 the next witness?
 25 MR. BISHOP: Not for the next witness.

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02:16 1 PRESIDENT VEEDER: Well, give us a copy in due
 2 course, as we'll insert it electronically and on paper, and
 3 can I say we're very grateful for the way the Parties do
 4 sort things out. We were going to make a ruling, I won't
 5 tell you what it was, but can I say in a case like this,
 6 inadvertent mistakes are bound to happen, and I think it's
 7 a rather generous way to resolve it by consensus between
 8 the Parties.
 9 MR. BLOOM: And if I may, just to kind of round
 10 out what the Parties had agreed to because just like we had
 11 made a mistake, what had happened on their end was
 12 Dr. Juola had reviewed, if you recall, the hard drive that
 13 we had provided to you. He looked at 200 and some-odd
 14 thousand pages. There was a second tranche to that that we
 15 had not received until yesterday, so that's to make sure
 16 the record's complete, we didn't object to them wanting to
 17 put that record in, and that is the document that is going
 18 in as R-1545A, and we're asking to do it as A so that the
 19 Tribunal will understand it's part of the same record that
 20 he submitted, and it's my understanding that he reviewed
 21 everything on both those documents, 1545, the hard drive we
 22 submitted; and 1545A.
 23 And then the other piece of it is that we will
 24 submit, without opposition, the six-page document that we
 25 had thought was in the record that was not in the record,

02:18 1 and we will submit that as R-1546. And if we can do that
 2 hopefully by the end of today, we can submit it.
 3 PRESIDENT VEEDER: Just to make that clear, that's
 4 Tab 24 of your bundle?
 5 MR. BLOOM: That's right.
 6 PRESIDENT VEEDER: And we need to just adjust the
 7 name then on Slide 58 of your cross-examination PowerPoint
 8 to reflect that it's R-1546.
 9 MR. BLOOM: Thank you. We will do that.
 10 PRESIDENT VEEDER: We could do that in
 11 handwriting.
 12 MR. BLOOM: Very good.
 13 PRESIDENT VEEDER: Good. Well, thank you very
 14 much for that. You saved us a long ruling, but we'll move
 15 on.
 16 Any other housekeeping matters we need to raise?
 17 No.
 18 Well, we have--
 19 HARLEE STRAUSS, RESPONDENT'S WITNESS, CALLED
 20 PRESIDENT VEEDER: Could state your full name.
 21 And then, if you're willing to do so, read the words of the
 22 Declaration.
 23 THE WITNESS: Yes. My name is Harlee Sue Strauss.
 24 And I solemnly declare upon my honor and
 25 conscience that I shall speak the truth, whole truth, and

02:20 1 your non-cancer risk?
 2 A. No. The calculation had no impact on my findings
 3 about non-cancer health risk, nor does it have an impact on
 4 my overall findings regarding further action to be taken at
 5 that site.
 6 Q. And you said you had a Second Amendment?
 7 A. Yes. I have a Second Amendment, and that has to
 8 do--
 9 PRESIDENT VEEDER: Pause one moment.
 10 It may be helpful for you to go to the particular
 11 page to make the correction. Could you just help us on the
 12 first correction. Where do we find that?
 13 MS. SILVER: The particular site was for a
 14 particular groundwater sample at Shushufindi 43, and I'll
 15 have to find you the page number in the Report.
 16 PRESIDENT VEEDER: And for the second as well we
 17 need the page number.
 18 MS. SILVER: Well, I will let her tell you what it
 19 is first, and then I will. If she doesn't tell you, I will
 20 tell you.
 21 THE WITNESS: It has to do with the wipe samples
 22 that were taken in the house of the vicinity of Lago
 23 Agrio 2, the well site. Three samples were taken inside
 24 the house, and I had written, I think it's on Page 5 and 6
 25 of my November 2014 Report, although I may have the numbers

02:19 1 nothing but the truth, and that my statement will in
 2 accordance with my sincere belief.
 3 PRESIDENT VEEDER: Thank you very much. There'll
 4 first be questions from the Respondent.
 5 MS. SILVER: Good afternoon, Dr. Strauss.
 6 DIRECT EXAMINATION
 7 BY MS. SILVER:
 8 Q. I've placed before you a binder with your four
 9 reports and several exhibits.
 10 Do you see that?
 11 A. Yes, I do.
 12 Q. And before we begin the direct and your
 13 presentation, is there anything that you would like to
 14 amend in any of your Reports?
 15 A. Yes, I'd like to make two amendments to my
 16 Reports. The First Amendment is in response to
 17 Dr. Douglas's testimony yesterday. He pointed out what was
 18 an error in one of my calculations at one--in the drinking
 19 water sample at one site. I went back and looked at my
 20 calculations, and he was correct. There was an error. He
 21 was incorrect about the source of error, but that
 22 calculation contained a spreadsheet error, and I no longer
 23 consider that sample and that exposure pathway to have a
 24 significant risk of cancer.
 25 Q. And does it affect your findings with respect to

02:21 1 slightly wrong. I wrote on those pages of that Report that
 2 those samples contained oil from the Oriente. I've now
 3 come to understand that while those samples do have a
 4 fingerprint of oil, it is not the fingerprint of Oriente
 5 oil and, therefore, the contamination is not associated
 6 with TexPet in any way in those oil samples.
 7 I used those samples as an example of an exposure
 8 pathway. They were not part of any quantitative assessment
 9 in any way and do not at all have any impact on my
 10 ultimate--on the opinions in my Report.
 11 BY MS. SILVER:
 12 Q. And what about your other samples? Have you
 13 determined that the oil samples on which you relied also
 14 contained Oriente Crude?
 15 A. The other samples for which I conducted
 16 quantitative assessment do contain Oriente Crude based on
 17 the opinion of Dr. Jeffrey Short.
 18 Q. Dr. Strauss, I'd like to ask you a few questions
 19 before you begin your PowerPoint presentation. Is that
 20 okay?
 21 A. Yes.
 22 Q. You are a human health-risk assessor by
 23 profession; is that correct?
 24 A. That's correct.
 25 Q. Can you briefly describe your professional

02:23 1 background.
 2 A. Yes, I've been conducting human health-risk
 3 assessments since the mid-1980s, which is about the time
 4 the methodology has been developed, and so I've watched it
 5 evolve and in some small ways have contributed to that, so
 6 I've been involved in the development of risk-assessment
 7 methodology. I've conducted many site-specific risk
 8 assessments mostly in the United States on contaminated
 9 sites with a variety of media and pathways.
 10 I've been involved with PAHs since late 1980--late
 11 1970s.
 12 Q. And are you considered an expert in human
 13 health-risk assessment?
 14 A. Yes, I am.
 15 Q. Are you an expert in any other field?
 16 A. I have expertise in general toxicology.
 17 Q. And what were you asked to do for the Republic of
 18 Ecuador?
 19 A. I have been asked to evaluate the human health
 20 risks in the Concession Area, and in so doing I've reviewed
 21 a variety of reports, research articles, documents, site
 22 data.
 23 Q. And can you please tell us what sites you
 24 evaluated in the Concession Area.
 25 A. For a quantitative assessment, I've evaluated nine

02:24 1 sites. They're on the map that I guess is in front of you;
 2 and as you can see, these sites are located widely
 3 throughout the Concession Area.
 4 Q. And what conclusions have you drawn from the nine
 5 human health-risk assessments you've conducted?
 6 A. Well, my overarching conclusion is that there are
 7 sufficient health risks to warrant further action at all
 8 the nine sites that I investigated via a quantitative human
 9 health-risk assessment. To draw this overarching
 10 conclusion, I found that oil was released from pits and
 11 other sources and was located in places in the environment;
 12 that is the soil, the sediment, the water, where people
 13 could come into contact with it in sufficient quantities to
 14 cause a health risk, and that these health risks are based
 15 on both current and future exposures, and that they're in
 16 both. In human health-risk assessment we only have two
 17 buckets of health effects: Cancer and non-cancer. We
 18 don't divide it any further, and I found that there are
 19 both non-cancer and cancer health risks, although not
 20 necessarily both at each site.
 21 Q. And do HHRAs prove actual particular harm to a
 22 particular person?
 23 A. No, they do not. HHRAs are a regulatory tool to
 24 make decisions, and they're meant to be protective of human
 25 health, and they're meant to avoid actual harm.

02:26 1 Q. You filed four reports in this arbitration; is
 2 that correct?
 3 A. That's correct.
 4 Q. Can you please identify the opinions in each of
 5 your Reports that you would like this Tribunal to consider?
 6 A. Yes. My First Report was a scoping report. It
 7 was submitted in February 2013, and that Report basically
 8 was a synthesis of my understanding of the site. It was
 9 before I visited the site. The final three reports
 10 contained quantitative information, and they were an
 11 evolution where that First Report was the starting point,
 12 but they went--I had quantitative site information that I
 13 felt was reliable and could conduct a quantitative risk
 14 assessment using it. And as time went on, I also went on
 15 to develop more sophisticated evaluations for Total
 16 Petroleum Hydrocarbons in crude oil, and so those are the
 17 Reports that are most relevant, I think, to the Tribunal.
 18 Q. Is your qualitative Report necessary for this
 19 Tribunal to consider given your conclusions and findings
 20 from your later-conducted quantitative HHRAs?
 21 A. No, my opinions on the necessity for further site
 22 investigation and cleanup are based on the quantitative
 23 risk assessments in the final three reports.
 24 Q. In your First Report, you reviewed several studies
 25 discussing the link between adverse health effects and

02:27 1 exposure to oil. Do you recall that?
 2 A. Yes.
 3 Q. And you stated that toxic contaminants released
 4 into the environment by Texaco resulted in or caused
 5 immediate and delayed effects in children and adults living
 6 in the Concession Area; is that correct?
 7 A. Yes.
 8 Q. Does that mean that you found that specific
 9 persons have been harmed by TexPet's contamination?
 10 A. No, I did not mean to imply any specific person
 11 was harmed. I looked at no specific person. And I believe
 12 that conclusion was inartfully worded, and perhaps should
 13 have said risk of adverse effects rather than adverse
 14 effect. I did not evaluate individual harms in the least.
 15 Q. Dr. Strauss, do you consider yourself an expert in
 16 epidemiology?
 17 A. No, I'm not.
 18 Q. And have you read the reports of the Republic's
 19 health experts, Drs. Grandjean and Laffon?
 20 A. Yes, I have.
 21 Q. Is it your understanding that, in those Reports
 22 they've cited to and have independently concluded that
 23 exposure to Oriente crude oil will result in risk of
 24 adverse health effects?
 25 A. That's my understanding, yes.

02:29 1 Q. And given your understanding, what is your opinion
 2 as to whether or not this Tribunal will need to consider
 3 your review of epidemiology studies linking exposure to oil
 4 and human health risks?
 5 A. I believe the Tribunal can rely on the opinions of
 6 Dr. Grandjean and Dr. Laffon.
 7 Q. And I just have one last question for you. In
 8 your First Report, you gave an overview of various types of
 9 pathways that can exist at a given site; is that correct?
 10 A. Yes, I did.
 11 Q. Are you asking the Tribunal to consider or take
 12 into account pathways you did not evaluate in your nine
 13 later conducted HHRAs to determine whether cleanup is
 14 necessary?
 15 A. I believe that the pathways that I evaluated are
 16 sufficient to show a significant risk that requires further
 17 investigation and cleanup.
 18 The further additional pathways, if they were
 19 quantified, I think might show further risk, but those are
 20 not necessary for me to reach my conclusion.
 21 Q. Thank you, Dr. Strauss. You can begin your
 22 presentation.
 23 If it's helpful, I can direct you to where the
 24 site for Shushufindi 43 is. I believe Dr. Strauss gave you
 25 the cites for the wipe samples that she amended. It's her

02:30 1 November 7, 2014--that's for the wipe samples.
 2 PRESIDENT VEEDER: Give us that.
 3 MS. SILVER: The wipe samples are the 11/7/2014
 4 Report at Footnote 45, which is on Page 24.
 5 PRESIDENT VEEDER: I'm way behind you. Which tab
 6 is that in your bundle?
 7 MS. SILVER: Tab 3.
 8 PRESIDENT VEEDER: I've got Tab 3. Go ahead.
 9 MS. SILVER: It's Footnote 45, which is on
 10 Page 24.
 11 And I do believe there may also be discussion of
 12 them on Pages 5 and 6, as Dr. Strauss said.
 13 PRESIDENT VEEDER: I'm sorry, I'm being really
 14 slow. I don't see a footnote.
 15 I'm catching up. Okay. Footnote 45, what do I
 16 change?
 17 MS. SILVER: Nothing. She was just pointing out
 18 that--well, the main point is that the wipe sample did not
 19 contain a signature of Oriente Crude, and I believe that it
 20 stated that it did.
 21 PRESIDENT VEEDER: We'll just note that. We don't
 22 see that, but we'll note it.
 23 And the other correction?
 24 MS. SILVER: And the other correction is with
 25 respect to site Shushufindi 43, and that is in the same

02:32 1 report on Page 20, and there is a table that appears on
 2 that page, and it is the last row, and it's for a
 3 groundwater sample.
 4 Oh, no, no. I'm sorry, that's incorrect,
 5 actually. Let me get back to you with the right page.
 6 Sorry.
 7 PRESIDENT VEEDER: That's okay.
 8 Please start your presentation.
 9 THE WITNESS: Yes, sir.
 10 I want to talk to you about risk-assessing my
 11 results, and also I'm going to, throughout the
 12 presentation, I'm going to talk a little bit about why my
 13 results differ from Dr. McHugh's.
 14 The bolded statement pretty much comes from the
 15 EPA's Web site describing the purpose of USEPA human health
 16 risk assessment, and it's to characterize the nature and
 17 magnitude of health risk to humans basically from chemicals
 18 that may be present in the environment.
 19 The origin of this methodology is to be able to
 20 make decisions in the absence of complete information. In
 21 the environmental arena, we never have complete
 22 information. We never know exactly how much dirt people
 23 eat. We never know exactly how many times they're going to
 24 be one place or another. We never have exact toxicity
 25 values, so the idea is to be able to make decisions of

02:34 1 whether site cleanup is necessary, and we use
 2 risk-assessment policy to have a methodology to use
 3 inference to bridge the gaps in the data that we have.
 4 And ultimately, the purpose of the risk
 5 assessments is to answer the question: "is remediation
 6 necessary," and if it is necessary, how clean is clean
 7 enough?
 8 I want to point out also that risk assessors, at
 9 least in the EPA scheme of things, provide information to
 10 those who make cleanup decisions, and thus, it's the
 11 responsibility of risk assessors to provide some of the
 12 uncertainties that are involved in the risk
 13 characterizations and to be very transparent in those
 14 uncertainties.
 15 The methodology--this slide is quite similar to
 16 the one that Dr. McHugh showed you yesterday for the
 17 four-step process in an EPA-type risk assessment, and the
 18 steps are the same. The middle steps actually can be done
 19 in either order. They're really in parallel, the exposure
 20 assessment and the dose response or toxicity assessment,
 21 two names for the same thing. I'm going to talk about them
 22 in the order of exposure assessment and then toxicity
 23 assessment.
 24 I want to start with the step one, which is the
 25 hazard characterization step, and this is a really critical

<p>Sheet 39</p> <p style="text-align: right;">2020</p> <p>02:35 1 step. This is where you scope the problem, understand it, 2 try and figure out what are the chemicals of concern, what 3 are the pathways of concern and also within the context of 4 the site you're looking at, so a site in California and a 5 site in the Concession Area, there are clear differences in 6 how people use that site, so all of that comes in the 7 hazard identification step. 8 And all of that information is pieced together in 9 what's called a "conceptual site model." This is actually 10 something that Dr. McHugh omitted from his Reports, and I 11 think would have helped him organize--it helps me at least 12 to organize my thinking. And that's what it's intended to 13 do, it's part of risk-assessment methodology whether it's 14 from ASTM or from EPA to organize your thoughts, and here 15 is what it is. 16 You start with the source, and in our case it's in 17 the Concession Area. What I evaluated was generally from 18 an oil pit. The next step is to figure out where it goes 19 to where people may come into contact with it, and that we 20 called the primary exposure media. And if we just go 21 across the top line, that could be, for example, soil. 22 The next step is to identify the exposure route, 23 and that could be typically for soil it's ingestion or it's 24 dermal contact. It could be also inhalation. I didn't 25 evaluate inhalation in my quantitative assessments here.</p>	<p style="text-align: right;">2022</p> <p>02:39 1 I want to spend some time on this slide, which is 2 talking about--it's an example of exposure pathways that 3 one would find in the Concession Area, and this graphic is 4 meant to represent a composite of what we observed at the 5 various sites, so it's not particular to any particular 6 site. And what you can see in the center, that residence 7 there, is not atypical of the residences, and you may well 8 see them in your site visit when you go there. 9 On the left is what is intended to be surface 10 contamination. If it's from a pit, it would be much 11 larger. Those pits are large. In this slide it's much 12 smaller, and there's various sources of water supply here. 13 There is a dug well, and there is a stream or a river. 14 There is laundry. You always see laundry. There's some 15 chickens there and cattle. Cattle you see some places, not 16 others. Chickens are everywhere. So, you always see that 17 at these sites. 18 And to just talk a little more explicitly, with 19 respect to soil exposure, people can be exposed to soil, 20 say this is intended to be a farmer, and so during farming 21 activities, and that would involve direct contact with the 22 soil, and so dermal exposure and also ingestion exposure to 23 that soil. 24 There can also be indirect pathways, which I did 25 not quantify but could well be important input here. If</p>
<p style="text-align: right;">2021</p> <p>02:37 1 The final step is to determine whether this 2 affected population, and if so, who. So, it could be 3 residents who are children, residents who are adults, it 4 could be farmers. And all together, if you can go from 5 source to exposure media to exposure route to an affected 6 population, that is called a complete exposure pathway. 7 Now, life isn't quite as simple as that linear 8 model, and I just put in one small complication here--there 9 can be many--and that's the secondary exposure. So, 10 instead of the primary point of contact being the soil, say 11 near the pit, it could be that soil, that contamination can 12 get into water or sediment. And, for example, in the 13 Concession Area, that could happen. It's a very rainy 14 area, so the pits can fill up and overflow. That would be 15 one example. 16 I'm going to move to Step 2 to exposure 17 assessment, and this is EPA's definition of exposure 18 assessment, and it's the determination or estimation, and 19 it can be qualitative or quantitative, and it's 20 quantitative in my final three assessments of the 21 magnitude, frequency, duration, and route of exposure. 22 Exposure assessments may consider past, present, or future 23 exposures. I should say that guidance now, at this point, 24 basically requires you to consider present and future 25 exposure. That's a standard guidance.</p>	<p style="text-align: right;">2023</p> <p>02:41 1 the chickens or the cattle come into contact with those 2 contaminated soils, the same would be true of the 3 sediments, and then their meat or other products such as 4 eggs could become contaminated. Again, I didn't quantify 5 that pathway. It's one of the uncertainties of my risk 6 assessment. 7 The other pathway you can see here is that 8 contaminated soil is located quite close to that house, and 9 so you could--children and adults living near that house 10 could come into contact with it. And we saw this. There 11 were two sites that I quantified: Shushufindi 13 and 12 Shushufindi 34 both had pits in places where people would 13 come into contact with it, either be it agriculture use, or 14 children living--certainly at Shushufindi 13 there was a 15 child living in that house. 16 Groundwater exposure occurs primarily through the 17 use of dug wells as a domestic water supply. It also could 18 be discharged and contacted if springs are used as a water 19 supply. We observed both during the site visits there. 20 Groundwater--dug wells are very, very common in the area, 21 including at Lago Agrio 16, Shushufindi 43, and Shushufindi 22 25. They're quite common. Shushufindi 25 there is also a 23 former drinking water use at a spring. 24 The way exposure takes place for water supply is 25 all domestic uses of water, so it could be ingestion, it</p>

<p>Sheet 40</p> <p style="text-align: right;">2024</p> <p>02:43 1 could be dermal while showering. Ingestion includes not 2 only just drinking your water, but also when it's used 3 during cooking. It also can be via laundry, so if you're 4 washing your laundry in contaminated water, the 5 contaminants gets transferred to the laundry, and then 6 you're wearing the contamination, where it's available for 7 dermal absorption. Again, that's not a pathway I 8 quantified. I don't know how much it would contribute, but 9 it's one of the unquantified pathways. 10 Another important pathway, sediment exposure. We 11 encountered contaminated sediment in several sites; Lago 12 Agrio 2 will be one that you will be seeing at your site 13 visit. And you can come into contaminated sediment just 14 via the sediment or common layoff, so both sediment and 15 surface water at the same time. Surface water is used for 16 bathing, for laundry. And as a domestic supply, surface 17 water can also be used as a water supply without--in places 18 where there is not laundry, you will be at, I think, 19 Shushufindi--no, Aguarico 6. Aguarico 6, the farmer drinks 20 the stream water while he's working in this field, at least 21 according to what he said--according to an interview I had 22 with him. He claimed that. 23 And so, these resources are widely used, and 24 you're exposed to it in many ways. 25 I'm going to move to what is the goal of an</p>	<p style="text-align: right;">2026</p> <p>02:46 1 applying it differently. 2 One big difference is the drinking water ingestion 3 rate. I have used adult ingestion rate of 7.5 liters per 4 day, which I view and with evidence that that would be a 5 high end but not unreasonable rate to use in the Concession 6 Area where it's hot and it's a subsistence agriculture 7 population. Dr. McHugh used the then-EPA default of 8 2 liters per day. It's now 2.5 liters per day, but it was 9 two when he did his calculations. 10 Another difference is I included dermal absorption 11 in my evaluations. In his first two, he didn't include any 12 dermal absorption from either soil or water. And in his 13 final two or his last risk assessment, he did include 14 dermal contact with soil, but not from water. 15 I want to move to the toxicity assessment here. 16 This is actually Dr. McHugh's slide. And you may recall 17 that he talked to you about the effects of beer and the 18 impact of dose, and that if you consume a lot of beer in 19 one night, you could have severe effects, and if you 20 don't--if you have that dose over the course of the month, 21 you'll have fewer effects, if any. 22 The piece that Dr. McHugh didn't mention was that 23 risk assessment is basically concerned with long-term 24 lifetime exposure. Risk assessment methodology was meant 25 to evaluate the impacts of long-term exposure and to</p>
<p style="text-align: right;">2025</p> <p>02:44 1 exposure assessment, and now I'm sort of back to theory. 2 I'm taking you out of the Concession Area here. 3 The goal is to calculate the average daily dose to 4 which an RME is exposed to environmental concentrations, 5 soil, sediment, air. What's an RME? You might want to 6 know. RME is a reasonably maximally exposed receptor or 7 individual. It is the hypothetical individual to whom that 8 we calculate the exposure. And regulatory decisions are 9 made from exposure and risk to this hypothetical RME. The 10 intent is not to go over to worst, worst case, but to be a 11 reasonable maximal exposure because the intent is to 12 protect all populations. 13 The method of calculating an average daily dose is 14 to combine environmental concentrations in either 15 site-specific or default exposure factors. Exposure 16 factors can be things like soil and sediment ingestion 17 rate, drinking water ingestion rate, how long people live 18 at the site. I used a combination of default in one case, 19 a couple of cases some site-specific risk--site-specific 20 exposure factors. 21 What I've highlighted here is where Dr. McHugh and 22 I disagree. Largely, I think you can see this as a 23 comparison slide, and I think one message is we used 24 actually a lot of the same things, a lot the same exposure 25 factors. We are using the same methodology; we're just</p>	<p style="text-align: right;">2027</p> <p>02:48 1 protect against health-impacts of long-term exposure. And 2 you all know that there's different impacts. If you drink 3 beer over a lifetime, you are at risk of liver disease and 4 other diseases. Risk assessment is also intended to 5 protect susceptible populations, and so one beer to a 6 healthy adult is not the same as a dose to a pregnant 7 woman. We know that there's harmful effects of alcohol 8 ingestion during pregnancy and it certainly is not going to 9 be protective of a two-year old and a full bottle of beer, 10 so we're intended to protect everybody. 11 To go further with the toxicity assessment, the 12 point of the toxicity assessment and a quantitative risk 13 analysis is to identify data to quantify the relationship 14 between exposure and the adverse effect, and I mentioned 15 earlier in risk assessment we considered basically two 16 buckets of adverse effects: Non-cancer and cancer. And on 17 the toxicity assessment we used things called toxicity 18 factors, what we referred to as toxicity factors to 19 quantify this dose, and for non-cancer effects, we called 20 that a reference dose, and for cancer we called it a slope 21 factor. The difference is how we view what happened, the 22 response at low doses that I'm going--we can talk about 23 that, if you want. 24 But I also want--we also--one of the big issues in 25 assessing risk in the Concession Area is how do you assess</p>

<p>Sheet 41</p> <p style="text-align: right;">2028</p> <p>02:50 1 risk of crude oil, a complex mixture that we're often 2 measuring as some measure of Total Petroleum Hydrocarbons, 3 and this is one of the big differences between Dr. McHugh's 4 and my risk assessment. He did not evaluate the Measures 5 of Total Petroleum Hydrocarbons, and I did. There's a 6 number of ways to do that, but one thing that you can't do 7 is ignore it. One of the things that Dr. McHugh said was 8 that the World Health Organization didn't have any 9 quantitative toxicity factor. They actually published 10 drinking water guidelines for Total Petroleum Hydrocarbons, 11 and that allowed him to not quantify it.</p> <p>12 But the problem is, if you read that document on 13 how WHO quantifies Total Petroleum Hydrocarbons, what they 14 say is, and this is a quote from that document, that you 15 have to consider sensory assessment for taste and odor, and 16 that they're going to be detectable at concentration below 17 concern for health. And so, therefore, taste and odor are 18 the canaries in the coal mine. So, to ignore the odor and 19 taste is basically saying, well, we'll allow people to 20 drink that water, and because there is no standard, there 21 is no health risk. Well, that's not the case. They didn't 22 develop a health risk because they thought they had a 23 canary.</p> <p>24 You have seen this slide--not this slide, but sort 25 of the elements of the slide before. Crude oil is a</p>	<p style="text-align: right;">2030</p> <p>02:54 1 you have the entire forest, and the forest is a much more 2 complicated ecosystem. And if you're just looking at 3 individual trees, you're going to miss a lot of important 4 information. And that's really my view of why it's much 5 more important to consider whole mixtures and use a TEM 6 approach and a comparable approach to toxicity evaluation 7 than just relying on the, you know, tip of the filter and 8 the 20 chemicals of 8270 and 8260.</p> <p>9 And so, I want to come to the benchmark, how I 10 evaluated the toxicity of crude oil in my more 11 sophisticated 2014 evaluation. And I calculated a 12 reference dose, the appropriate toxicity factor for 13 non-cancer evaluation, a reference dose using industry data 14 and standard EPA methodology. The industry data was a 15 90-day study in which crude oil--actually, several crude 16 oils were painted onto the backs of mice--sorry, rats, and 17 the outcome of that study--well, there are a number of 18 outcomes, these were the four that occurred at the lowest 19 dose of the applied crude oil. And you can see a number of 20 effects on the thymus, the bone marrow, and the liver.</p> <p>21 One of the points I wanted to make is Dr. McHugh 22 said the skin is a barrier, and it keeps the chemicals out. 23 Well, that's not really true. I mean, it doesn't allow as 24 much absorption as ingestion exposure, but chemicals still 25 get through.</p>
<p style="text-align: right;">2029</p> <p>02:52 1 complex mixture. It contains thousands of chemicals. It's 2 really hard to measure it.</p> <p>3 This is another slide from Dr. McHugh's 4 presentation, but I've changed it a little bit because I 5 want to highlight where we differ, and this is really--we 6 interpret things differently here.</p> <p>7 TEM, the total extractable materials, is the 8 Measure which measures the greatest majority of compounds 9 that are in crude oil. I'm not going to talk about 418.1, 10 but it's fairly similar in terms of what it covers. And 11 then there is the fraction methods, the 8015 method and the 12 and Massachusetts method and the Texas method that we 13 talked about that looks at fractions, and that covers a 14 little--that covers actually probably a third to a quarter 15 of what is in crude oil in terms of its components, and 16 then you're filtering down to what Dr. McHugh considered 17 the most precise measurements, which measures the volatile 18 organic compounds and some of the PAHs.</p> <p>19 Well, what your--so, you do--it is true that you 20 have more exact measurements of maybe 20 or 30 of the 21 individual compounds, but you're losing all the information 22 about all the other stuff in the mixture which you're 23 basically assuming is non-toxic, because you don't have any 24 information about it, and so it's like down at the bottom 25 you have the tree or you have five trees, and at the top</p>	<p style="text-align: right;">2031</p> <p>02:56 1 Because remember, this study, the crude oil was 2 applied to the backs of the rats, and the effects that were 3 measured were the internal organs, clearly the components 4 of crude oil, the toxic components of crude oil, which are 5 the high end PAHs in this case, were internalized where 6 they caused damage.</p> <p>7 Let me just go back and say one thing. In that 8 industry study, or it was reported by American Petroleum 9 Institute and industry trade group, there was a study 10 conducted by industry, and it was reported by the trade 11 group API to the USEPA, and this was the basis of my 12 calculation. I called it a benchmark dose as do others of 13 my reference dose calculation. And again I followed EPA 14 methodology to calculate a reference dose, and that 15 is--it's simply dividing the benchmark dose, which the 16 American Petroleum Institute calculated for me by a 17 composite uncertainty factor of 3,000.</p> <p>18 And so, what is that? Well, remember, it's a rat 19 study, so how does it have an impact on humans? That 20 traditionally is a factor of ten, and I used a factor of 21 ten for that. How different are humans from each other? 22 Well, probably more different than a factor of ten, but 23 that's the commonly applied uncertainty factor, so I 24 applied that and so on.</p> <p>25 So, I used again, following EPA methodology, to go</p>

02:57 1 from an observed effect in an animal to an effect that
 2 should be a safe dose to which all humans can be exposed.
 3 Now, I talked to you now about the first three
 4 steps. I'm moving on to the fourth step and how to
 5 characterize the risk, and this is putting together the
 6 toxicity information and the exposure information, and for
 7 cancer it's simply a multiplication of the lifetime average
 8 daily dose times the toxicity factor, and there is a
 9 benchmark range that EPA and other organizations use of one
 10 in 10,000, that's one in ten to the minus four; to one in a
 11 million, that's ten to the minus six, by all chemicals, by
 12 all pathways. That's where you make decisions, depending
 13 on the particular thing you're evaluating. Above that
 14 number, above one to the ten minus four risk, you almost
 15 always take action, below one in a million you consider it
 16 an insignificant risk.
 17 In my nine evaluations or my evaluations at the
 18 nine sites, I found that seven well sites had cancer risks
 19 in that risk range where one often looks further, so
 20 requiring more evaluation. And under current conditions,
 21 two risks one in Aguatico 6 and at Lago Agrio 2, two sites
 22 you're going to be going on the site visit as I understand
 23 it, where it was above the EPA risk range.
 24 Going to the hazard index, so the non-cancer
 25 effects, again the reference dose is intended to be a safe

03:01 1 crude oil. And to me this is the apples to apples
 2 comparison because you're comparing all the toxicity of all
 3 of the crude oil with the concentration of all of crude
 4 oil, and that's why I used--that's why I think it's the
 5 most important one.
 6 I want to end with just a couple of comments,
 7 other comments, on why Dr. McHugh and I had such different
 8 conclusions regarding risk. This is--I've talked about
 9 several of them.
 10 On sample location, we used a very different
 11 sample set. The guidance requires samples from source
 12 areas. I believe Dr. McHugh used the delineation samples,
 13 which were intended to be--to surround the source area but
 14 not to test the source area. I used the LBG datasets,
 15 which were--looked at the source areas.
 16 And again, quantitative risk assessment requires
 17 concentrations of contaminants in the source areas.
 18 Again, I think another big difference in our
 19 analysis is the chemicals that we included in the analysis,
 20 actually our cancer risk assessments were virtually the
 21 same. We used the same PAHs. I did not apply a whole
 22 mixtures approach, so our results are fairly similar or
 23 would be if we used each other's dataset.
 24 But for the TEM analysis, again, I included the
 25 entire range of components of crude oil. Dr. McHugh used

03:00 1 dose, and so it's just a comparison of the average daily
 2 dose to that safe reference dose. And it's considered that
 3 when the dose is greater than the reference dose, further
 4 action is required, further site investigation or cleanup.
 5 This is a slide that Dr. McHugh showed. He showed
 6 a slightly more complicated version of it. I took out some
 7 of the middle columns, just to make it easier to
 8 understand.
 9 I do want to say that I put them all in there for
 10 the sake of transparency, not for the sake of confusion. I
 11 wanted to be--to show clearly the uncertainty and the
 12 differences that would appear by the different methods of
 13 calculation. So, what remains on this slide is the
 14 Massachusetts method, which Dr. McHugh acknowledges is used
 15 in regulatory decision-making, the 8015 calculations which
 16 Dr. McHugh suggests are only good for screening, which, by
 17 the way, he had access to and did not use, but he did
 18 acknowledge that you could do that.
 19 And the final column on your right is my method
 20 for combining the whole mixtures so the toxicity from the
 21 whole product of crude oil, which I just explained to you
 22 with TEM.
 23 Now, I think this is the most reliable method. It
 24 does give the highest numbers, which in some ways you would
 25 expect because you're covering the entire range of the

03:03 1 just a few them, just to give an example of that, the whole
 2 mixture versus the fractional approach, and Dr. McHugh
 3 evaluated less than 1 percent of the chemicals in crude
 4 oil.
 5 And I hope that clarifies risk assessment and what
 6 I did in my opinions, and that concludes my presentation.
 7 PRESIDENT VEEDER: Thank you very much.
 8 Are there any more questions from the Respondent?
 9 MS. SILVER: No. Thank you.
 10 PRESIDENT VEEDER: There will now be questions
 11 from the Claimant.
 12 CROSS-EXAMINATION
 13 BY MS. RENFROE:
 14 Q. Good afternoon, Dr. Strauss.
 15 A. Good afternoon.
 16 Q. I appreciate the remarks that you made with your
 17 counsel at the beginning of your presentation about
 18 clarifying some of the points in your Reports--that may
 19 save us a little bit of time--but I would like to start
 20 with a point and make sure that the clarification you
 21 offered is, indeed, clear to everybody.
 22 And so, if I might begin with our Slide 1, and
 23 while I'm doing this, I will ask if we can have passed out
 24 to you the first binder of documents.
 25 So, Mr. Johnson, may we have Slide 1, please.

03:05 1 What I have on the screen, Dr. Strauss, is a quote
 2 from the Republic of Ecuador's counsel made during Opening
 3 Statement, and please take a moment and get yourself
 4 organized. I'm not trying to rush you through these
 5 materials, but I don't know if you were here for the
 6 Opening Statements, but this is a quote from, I believe,
 7 Ms. Silver, who was presenting regarding health risks on
 8 behalf of the Republic of Ecuador. So, take a moment, read
 9 that, and then I have a few questions about it.
 10 (Witness reviews document.)
 11 A. Okay.
 12 Q. Okay. So, I think that your comments at the
 13 beginning in response to Ms. Silver's questions helped
 14 clarify, but I want to make sure for this record we are
 15 very clear because your Reports have spoken about actual
 16 health impacts in the past and in the present. And I heard
 17 you say earlier at the beginning of your introduction, that
 18 those were, perhaps, inartful words on your part, and that
 19 you were not intending to render opinions about actual
 20 human health effects or impacts.
 21 Do I have that correct?
 22 A. You have that correct.
 23 Q. All right. And so, as is stated in this portion
 24 of counsel's Opening Statement--and I want to know if you
 25 agree with this--that your task has been to look forward

03:08 1 question of whether there may be in the future a potential
 2 human health risk, and that's the scope of what you have
 3 done here; is that correct?
 4 A. Well, I would characterize it looking at current
 5 and future exposure scenarios and evaluating health risks
 6 based on those scenarios to see whether they cause a
 7 significant risk of harm, and again within the regulatory
 8 context of making the decision about whether cleanup or
 9 further investigation is required.
 10 Q. And that's right. That takes us to the next point
 11 that I wanted to make, which is, the question you're trying
 12 to answer is whether further evaluation of a given site is
 13 needed; correct?
 14 A. In part.
 15 Q. And/or whether remediation is needed?
 16 A. That's correct.
 17 Q. Those are the two questions that your work has
 18 undertaken to answer; correct?
 19 A. Those are the--yes, that's what I would like to
 20 put before the Tribunal--for the Tribunal to consider.
 21 Q. And to the extent someone characterizes your
 22 Reports in a different fashion, that would be
 23 inappropriate?
 24 A. That would certainly be--yes.
 25 Q. Right. That's not what you intend. That's not

03:06 1 and to evaluate the possibility that there may be a
 2 theoretical human health risk from conditions in the
 3 Concession Area.
 4 A. Yes. The way I conducted my quantitative risk
 5 assessments at the nine sites, I did not evaluate or
 6 consider past exposures. They were present and future
 7 exposure pathways with--consistent with the methodology of
 8 EPA to determine whether cleanup is required or, at a
 9 minimum, whether further investigation is required because
 10 the dataset I had was not a complete dataset.
 11 Q. And just to put a bow around this point, if you
 12 will, to the extent that your Reports mention actual human
 13 health effects, then we should--we should put those
 14 comments aside. Those should not be--you're not intending
 15 to convey that, and those should be dismissed?
 16 A. That's correct. I would like the Tribunal to rely
 17 on the quantitative risk assessments and the risk from now
 18 going forward.
 19 Q. Okay. So, that means that we should put aside
 20 your very First Report, which was your qualitative risk
 21 assessment; correct?
 22 A. That is correct.
 23 Q. All right. And then continuing to look at this
 24 portion of the argument by counsel for the Republic, she
 25 characterizes your work as determining or weighing on the

03:10 1 how you intend that they be used?
 2 A. That's correct.
 3 Q. Now, am I also correct that in undertaking your
 4 analysis of conditions at the nine sites that you
 5 evaluated, you did not take into account the Remedial
 6 Action Plan between TexPet, the Republic of Ecuador and
 7 Petroecuador?
 8 A. I took no account of that. I accounted only for
 9 the data as it sits now.
 10 Q. Right. And so, that means that you performed your
 11 quantitative human health-risk assessments as if the
 12 Remedial Action Plan and the Settlement Agreement between
 13 TexPet, Petroecuador, and Ecuador had never occurred?
 14 A. That's correct.
 15 Q. And so, that means that you did not concern
 16 yourself with whether a given sample was from an area that
 17 was not assigned to TexPet for remediation?
 18 A. I neither concerned myself or most of the time had
 19 knowledge of that.
 20 Q. Right. You were oblivious to those facts--
 21 With all due respect--and I didn't mean any
 22 disrespect, but in undertaking your work, you did not seek
 23 to focus on a sample or evaluate areas that had been
 24 assigned to TexPet or not?
 25 A. That's correct.

03:11 1 Q. Now, am I also correct that you acknowledge that
 2 Petroecuador and/or affiliates of Petroecuador have
 3 operated the former Concession Area continuously since June
 4 of 1990?
 5 A. That's my understanding. I don't have direct
 6 knowledge of that.
 7 Q. Right. And are you aware that Petroecuador has
 8 not only operated in the former Concession Areas but in
 9 many places it has actually expanded those operations?
 10 A. I am generally aware of that.
 11 Again, I'm not offering opinions on this area.
 12 Q. I understand.
 13 But, to the extent that you are offering opinions
 14 about whether any of these nine sites that you examined
 15 might need further evaluation or might need remediation, am
 16 I correct that you are offering no opinion about whose
 17 actions might have caused those impacts?
 18 A. I am not offering that opinion, no. Let me
 19 qualify it to say that I relied on data from Berger, from
 20 LBG who have looked at that, so I will defer that to them.
 21 Q. So, you're not providing any opinion to this
 22 Tribunal about whose activities caused the impacts at a
 23 given location at any of those nine sites?
 24 A. No--that's correct.
 25 Q. Is that correct?

03:13 1 A. That is correct.
 2 Q. Okay. All right.
 3 Now, another point of clarification, is it true,
 4 Dr. Strauss, that you were not an Expert, and had no
 5 involvement in the Lago Agrio Case?
 6 A. Could you--I want to answer this one properly, so
 7 could you please say it again.
 8 Q. Let me see if I can give you a better question.
 9 Did you serve as an Expert in the Lago Agrio Case?
 10 A. No.
 11 Q. And the quantitative risk assessments that you
 12 have provided to this Tribunal were not provided to the
 13 Lago Agrio Court for the Lago Agrio Case, were they?
 14 A. Certainly mine were not.
 15 Q. Right.
 16 And, to your knowledge, the Plaintiffs in the Lago
 17 Agrio Case did not provide any kind of quantitative human
 18 health-risk assessment for that case, did they?
 19 A. I don't know.
 20 Q. None has been provided to you, has it?
 21 A. No, I don't believe so.
 22 Q. Right.
 23 So--and I think this would be clear and implicit
 24 in the questions I just asked, but for the record, the
 25 sampling data that LBG collected from former Concession

03:14 1 sites in 2013 and 2014, that, of course, that data was not
 2 available to the Lago Agrio Court in the Lago Agrio
 3 Litigation, was it?
 4 A. Not exactly the LBG data, no.
 5 Q. Right. Now, were you involved--were you
 6 personally involved in the collecting of that data; that
 7 is, the LBG data?
 8 A. Somewhat.
 9 Q. Did you direct where the samples were to be taken
 10 in any way?
 11 A. Only a very limited number.
 12 Q. At which sites, please?
 13 A. Lago Agrio 2.
 14 Q. Any other site?
 15 A. Well, I conferred with LBG on the Sampling Plan
 16 throughout. I was a part of that team, and so there were
 17 conversations. I was not in the field and said take a
 18 site--take a sample here, take a sample there. That was
 19 not part of what I did, with the exception of Lago Agrio 2.
 20 Q. And at Lago Agrio 2, were you involved in the
 21 taking of those wipe samples?
 22 A. Yes.
 23 Q. Any other samples?
 24 A. The surface soil sample in front and back of the
 25 house.

03:16 1 Q. Okay. And I think we will be getting to your
 2 calculation tables shortly, so when we get there, perhaps
 3 you could flag for me which samples you actually were
 4 involved in taking, but you said they were surface soil
 5 samples?
 6 A. There were two samples of surface soil, one sample
 7 of surface soil from the patio area of Lago Agrio 2, and
 8 then there was a sample from the back of that house, which
 9 was exposed asphaltic material, which was then evaluated.
 10 Q. Okay.
 11 A. I think it has a soil label on it, but it is
 12 not--it wasn't like what you consider soil.
 13 Q. Okay. We may get there this afternoon.
 14 A. I hope we don't get there Monday.
 15 (Laughter.)
 16 Q. Okay. So, let me switch gears just a little bit.
 17 Do you agree with the conclusion that we've read
 18 in one of the reports of LBG, that looking at an
 19 environmental sample, just that sample itself, that one
 20 cannot determine the source of the material in that sample?
 21 A. Why don't you try that again. I don't think I got
 22 it.
 23 Q. I will be glad to.
 24 So, in one of LBG's Reports--and I can find it if
 25 we need it--but they acknowledged that if you're simply

03:17 1 looking at an environmental sample, the analytical result
 2 of a soil sample, for example, that just looking at that in
 3 and of itself, tells you nothing about whose action led to
 4 that particular impact; do you agree with that?
 5 MS. SILVER: Excuse me, Ms. Renfroe, if you're
 6 going to ask her a question about an LBG Report, do you
 7 think you could give her a cite so that she could review
 8 it.
 9 MS. RENFROE: I would be glad to do that, but
 10 maybe we can put that aside.
 11 BY MS. RENFROE:
 12 Q. Just independent of LBG, do you agree with me
 13 that, as it relates to your work at these nine sites?
 14 A. I can only say that my practice is to evaluate the
 15 chemicals in a sample in the context of where that sample
 16 is taken, the depth of the sample, the location of the
 17 sample, if it's petroleum, actually the smell of the
 18 sample. If that's--or the staining, the logs, the field
 19 notes in association with it.
 20 So, I try not to, if I have other data available,
 21 to try to look at things holistically.
 22 Q. I understand, but that was really not my question.
 23 Let me try it again.
 24 If you are presented with an analytical result
 25 from a laboratory for a soil sample, looking at that alone

03:20 1 think we've got it highlighted, and you see they've stated
 2 there: "As to the former, it is generally impossible to
 3 distinguish chemically between petroleum released by TexPet
 4 versus Petroecuador in most of the situations at issue in
 5 the Concession Area."
 6 Do you see that?
 7 A. Yes, I do.
 8 Q. Okay. Do you agree with that?
 9 A. I have no reason to disagree with it.
 10 Q. No reason to disagree with it?
 11 A. Correct.
 12 Q. All right, thank you.
 13 Now, let's move now to the topic of the
 14 quantitative risk assessments that you have done. And to
 15 be clear for this Tribunal, I'm going to focus on those
 16 quantitative risk assessments, since we are putting the
 17 qualitative risk assessment aside.
 18 A. Okay.
 19 Q. And if I'm counting correctly, I believe you've
 20 provided three different quantitative risk assessments; is
 21 that correct?
 22 A. I don't know how you're counting. I provided
 23 quantitative risk assessments at nine different sites in
 24 three different reports.
 25 Q. Okay. You've got your Reports there, and you've

03:19 1 doesn't enable you to determine whose or which entity's
 2 actions led to that particular impact; do you agree with
 3 that?
 4 A. I think it just depends. If I don't know where
 5 the soil sample comes from, I obviously don't know where it
 6 is. If the soil is taken in the middle of my house that I
 7 have been living in for 30 years, maybe it's mine. I just
 8 can't answer that question exactly, as you phrased it.
 9 Q. And so, if one said it's almost impossible to
 10 distinguish between Party A and Party B's actions in a
 11 given environmental sample, you would disagree with that,
 12 or you would agree with that?
 13 A. I'm having trouble answering it because I've had a
 14 long career now, and I have been involved in a lot of
 15 forensics and looking at non--the weird chemicals that are
 16 involved to distinguish between one and another, so in a
 17 theoretical context, I think oftentimes you can find a
 18 means of distinguishing.
 19 Q. Okay. Maybe we can pull up the LBG Report, the
 20 March 2015 Report, Page 7. I don't think I have that in
 21 your bundle, but let's see if Mr. Johnson can pull that up
 22 for us quickly. We will give him a little challenge for
 23 the afternoon.
 24 A. I'm happy to share the burden.
 25 Q. Now, I've got this quote from LBG's Report, and I

03:22 1 also got a bundle of documents in front of you. If you
 2 could look at Volume 1, and let's make sure we've got the
 3 right packet.
 4 MS. RENFROE: And I believe the Tribunal has
 5 Volume 1 of our cross bundle.
 6 BY MS. RENFROE:
 7 Q. And in the inside pocket there are some charts
 8 that we have taken and blown up from your Reports.
 9 Would you confirm, Dr. Strauss, that these are the
 10 tables from your Reports that contain--well, the results of
 11 your calculations of your quantitative risk assessments
 12 from your last three reports?
 13 A. That is correct.
 14 Q. And we are going to spend some time with these
 15 this afternoon, but just to make sure that we, just for
 16 orientation, your Table 5.1 and 5.2, which is the first two
 17 tables, actually first three tables, first three pages,
 18 those are from your December 2013 Report; correct?
 19 A. Yes.
 20 Q. And these are a combination of both a cancer risk
 21 assessment and non-cancer risk assessment; correct?
 22 A. Correct.
 23 Q. And then, if we turn further into the packet and
 24 we then come to your November 2014 Quantitative Risk
 25 Assessment, that is the results of it?

03:24 1 A. Yes.
 2 Q. And these results are for the non-cancer
 3 calculations; correct?
 4 A. That's correct.
 5 Q. And then finally, the last page is from your
 6 March 2015 Report showing your most recent cancer risk
 7 calculations; correct?
 8 A. That's correct. And this is the correction, the
 9 bottom line, on this one, Shushufindi 43, that should be, I
 10 think, four times ten to the minus seven, or something like
 11 that. That's the change.
 12 Q. So, in the most right-hand column where it says
 13 cancer risk, instead of five times ten to the minus six,
 14 what should it say?
 15 A. I believe it should be--this is off the top of my
 16 head, but I believe it should say four times ten to the
 17 minus seven.
 18 Q. And that would--
 19 A. For 4(e) minus 07.
 20 Q. And in your opinion then, that means there is no
 21 risk--no future cancer risk at this location, based on this
 22 sample?
 23 A. Well, the terminology I would use is "significant
 24 risk," so, there is no significant risk, and that should
 25 lose its yellow color.

03:25 1 Q. So, it would go to white?
 2 A. Correct.
 3 Q. Okay. Now, before we get into these calculations
 4 and your results in some detail, my question to you is:
 5 Did you do your own data quality evaluation of all of the
 6 analytical data that you relied upon for these
 7 calculations, or did you rely upon Dr. Short for that?
 8 A. I actually relied on LBG for that.
 9 Q. Okay. And, likewise, in the development or the
 10 collecting of the samples and the compilation of the
 11 database, did you also rely upon LBG for that?
 12 A. Yes.
 13 Q. And so, to the extent that LBG made an error in
 14 presenting the data or in their data quality evaluation,
 15 that would have an effect on your own calculations, would
 16 it not?
 17 A. I used the data that they provided me.
 18 And, yes, it would, because if the data were
 19 different, then my results would be different.
 20 Q. Right, okay. And if it turns out that a sample
 21 reported by LBG had some sort of data-reliability problem
 22 with it, whether it was a blank, whether it had blank
 23 contamination or it had some other problem from the
 24 laboratory, to the extent that happened, then that would
 25 have an effect on the reliability of your calculations that

03:27 1 depend on that sample?
 2 A. That is correct.
 3 Q. Right. Now, what I would like to do next,
 4 again--I want to take a few steps before we dive into these
 5 calculations--some of us might find them a bit daunting, so
 6 I'm perhaps stalling a little bit, but I want to talk to
 7 you just briefly about the methodology that you used to
 8 develop the non-cancer calculations, and it may help just
 9 to have in front of you and the Tribunal the middle set of
 10 calculations where you have the six different methods, and
 11 this would be the calculations from your November 2014
 12 Report showing white, pink, and various shades of pink.
 13 And we now have it on the screen.
 14 A. Okay.
 15 Q. Okay. So, you spoke a little bit earlier today,
 16 and I believe you were here for the testimony of
 17 Dr. McHugh, and what I want to talk about now is the
 18 differences in the analytical methods that were used, some
 19 of which you both used and some of which only you used.
 20 Okay? That is the topic I want to go to now.
 21 A. That's fine.
 22 Q. Okay. So, when we're talking about this, we're
 23 talking about the decision to use a fractionation approach
 24 to analyzing an environmental sample or the approach that
 25 you talked about meaning the TEM approach. Do you have

03:28 1 that dichotomy correct?
 2 A. I believe I understand what you're talking about.
 3 Q. And when you first did your quantitative risk
 4 assessment in 2013, the very first three tables, you used
 5 the fractionation approach which has also been described as
 6 the VPH-EPH Method; correct?
 7 A. That is one of the methods I evaluated.
 8 Q. And the other method you used was the 8015 Method?
 9 A. That's correct.
 10 Q. And so, if we were to--if we wanted to understand
 11 your calculations of non-cancer health risk using just
 12 those two approaches, then we could go to your first three
 13 tables; correct?
 14 A. Well, you could go to Table 5-1 of both pages for
 15 the first, what is it--from my First Report, from my
 16 December 2013 Report, and then you could go to--I don't
 17 think I numbered this table, but it's listed as Page 20,
 18 the big colorful chart, complicated chart.
 19 Q. Right.
 20 A. For those that I evaluated in my November 2014
 21 Report. I evaluated it--I evaluated Massachusetts EPH-VPH
 22 and the Method 8015 in all of my quantitative assessments.
 23 Q. Right. And going back to your first Quantitative
 24 Assessment Report that you did in 2013, which is in the
 25 first, I think you said it was Table 5-1.

<p>Sheet 47</p> <p style="text-align: right;">2052</p> <p>03:30 1 A. Yes. 2 Q. Where there you used only the first two methods, 3 the VPH-EPH Method; correct? 4 A. Yes. 5 Q. And if we look at the very first page of your 6 tables--that is, Table 5-1, and if we look at the Lago 7 Agrio 2 site, for example, and looking at the sample 8 location T2A just as an example, we see that there are two 9 columns underneath that: EPH and DRO; correct? 10 A. Yes. 11 Q. And the EPH refers to the VPH-EPH Method that Dr. 12 McHugh spoke of yesterday? 13 A. That's correct. 14 Q. And the DRO column refers to the 8015 Method; 15 correct? 16 A. That's correct. 17 Q. And those two methods were the only two methods 18 that you used in 2013 in your risk assessment work for 19 2013; correct? 20 A. That's correct. 21 Q. And you presented those calculations to this 22 Tribunal with the expectation that the Tribunal would rely 23 upon your work? 24 A. Yes. 25 Q. And in presenting these risk calculations in 2013,</p>	<p style="text-align: right;">2054</p> <p>03:33 1 Q. And this is the one that you used in 2013 and 2 2014? 3 A. Yes. 4 Q. And so, if we can turn to Page 1, the 5 Introduction. The first paragraph. 6 A. The Preface? 7 Q. In the Introduction, Page 1. It's actually--no, 8 it's beyond the Preface. It says 1.0, Introduction? 9 A. I'm with you. 10 Q. You're with me. And the first paragraph. 11 And it says there, and if we could just read this 12 together: "A key component of the evaluation of petroleum 13 contaminated waste sites is the assessment of potential 14 human health risks from exposures to Petroleum Hydrocarbon 15 compounds, usually present as mixtures. An improved method 16 for the evaluation of health hazards posed by oral 17 exposures to these complex mixtures was developed and 18 described by the Massachusetts Department of Environmental 19 Protection in 1994," and then it goes on to say, "and 20 integrated into the Massachusetts Department of 21 Environmental Protections Bureau of Waste Cleanup." The 22 next sentence is the one I want to focus on. Are you with 23 me? 24 A. Yes, I am. 25 Q. "The method involves segregating the Petroleum</p>
<p style="text-align: right;">2053</p> <p>03:32 1 is it fair to say that you thought that your methodology 2 using the VPH-EPH approach was accurate and protective? 3 A. No, I think it's compliant with regulatory 4 guidance. That's a step beyond my conclusion. The EPH and 5 DRO only constitutes a fraction of the material in the 6 crude oil, but it was what I had, and I did the evaluation 7 that way. 8 These methods were developed for refined oil, for 9 refined petroleum products, and they're very good for that. 10 They're not as good for Crude, but, as a risk assessor, you 11 deal with the data that you have and live with uncertainty 12 for the rest. 13 Q. So, maybe we can take a moment and look at the 14 Massachusetts Method that you actually relied upon in 2013 15 and 2014. I think the Tribunal had a chance to look at 16 this briefly yesterday. Let me see if we can get it pulled 17 up. And it should be in your bundle. 18 A. I'm not sure what you're referring to here. 19 Q. Okay. Let me help you. 20 A. Okay. 21 Q. Right. And if you can look at Tab 10 in your 22 bundle there. 23 Is that the Massachusetts Method that I'm--for 24 shorthand purposes calling the VPH-EPH Methodology? 25 A. Yes.</p>	<p style="text-align: right;">2055</p> <p>03:35 1 Hydrocarbon compounds present in mixtures into broad 2 chemical classes (alkane, cycloalkane, alkene and 3 aromatics) and further into subgroups or fractions based 4 upon their size defined by number of carbon atoms in the 5 compounds." 6 Do I read that correctly? 7 A. Yes. 8 Q. And then the final sentence says: "These 9 designations were made upon consideration of the nature and 10 degree of comparative toxicity of compounds and structure 11 activity relationship considerations." 12 Do you see that? 13 A. Yes. 14 Q. And so, this is saying to us that the 15 fractionation method is the method to use for purposes of 16 evaluating crude oil in environmental samples, and this is 17 the method that you relied upon in your 2013 approach; 18 correct? 19 A. Well, I think that was a compound question, and 20 I'm having a hard time answering it. Perhaps you can 21 simplify it. There are two parts. 22 Q. I'm happy to do that. 23 First part is this paragraph and this method is 24 describing the fractionation approach which is called the 25 VPH-EPH Method?</p>

03:36 1 A. That's correct.
 2 Q. And, Number 2, this is the method that both you
 3 and Dr. McHugh relied upon for your quantitative risk
 4 assessments last year and this year?
 5 A. That's also correct.
 6 Q. And Number 3, when you wrote your Report in 2013
 7 relying upon this method, you did not tell this Tribunal
 8 that this method was not protective of human health, did
 9 you?
 10 A. No, I did not.
 11 Q. Right. Now, let's move to the second point, which
 12 has to do with the calculation of a toxicity value. That
 13 is a second aspect in which you and Dr. McHugh have some
 14 disagreement in approach; fair?
 15 A. Fair.
 16 Q. All right. So, let's move to that point, if we
 17 may.
 18 But actually before I move to that, I should cover
 19 one more point. And that is the 8015 Method which you also
 20 used.
 21 So, now, to discuss that, let me take you to your
 22 second set of tables, the one that is--that you did for
 23 your 2014 Report which I have annotated, and this is the
 24 set of tables that shows your six methods. The Tribunal
 25 saw these yesterday during Dr. McHugh's presentation, and I

03:39 1 that discussion?
 2 MS. SILVER: Ms. Renfro, if you're going to
 3 reference or quote what he says, do you think you could put
 4 it in front of her, please?
 5 MS. RENFROE: Sure, I'd be glad to. Let's put up
 6 McHugh's Slide 54 from Dr. McHugh's presentation.
 7 PRESIDENT VEEDER: At some stage, we're going to
 8 need a mid-afternoon break, so whenever it's convenient,
 9 you say.
 10 MS. RENFROE: I could go all afternoon on this, so
 11 you tell me when you would like to take a break and perhaps
 12 we should ask the witness.
 13 PRESIDENT VEEDER: I'm glad it's only the
 14 afternoon and not all night.
 15 Well, we could do it now, if it's convenient.
 16 MS. RENFROE: Now is perfectly convenient.
 17 PRESIDENT VEEDER: We'll take a 15-minute break,
 18 please don't discuss the case or your testimony away from
 19 the Tribunal.
 20 THE WITNESS: Thank you.
 21 (Brief recess.)
 22 PRESIDENT VEEDER: Let's resume.
 23 MS. RENFROE: Thank you very much.
 24 Can you hear me?
 25 THE WITNESS: Yes, I can.

03:38 1 I would like to focus on these for a moment.
 2 As just to get us oriented if I could. As we look
 3 at the screen and your table, we see that this is your
 4 summary of non-cancer hazards sites investigated in 2014,
 5 and when we look at the top row, we can see your first
 6 column, which is actually your fourth column, but your
 7 first column that has your calculation results, it says
 8 VPH-EPH fraction; correct?
 9 A. Yes, it does.
 10 Q. And we just talked about that method; right?
 11 A. Correct.
 12 Q. Now, moving one to the right is your 8015 Method;
 13 correct?
 14 A. Oh, what you just put in green? Yes.
 15 Q. Yes, it's just been highlighted.
 16 And the 8015 Method is also one that you used in
 17 2013 as well as 2014?
 18 A. Yes.
 19 Q. And that method is one that Dr. McHugh discussed
 20 yesterday, and I believe you were here during his
 21 presentation, and he discussed that there is a Louisiana
 22 Department of Environmental Quality Guideline that says, as
 23 between these two methods, VPH-EPH and 8015, if you have
 24 the VPH-EPH data, the fractionated data, then that's what
 25 you should use over and above the 8015 data. Do you recall

03:57 1 BY MS. RENFROE:
 2 Q. So, before the break, I wanted to address one more
 3 point about the analytical method and to talk about the
 4 8015 method that you and Dr. McHugh used. And I think it
 5 would be helpful to have in front of you, if you could,
 6 your table from the 2014 Report, which we were looking at,
 7 and then bear that in mind as we look to this.
 8 So, I had asked you a question about the testimony
 9 of Dr. McHugh yesterday, which I believe you heard, about
 10 the regulatory guidance from the State of Louisiana that
 11 says: When you have fractionation data, such as what you
 12 get with VPH and EPH, versus 8015, if you have the
 13 fractionation data, that should be used for management
 14 decisions at contaminated sites. And my question is--I
 15 know you see the guidance here, and you heard the testimony
 16 of Dr. McHugh yesterday on this point; correct?
 17 A. Yes.
 18 Q. And you would agree that the fractionation data
 19 provides, as between 8015 and the VPH-EPH, it provides the
 20 more precise information about the specific components in
 21 crude oil that potentially present the most risk?
 22 A. I don't agree with that.
 23 Q. But you do see this guidance from the Louisiana
 24 Department of Environmental Quality that says, as between
 25 the two, when you have fractionation data, that's what you

03:59 1 should use. Do you see that Dr. Strauss?
 2 A. Yes, I see if those are your two choices, that's
 3 what you should use.
 4 Q. Right and--okay. So, that means that, as between
 5 the calculations you provide in Column 1--actually, it's
 6 your fourth column, but your Method Number 1, and your
 7 fifth column, which is your Method Number 2, the Louisiana
 8 Department of Environmental Quality is telling us that as
 9 between those two, we should use the VPH-EPH, which would
 10 be your method Number 1. That's at least what the
 11 Louisiana guidance tells us, doesn't it?
 12 A. That's what it would say, yes.
 13 Q. Now let's move to the issue of the toxicity value,
 14 which is another issue in which you and Dr. McHugh have
 15 some disagreement, okay?
 16 Now, on this point, I would like to direct your
 17 attention--you have your Reports there, and I want to take
 18 you to your Report of November 2014, specifically Page 37
 19 and 38.
 20 A. Am I looking at your bundle, or I have it in mine?
 21 Q. You can look at it in your bundle. I knew you
 22 would have your Report, so I didn't duplicate them.
 23 A. That's fine. I just needed to know which pile to
 24 look in.
 25 Q. Sure, sure. Right. I will try to guide you a

04:00 1 little better next time.
 2 November 2014? And I'd like to take you to--
 3 MS. SILVER: Can you give me one second to catch
 4 up?
 5 MS. RENFROE: Certainly. Absolutely.
 6 (Pause.)
 7 BY MS. RENFROE:
 8 Q. Dr. Strauss, can you tell us which tab you're
 9 looking at in that bundle of your Reports?
 10 A. Tab 3.
 11 Q. Tab 3 of your collection of reports. Thank you.
 12 MS. RENFROE: Counsel, let me know when you're
 13 ready.
 14 MS. SILVER: You said November; right?
 15 MS. RENFROE: Yes.
 16 MS. SILVER: Okay. Give me one more second.
 17 MS. RENFROE: Sure.
 18 MS. SILVER: And what page was it?
 19 MS. RENFROE: Sure. It's Page 37 and 38.
 20 MS. SILVER: Thanks.
 21 MS. RENFROE: Of course. Happy to accommodate.
 22 BY MS. RENFROE:
 23 Q. Just quickly, this portion of your Report lays out
 24 your method for the creation of your toxicity value;
 25 correct?

04:02 1 A. I'm not sure about creation, but it's my method
 2 for developing it, yes.
 3 Q. And it's true, isn't it, Dr. Strauss, that the
 4 toxicity value that you developed for crude oil in this
 5 case, that you developed it for this case; correct?
 6 A. I did develop it for this case. It can be used in
 7 other places.
 8 Q. But we would not find--and if we turn specifically
 9 to Page 38--let's focus now very precisely on what your
 10 toxicity value is.
 11 These two pages explain how you derived the
 12 toxicity value; correct?
 13 A. That's correct.
 14 Q. And then at the top of Page 38, we see the values
 15 that you actually came up with, and I want to draw your
 16 attention specifically to the last paragraph and the last
 17 sentence, where you say: "Accounting for this reduction in
 18 toxicity by the dermal route leads to an RfD (oral) of
 19 .004 milligram per kilogram per day."
 20 Did I read that correctly?
 21 A. Yes, you did.
 22 Q. And this is your toxicity value that you derived
 23 for this case; correct?
 24 A. Well, the 0.004 is the oral toxicity factor. I
 25 derived a dermal toxicity factor as well.

04:03 1 Q. Right. And I want to focus on the oral toxicity
 2 factor for a moment.
 3 If we could now look at McHugh--and this is not in
 4 your bundle, we're going to pull it up on the
 5 screen--McHugh Exhibit 61, and which for the record is the
 6 guidance from the Massachusetts Department of Environmental
 7 Protection, entitled, "Characterizing Risks Posed by
 8 Petroleum Contaminated Sites." And we see that this is the
 9 implementation of the Massachusetts VPH-EPH approach.
 10 Do you see that?
 11 A. Yes.
 12 Q. And if we turn to Page 3 of this guidance, you'll
 13 see a table there that shows the toxicological approach for
 14 non-cancer health effects, and we see there a group of
 15 toxicity values for various fractions of crude oil;
 16 correct?
 17 A. Yes.
 18 Q. And so just to understand what you have done,
 19 instead of using these published reference doses or
 20 toxicity values for crude oil for your health risk
 21 calculations, instead of using these, instead you developed
 22 a single toxicity value of .004, and you applied that
 23 toxicity value to the entire crude oil in a given sample;
 24 correct?
 25 A. Yes, I did.

04:05 1 Q. And so what you're doing here is you're saying
 2 you're going to treat all of the components of crude oil as
 3 if all of them were equally toxic; correct? That is,
 4 you're saying that you're going to apply one single
 5 toxicity factor of .004 milligrams per kilogram per day to
 6 the entire amount of crude oil in a given sample?
 7 A. That's exactly what I did.
 8 Q. Right. But if we compare your number of .004
 9 milligrams per kilogram per day to these published toxicity
 10 values to the various fractions of crude oil, isn't it
 11 correct that your value, your toxicity value, is far
 12 more--is far lower than the published toxicity values;
 13 correct?
 14 A. Yes, it is.
 15 Q. And so, what's happening here is, by applying your
 16 toxicity value rather than the value published by the
 17 Massachusetts Department of Environmental Protection, you
 18 have--you're saying that the entire crude oil sample is far
 19 more toxic than any of these fractions that have been
 20 identified by this regulatory agency; correct?
 21 A. That is what the data say.
 22 Q. And just to do a little bit of math here, if we
 23 take the aliphatic hydrocarbons, that group of fractions,
 24 and we compare your derived toxicity value to the published
 25 toxicity value, we can see that yours is ten times--there

04:08 1 has concluded and published?
 2 A. No. That's where I disagree with you.
 3 Q. Let's move on to the next one, then: .004, your
 4 .004 versus .03, seven and a half times difference, isn't
 5 it?
 6 A. Yes, and now we're approaching the toxic fraction
 7 of that crude oil that that experiment that I based my
 8 evaluation on measures. It is not based on these prior
 9 examples.
 10 Q. Now, we cannot find in any published authority or
 11 any published guidance a toxicity value for the entire
 12 fraction of crude oil of .004. There is no such
 13 publication, is there?
 14 MS. SILVER: Ms. Renfro, if you're going to
 15 continue--I'm sorry to interrupt you, but if you're going
 16 to continue to question the Witness on this, do you think
 17 you could get her the document that you're referring to
 18 rather than just having it on the slide?
 19 MS. RENFRO: I'm referring to her Report,
 20 Page 38, which she has in front of her.
 21 MS. SILVER: But you're also referring to this
 22 Massachusetts regulatory document.
 23 MS. RENFRO: Well, now I'm moving away from that.
 24 I moving away from it. It's a different question. I'll be
 25 glad to repeat it.

04:07 1 is a ten times difference, isn't there?
 2 A. Yes, there is.
 3 Q. And if we made a similar comparison to the, let's
 4 just take the aliphatic hydrocarbons, that C19 to C36
 5 group, and if we compare the published toxicity factor to
 6 the one that you've used, there is a 500 times difference,
 7 isn't there?
 8 A. Yes, there is.
 9 Q. And what you're telling us with your toxicity
 10 value is that, this group of hydrocarbons is 500 times more
 11 toxic than what this public Health Authority in
 12 Massachusetts has concluded and published; isn't that
 13 correct, Dr. Strauss?
 14 A. Why don't you ask me it again. I don't believe
 15 that's correct, but let me hear the question again.
 16 Q. Well, certainly. It's just a matter of math. I'm
 17 comparing the published toxicity value for aliphatic
 18 hydrocarbons, C19 through C36, which is 2.0. That's the
 19 toxicity value that's been published by this public health
 20 organization, and I'm comparing it to yours, and yours of
 21 .004, that difference is a 500 times difference, isn't it?
 22 A. Yes, it is.
 23 Q. With the consequence that you are declaring that
 24 this portion of crude oil is 500 times more toxic than what
 25 the Massachusetts Department of Environmental Protection

04:10 1 PRESIDENT VEEDER: If I could just say to the
 2 Witness, if ever you feel the need to call for a document,
 3 please feel free to do so.
 4 THE WITNESS: I've been around--I'm from
 5 Massachusetts. I was at the meetings where these documents
 6 were developed.
 7 PRESIDENT VEEDER: I recognized your accent.
 8 BY MS. RENFRO:
 9 Q. And so, my question is: If we wanted to find a
 10 publication or a guidance from a public health agency that
 11 publishes a toxicity value for crude oil, like we have just
 12 looked at from the State of Massachusetts as an example,
 13 we're not going to find one that has a toxicity value as
 14 low as .004 milligrams per kilogram per day, will we?
 15 A. No.
 16 Q. Now, with that, let's turn to your--let's turn to
 17 your calculations, your non-cancer risk calculations of
 18 November 2014, and let's see if we can get on the screen
 19 that table. And let's now look at these in some detail.
 20 I think this may be clear for the Tribunal, but
 21 let's make sure it is clear since this is your--these are
 22 your calculations, and just for convenience of the record,
 23 convenience of all of us and clarity of the record, would
 24 you mind if we put at the top of VPH-EPH Number 1, Method
 25 Number 1, and then at the top of 8015 Method Number 2, and

04:11 1 then if you need a pen, there is one right to your right,
 2 if you would like to--you don't have to, but if you'd
 3 like--your third one, your VPH-EPH whole mixture, I'm going
 4 to call that Method Number 3. The next one, 8015 whole
 5 mixture, I'll call that your Method Number 4. The next
 6 one, Texas 1005 whole mixture, I'll call that your Method
 7 Number 5, and then finally your TEM whole mixture
 8 calculation, I'll call that your Method Number 6; okay?
 9 A. That's fine.
 10 Q. Is that okay?
 11 Now, let's just take an example and compare these
 12 results and see what they tell us.
 13 So, if we look at, for example, the site--the
 14 first site, Aguatico 6 and the very first location,
 15 Transect Number 5, which is the very top. And just to
 16 again orient the Tribunal, what you have done with this
 17 table, is with Aguatico 6, which is a well platform;
 18 correct?
 19 A. Well, there is a well platform there. That's not
 20 where this location was.
 21 Q. Right, I understand. But there are samples taken
 22 from four locations that you've included in your
 23 calculation.
 24 A. That's correct.
 25 Q. And you've described these as your exposure--well,

04:14 1 Method Number 1 using the VPH-EPH Method it says, ND, which
 2 means non-detect.
 3 A. That's correct.
 4 Q. And that means that, using that analytical method
 5 and applying your calculations using your methodology, you
 6 come up with no risk--and this is no human health
 7 risks--because there is no petroleum in that sample;
 8 correct?
 9 A. No.
 10 Q. Well, the non-detect, doesn't that mean
 11 non-detect, meaning there is not any detectable level of
 12 petroleum in that sample?
 13 A. No.
 14 Q. What does the ND stand for then, Dr. Strauss?
 15 A. There is not any detections using VPH-EPH. There
 16 was a detection using TEM that was identified as petroleum
 17 on the forensics.
 18 Q. Right. And we'll come to that. That's your
 19 Method Number 6.
 20 A. But it's the same sample.
 21 Q. I understand, but I'm just--
 22 A. You just asked if there was petroleum in the
 23 sample. There is petroleum in the sample. It was just not
 24 picked up by EPH-VPH, which is a more limited method of
 25 analyzing for petroleum than TEM.

04:13 1 you've described the exposure pathway that you use.
 2 A. Yes.
 3 Q. Which is an assumption on your part; correct?
 4 A. Yes, consistent with guidance.
 5 Q. And then the third column shows the sample
 6 designation which tells us where the sample was taken;
 7 right?
 8 A. That's correct.
 9 Q. And so, in the first case, we see that Transect 5
 10 is a sediment sample--there are two samples there; right?
 11 SE-05; right?
 12 A. Yes.
 13 Q. And SW-05? Those are two sediment samples, aren't
 14 they?
 15 A. No.
 16 Q. The first one is a sediment and the second one is
 17 what?
 18 A. Surface water.
 19 Q. Surface water near a field. So, we've got two
 20 samples from approximately the same location?
 21 A. Yes.
 22 Q. And you're calling that Transect 5?
 23 A. Yes, based on LBG's designations.
 24 Q. Right, okay.
 25 And then what you show us or in the first or the

04:15 1 Q. In your opinion?
 2 A. In my opinion.
 3 Q. Right. So, but just to understand what you're
 4 telling us with the ND, you have not calculated any health
 5 risk using the VPH-EPH Method for this particular sample
 6 location; correct?
 7 A. That is correct.
 8 Q. And to be clear, every one of the white cells,
 9 white cells on this chart, where there is an ND, that means
 10 that that method, VPH-EPH or any other method says there is
 11 no petroleum in the sample; correct?
 12 A. No, it says none was detectable by that method.
 13 Q. Non-detectable by that method. Okay. I
 14 appreciate that clarification.
 15 And so if there was no petroleum detectable by
 16 that method, you then did not calculate a potential human
 17 health risk; correct?
 18 A. Correct.
 19 Q. And that's why the cell here is white?
 20 A. That is correct. The cells are white, if the
 21 hazard index is less than one whether or not it was a
 22 non-detect.
 23 Q. Right. Okay. I appreciate you mentioning that.
 24 So, the orientation of the colors in your chart is anything
 25 that is in white means there is a hazard index of less than

04:16 1 one, which means it's safe.
 2 A. Yes. One is the regulatory benchmark.
 3 Q. Right.
 4 A. This is a regulatory risk assessment.
 5 Q. Right.
 6 And then, if you have a calculated value over one,
 7 you're not saying that there will be an actual adverse
 8 health effect, are you?
 9 A. No. This is a regulatory risk assessment. This
 10 is a trigger for action of further investigation or
 11 cleanup.
 12 Q. Right, okay. And would you also agree that if you
 13 have a hazard index of over one, that does not necessarily
 14 mean that there will be an increased risk; rather, it means
 15 that there might be an increased risk?
 16 A. Well, we usually use the term "hazard" with
 17 respect to non-cancer effects, but, yes. Again, it's part
 18 of going back to my initial presentation. This methodology
 19 was developed to make decisions in the midst of
 20 uncertainty.
 21 Q. Okay. All right. Let's take another example, if
 22 we could. Let's go down to Shushufindi 13. I believe you
 23 mentioned that site in your opening presentation. And if
 24 we look at the first sample location, that is SW4 and SE4.
 25 Are you with me?

04:19 1 Q. So, you're treating the entire forest as if they
 2 were all equally toxic?
 3 A. I'm treating the forest--I wouldn't characterize
 4 it that way. The toxicity factor is based on the forest,
 5 so I'm matching it to the forest.
 6 Q. And then your Number 5, there that analytical
 7 method showed no detectable petroleum in the sample?
 8 A. I'm sorry, I lost the question.
 9 Q. Sure, sure. It's Shushufindi 13, first sample
 10 location, Method Number 5. It says ND?
 11 A. Yes.
 12 Q. I believe?
 13 A. Yes, it does.
 14 Q. Right, okay. And then finally we look to your
 15 Method Number 6, which here you're combining two
 16 differences between you and Dr. McHugh. You're using the
 17 TEM analytical method; right?
 18 A. Yes.
 19 Q. And then you're using that single toxicity value
 20 rather than the specific published toxicity values;
 21 correct?
 22 A. Yes.
 23 Q. And when you combine those two approaches, you get
 24 this hazard index of 20 with some asterisks next to it;
 25 correct?

04:18 1 A. I'm with you, yes.
 2 Q. And there using your six different methods, you
 3 get--you calculate six different hazard indices; correct?
 4 A. Well, five and one was--
 5 Q. Right. I should have said that differently.
 6 You get six different outcomes?
 7 A. Each column is filled differently, yes.
 8 Q. Right. So, moving from left to right, using the
 9 VPH-BPH, your Method Number 1, you do calculate a number,
 10 but it's below one, and so that means there is no--there is
 11 a hazard index below one and no health risk?
 12 A. There is no trigger for further action, yes.
 13 Q. Same result with your second Method Number 2 and
 14 Number 3.
 15 A. That's correct.
 16 Q. And then, though, when you use your whole mixture
 17 approach, what that means is you're applying that toxicity
 18 value that we looked at a few minutes ago, you're applying
 19 that value to the entire array of everything in the sample?
 20 A. Yes.
 21 Q. Irrespective of the differentiation in toxicity
 22 between the fractions in crude oil?
 23 A. The toxicity number is based on the toxicity
 24 evaluation of the entire mixture, so it's the forest, so,
 25 yes.

04:20 1 A. That's correct.
 2 Q. And so, we see, if we compare your outcome using
 3 Method Number 1, to your outcome using Method Number 6, we
 4 have--we see a margin of difference of a thousand, don't
 5 we?
 6 A. Yes, we do.
 7 Q. And so--but you in your Report, in the narrative
 8 portion of your Report, you have declared this site, this
 9 location contaminated, haven't you?
 10 A. I would like for you to refer me to what you're
 11 talking about, please.
 12 Q. Sure. Let's look at your Report, November 2014,
 13 Page 7. I believe that's your Tab 3?
 14 A. Oh, yes.
 15 Q. Pardon me?
 16 A. I'm with you.
 17 Q. Yes.
 18 MS. RENFROE: For the Tribunal, I believe it's
 19 Tab 3 in your bundle of Expert Reports; is that correct,
 20 Dr. Strauss?
 21 THE WITNESS: Yes, this Report is in Tab 3.
 22 Q. Okay. Thank you.
 23 And we're looking at Page 7, and if we see it
 24 towards the top of Page 7, there is a bullet point that you
 25 have written, and it says Shushufindi 13. It has the

04:22 1 acronym of Shushufindi 13; correct?
 2 A. This site, yes, I refer to it as Shushufindi 13 or
 3 SSF13.
 4 Q. Right. And you say there that the residents of
 5 this farm obtained their drinking water from a stream
 6 catchment area. A sample collected in the same stream
 7 immediately downstream from the drinking water area
 8 revealed petroleum contamination."
 9 Then you go on to talk about how that is used.
 10 And then you say: "The chickens and ducks are
 11 caged to prevent them from coming into contact with
 12 contaminated sediments and highly contaminated surface soil
 13 in the former pit," and you go on; correct?
 14 A. That's true, yes.
 15 Q. So, am I correct that the location that we've just
 16 been looking at, SW4 and SE4 in your table where it says
 17 current exposure playing in stream, that corresponds to the
 18 stream in the first couple of sentences of your Statement
 19 there?
 20 A. Yeah, it's the same stream. I'd have to consult a
 21 map to see if that is adjacent to where that spring box is.
 22 Q. Right. So, what you're telling us, comparing your
 23 different approaches, is that even though, for example,
 24 under your approach Texas 1005, it shows non-detect, you're
 25 declaring the stream contaminated?

04:23 1 A. Yes, I am, because the petroleum--well, a couple
 2 of things. One is if--in this text--can we go back to
 3 here--back to my table.
 4 Q. Your table?
 5 A. Yeah, the table that you just took off.
 6 Q. Sure. Let's get it back up.
 7 A. I am--well, it is contaminated based on the TEM
 8 measurement, and there is also--obviously, there is also
 9 detections of EPH-VPH and 8015m, or else that would have
 10 been a non-detect, and so there were petroleum contaminants
 11 identified by three different methods and I can't
 12 distinguish here between whether it was the sediment sample
 13 or the surface water sample. It was most likely the
 14 sediment sample, so yes.
 15 Q. But even though you declared it contaminated, your
 16 calculations show that there is no hazard index above one
 17 with the exception of your Method Number 4 and Method
 18 Number 6?
 19 A. Yes, and I clearly showed the range of
 20 uncertainty, which is what a risk assessor does. In an
 21 effort of transparency, there are different methods of
 22 calculating the hazard index. I've used the standard ones,
 23 and I've used the one that I believe is most appropriate.
 24 I put in a couple of others just to see what they look
 25 like. I actually don't think anybody should rely on those.

04:25 1 I think the TEM whole mixture method which is
 2 apples to apples, and if you want, the regulatory methods
 3 are the ones to look at, and that's the range.
 4 Q. And if this Tribunal concludes that the VPH-EPH
 5 Analytical Method is protective of human health, as you
 6 told us it was a few minutes ago, then they can rely upon
 7 your conclusion in your Method Number 1, can't they?
 8 MS. SILVER: Objection. I think that misstates
 9 her testimony.
 10 PRESIDENT VEEDER: That's an open question. The
 11 Witness can agree or disagree.
 12 THE WITNESS: Can you repeat it again?
 13 BY MS. RENFROE:
 14 Q. Sure, I would be glad to.
 15 If this Tribunal concludes that the VPH-EPH
 16 Method, which you used for your Method Number 1, if they
 17 conclude that that method is protective of human health,
 18 then they can rely upon your calculations of risk in your
 19 first column, your Method Number 1 column, can't they?
 20 A. If they--if the Tribunal chooses to rely on the
 21 EPH-VPH Method, unless I've miscalculated, and I really
 22 hope I haven't, they can rely on those numbers. If I have
 23 presented what I believe is the most apples-to-apples
 24 approach, which is the TEM whole mixtures and I've provided
 25 the classic or--not traditional--a current regulatory

04:27 1 method, which they constantly evolved prior to the early
 2 2000s, that was not a method--I mean, methods evolve. Risk
 3 assessment is an evolving field.
 4 I believe that looking at crude oil as a whole
 5 mixture, which is completely consistent with guidance which
 6 says look at the whole product, if you can do it. I
 7 believe that this method is consistent with guidance. I
 8 also, in my professional opinion, think that that's the
 9 best apples-to-apples approach.
 10 The Tribunal can choose. I've given them the
 11 choice.
 12 Q. And one of those choices being VPH-EPH you've
 13 agreed with me is indeed protective of human health. You
 14 have already told us that, haven't you?
 15 A. Actually, I don't believe I said that.
 16 Q. Okay. Well, we have the record. Let's move on to
 17 another example, and that is why don't we go to Lago
 18 Agrio 16, and let's look at--you've got two different
 19 locations here, and one is a drinking water well called
 20 ODW; right?
 21 A. Correct.
 22 Q. The second one is a new drinking water well, NDW;
 23 right?
 24 A. Yes.
 25 Q. Let's focus on the first one. You show us here

04:28 1 again six different calculations of potential health risk,
 2 and once again, if we look at the first method, VPH-EPH, we
 3 see that there is not only--you have calculated not only no
 4 hazard index, but according to your table, using this
 5 method, this sample is non-detect for petroleum, isn't it?
 6 A. Yes, that's correct, but I would like to go back.
 7 I actually only had five samples there. NT means not
 8 tested for TEM, so that was--there were no data.
 9 Q. No data and, therefore, no calculation of any
 10 risk, from this drinking water--
 11 A. Correct.
 12 Q. From this drinking water well; right?
 13 A. There were no data. You can't calculate risk with
 14 no data.
 15 Q. So, then moving to the right, second method, you
 16 calculate a risk but it's below the hazard index of one, so
 17 no potential human health risk here using this method?
 18 A. Correct.
 19 Q. Third method, you show non-detect for petroleum
 20 and no human health risk there using that method?
 21 A. Yes.
 22 The analytical chemistry methods on one and three
 23 and two and four are the same, the only difference is the
 24 toxicity factor that was applied.
 25 Q. Right. And then Method Number 4, you do show a

04:29 1 hazard index over one applying that whole mixture toxicity
 2 value; right?
 3 A. Yes.
 4 Q. Then you go to your last two methods, and there
 5 you show either non-detect or not tested, no hazard index,
 6 no human health risk; correct?
 7 A. Well, I believe you can draw absolutely no
 8 conclusion from not tested.
 9 Q. Well, you have not presented or concluded that
 10 there is a health risk at this location using your Method
 11 Number 6?
 12 A. That's correct.
 13 Q. Now, if we go back to your Report, November 2014,
 14 we had that up a moment ago, Page 7--let's look and see
 15 what you told the Tribunal about Lago 16.
 16 Here, you told the Tribunal that "an extended
 17 family living in two houses uses petroleum-contaminated
 18 water from a shallow dug well for drinking, cooking,
 19 bathing and laundry."
 20 Did I read that correctly?
 21 A. Yes, you did.
 22 Q. And then you talk about the family pouring water
 23 over their young children several times a day and more
 24 frequently when it is hot. And then you say this well is
 25 also contaminated with petroleum.

04:31 1 A. Yes.
 2 Q. And there you're talking about the new well. So,
 3 first you're talking about the old well, and then the last
 4 two sentences you're talking about the new well; correct?
 5 A. Yes, yes.
 6 Q. So, let's go back to your table and focus on the
 7 old well, and so, in the old well, Lago 16, okay, and the
 8 ODW, standing for old drinking water well, I presume?
 9 A. Yes.
 10 Q. Right.
 11 A. It's not the world's best terminology, but it's
 12 what we used. It was there before the second site visit.
 13 Q. Understood, understood. You inherited it?
 14 A. Yes, I did.
 15 Q. So in these six different methods, six different
 16 outcomes that you've presented in your table, we see that,
 17 in only two instances do you show even a detection of
 18 petroleum, but the other four you don't report even a
 19 detection. You either didn't detect petroleum or you
 20 didn't test for it; correct?
 21 A. That is true.
 22 Q. So, that's the result from four out of your six
 23 methods, but yet, in the narrative portion of your Report,
 24 you told this Tribunal that that well, that hand-dug well
 25 was contaminated with petroleum, didn't you?

04:32 1 A. Yes, I did.
 2 Q. And yet you've got six different outcomes that
 3 suggest, four of which suggest it's not contaminated?
 4 A. But I have additional information.
 5 Q. But I'm looking at your calculations, what you
 6 have presented, and that's what I'm focused on right now,
 7 Dr. Strauss?
 8 A. But that wasn't the basis for the statement.
 9 Q. Okay. All right. Let's move on, then, to the
 10 next--
 11 MS. SILVER: Ms. Renfro, can I just point--I
 12 don't believe the sections that you're directing her to
 13 are--I believe they're there--I'm just looking at her
 14 Report, and I believe they're there to show an exposure
 15 pathway.
 16 MS. RENFRO: I think you might want to take that
 17 up with her on your redirect.
 18 PRESIDENT VEEDER: Let me stop you. We've got her
 19 answer to that effect, if you want to pick it up in more
 20 detail in redirect, you can do so. She said that wasn't
 21 the basis for the statement, so let's move on.
 22 BY MS. RENFRO:
 23 Q. Now, I would like to take you now to one of the
 24 sites that you have focused on in here, and that's
 25 Shushufindi 13. So, let me ask now if another bundle of

04:33 1 documents can be distributed, and you might--you're free to
 2 keep those out, but I'm going to direct you to a different
 3 group of documents.
 4 A. That's fine.
 5 Q. Dr. Strauss, let me tell you what I have passed
 6 out. And for the convenience of the Tribunal and counsel,
 7 I have collected together a series of documents about
 8 Shushufindi 13. I've simply picked this site as an
 9 example. I noticed that you mentioned it in your opening
 10 presentation.
 11 And so, what I would like to do now is walk
 12 through some of these documents, time permitting--I'm going
 13 to have to skip some, but I want to walk through these
 14 documents as we understand, to help give us more context
 15 and understand the conclusions that you have presented in
 16 your health-risk calculations, okay?
 17 So, in this packet, I have included an extra copy
 18 of your tables in Tab 1 and we can probably skip that,
 19 unless you prefer to use that copy, but it's the same
 20 table. All right?
 21 A. Okay.
 22 Q. And then if we go to Tab 3, can you confirm that
 23 Tab 3 is a map from the LBG Report, it's Figure 3.6.1;
 24 correct?
 25 A. Well--

04:36 1 Q. Or is this from your Report?
 2 A. I don't--I don't think it's from my Report. I'm
 3 willing to agree. I mean, it's LBG's Report.
 4 Q. LBG's map, okay. All right.
 5 So, and my purpose in presenting it to you is to
 6 just help us understand the location of these samples at
 7 Shushufindi 13 that you have--that you've developed
 8 calculations for. And again, I'm just using this site as
 9 an exercise. There's a number of sites that we can use,
 10 but what we see in your table is that there are, as I see
 11 it, three different locations where samples have been taken
 12 and you have developed calculations of potential risk?
 13 A. That's correct.
 14 Q. Is that right?
 15 A. Yes.
 16 Q. All right. And so, just bear with me as I walk us
 17 through this.
 18 So, can you relate for the Tribunal and tell us
 19 where on this map, if we look at the first sampling
 20 location in your Shushufindi 13 chart, and you see it's SW4
 21 and SE4, can you show us where that sample point is?
 22 A. It's where it says "slight petroleum odor" of the
 23 stream coming off of Pit Number 3.
 24 Q. Okay. So, Pit Number 3, and if we look then to
 25 the east of Pit Number 3, we will find your SW4 and SE4.

04:38 1 Can you direct us a little bit more, or can we get you a
 2 pointer. Would that help you?
 3 A. It was enhanced right there.
 4 Q. Okay. Can you take us there? Is it those two--
 5 A. It's where it says SE004, transect four, right
 6 above--it's where that point--that blue triangle--
 7 Q. Right, "slight petroleum odor."
 8 A. Right.
 9 Q. Right. Okay. Good. Let's circle that.
 10 Then can you show us the second location, SW1.
 11 A. It's up in the top left--well, not top left, but
 12 top central corner.
 13 Q. Okay. Can we circle there as well?
 14 A. And that's Transect 1.
 15 Q. Transect 1, right there. Okay.
 16 Now, let's look for your third location, which is
 17 called SL11. Can you tell us where that is?
 18 A. You know, I was just looking at that, where did it
 19 go? It's in that green pit.
 20 Q. Okay. Inside--well, I will let you point it out.
 21 A. Well, you circled it, so it's that central blue
 22 circle in the pit.
 23 Q. Right. Now, based on your answers earlier, I take
 24 it that you are not familiar with which of the features on
 25 this map are the RAP features that were assigned to TexPet

04:39 1 in the Remedial Action Plan?
 2 A. I have no idea.
 3 Q. Right. And so, it would not surprise you, then,
 4 to know that the Pit 3, the green Pit 3, is not a RAP
 5 feature that was assigned to TexPet for remediation?
 6 A. I'm neither surprised nor unsurprised. I really
 7 have no knowledge.
 8 Q. Okay. And if I told you that the RAP features
 9 that were assigned to TexPet for remediation were those two
 10 blue pits and the blue area on the stream at the upper
 11 portion of the map, you would have no reason to disagree
 12 with me, would you?
 13 A. No, I have no reason to disagree. I have no
 14 knowledge one way or the other.
 15 Q. Understood.
 16 And based on that, can you confirm for us that, at
 17 this site, there are no samples taken that you relied upon
 18 for your risk calculations at any of the RAP features.
 19 A. You have the samples that I relied on, whether
 20 they were RAP features or not are immaterial to my
 21 analysis.
 22 Q. Understood. But can we agree that you didn't take
 23 any samples or rely upon any data from any of those blue
 24 features?
 25 A. That is correct.

04:41 1 Q. Right. Now, did you investigate--in forming your
2 opinions or reaching your conclusions about potential human
3 health-risk at this site, did you investigate in any way
4 the operations of Petroecuador?

5 A. Only as a general matter, not to form an
6 understanding--not particularly Petroecuador, either, just
7 oil facilities, to understand generally a scope of what to
8 look for--a scope just to understand within the context of
9 a conceptual site model, what contaminants to look for and
10 where.

11 Q. If we could pull that map back up, please,
12 Mr. Johnson. Thank you.

13 So, if, for example, if the historical records and
14 recent records showed that Petroecuador has continued to
15 operate at this site and has had spills at this site, that
16 is not something that you considered in rendering your
17 conclusions about future health risks from TexPet's
18 operations?

19 A. That's correct, I did not consider it.

20 Q. And so, just to cut through some of this, if the
21 documentation in this arbitration case shows a history of
22 spills by Petroecuador at this site, if it further shows
23 remediation of a pit by Petroecuador at this site, you have
24 not taken that into consideration in forming your
25 conclusions about potential human health-risk attributable

04:44 1 pit or remediated a pit or not, and the effects of that on
2 that particular environment at a particular site is not
3 something that you've considered in developing your
4 calculations?

5 A. Why don't you try that one again. I'm not sure
6 how to answer it.

7 Q. Sure. I'm sure I can do better. Let me try.

8 So, we know that Petroecuador has closed pits in
9 some locations. Are you familiar with that?

10 A. That is my understanding.

11 Q. And in other locations, they've remediated pits.
12 Are you generally familiar with that point?

13 A. Generally familiar, but not in any particulars.

14 Q. And you have no specific information about the
15 standards or the criteria that they have used to remediate
16 those pits, do you?

17 A. I have not--I am not offering any opinions in that
18 regard.

19 Q. Okay. And I think I understand what your
20 testimony is, and I want to ask one or two more questions,
21 and then we will move on to a different topic.

22 But to the extent that there may be a site among
23 the nine that you have evaluated, where Petroecuador has
24 either not closed a pit or has closed it to a standard or
25 criteria that is different than what the Republic of

04:43 1 to--which you attribute to TexPet?

2 A. I have not taken that information into account. I
3 have evaluated the site conditions based on my knowledge of
4 the site. I have been there and developed the exposure
5 pathways. I know what those locations look like, and
6 relying on the data that LBG provided.

7 Q. If I asked you that same question about all of the
8 other eight sites upon which you have developed
9 calculations of potential human health-risk, would your
10 answer be the same?

11 A. Yes.

12 Q. So, to conclude or to summarize this point, your
13 calculations of potential human health-risk in doing that
14 work, you have made no attempt to differentiate between
15 impacts caused by Petroecuador as opposed to historical
16 operations?

17 A. I have used the data provided by LBG. It is my
18 understanding they looked at those questions, but you would
19 have to ask them. I have not.

20 Q. All right. Do you have any familiarity with the
21 fact that Petroecuador has at some of these sites closed
22 pits?

23 A. Just as a general nature. I'm not offering any
24 opinions, and I haven't reviewed that specifically.

25 Q. And likewise, the manner in which they've closed a

04:46 1 Ecuador now contends TexPet should have done, you have not
2 made any effort to differentiate those effects in your
3 calculations, have you?

4 A. No, I'm not offering any opinion in that area
5 whatsoever.

6 Q. Right. Okay.

7 Now, sticking with this site, Shushufindi 13, and
8 going now specifically to that sample S--let's see. I
9 believe you told us it was--let me find it. SE4. SE4,
10 first one of your methods--first one of your sample
11 locations, and you described this as "current exposure
12 playing in a stream."

13 Are you with me?

14 A. Yes.

15 Q. Okay. Did you make any effort in--before you
16 developed these calculations, did you make any effort or
17 attempt to evaluate whether that sample reflected plant
18 matter as opposed to petroleum?

19 A. Did I personally? No. It's my understanding that
20 others have looked at that question.

21 Q. And if a sample--for example, SE4--if that sample
22 contains plant matter in addition to petroleum, then your
23 risk calculation, for example, under Method Number 4 or
24 Method Number 6, if it turns out that that sample has plant
25 matter in it, then your hazard index calculation would be

04:47 1 exaggerated, wouldn't it? It would exaggerate the health
2 risk from that particular location.
3 A. Well, I'm not sure about Method Number 4.
4 Yes, if you're giving me a hypothetical, yes, it
5 would reduce the total concentration that would be
6 attributable to oil.
7 Q. And you're not suggesting to this Tribunal that
8 there would be a health risk from plant matter, are you?
9 That's not what you're trying to convey, is it?
10 A. It's not what I'm evaluating.
11 Q. Right. So, with respect to that sample or the
12 rest of the samples at this site, SW4, SW1, did you make
13 any effort to satisfy yourself that those samples did not
14 have blank contamination?
15 A. I relied on the validated results of LBG for any
16 issues related to data quality like that.
17 Q. So, you did not independently satisfy yourself
18 that the National Functional Guidelines were being met with
19 respect to these samples?
20 A. I relied on LBG in that regard.
21 Q. All right. So, if we can just take another look
22 at SW4, this is a surface-water sample. If it turns out
23 that that sample has no petroleum in it, then your
24 health-risk calculations across the row where you provide a
25 number, whether it's below one or above one, then those

04:49 1 numbers would be unreliable?
2 A. I'm not going to agree with that. This risk
3 calculation was based on both sediment and water. I would
4 have to look at the underlying portion of it, but I think
5 it's more than likely that most of the risk was contributed
6 by the sediment. But I would have to look to confirm that.
7 Q. And that's not something you have done yet?
8 A. Well, it's in my spreadsheets, it's not on this
9 piece of paper here.
10 Q. Okay.
11 A. I could look in my spreadsheets, which are
12 provided in a report and find that out.
13 Q. Okay. So, then let's move on to SE4, in that same
14 location. If Dr. Short, the Republic of Ecuador's Expert,
15 if he concluded that that sample at SE4 contained plant
16 matter, would you be in a position to disagree with that?
17 A. No, I would rely on Dr. Short for that evaluation.
18 Q. Okay. And then moving down to SL11 quickly, SL11,
19 your third location where you have calculated across the
20 board a hazard index using every one of your methods.
21 Do you see that?
22 A. Yes.
23 Q. And again one more time, can we look at the map
24 and let's orient ourselves where that sample is taken.
25 A. It's taken in the green area.

04:51 1 Q. Right.
2 A. The light green area.
3 Q. The light green area, which is a pit, isn't it, of
4 some sort? Or you may not know?
5 A. I do know. I've been there.
6 Yes.
7 Q. Okay. Now, if you would go to Tab 22 in your
8 booklet there, please, let's see what Dr. Short says about
9 this sample SL11.
10 So, we have Tab 22, which is an excerpt of the
11 Report of Dr. Jeffrey Short. And if we look at Page 15,
12 Dr. Short is discussing Shushufindi 13, Sample SL11.
13 Do you see that, Dr. Strauss?
14 A. Yes.
15 Q. If then if we read to the bottom of the paragraph,
16 he concludes that the results--"these results strongly
17 suggest that petroleum was recently (less than a year)
18 discharged to the soil that was sampled."
19 Do you see that?
20 A. Yes, I do.
21 Q. And he's referring to SL11, which is the sample
22 that you've relied upon to calculate a hazard index under
23 all six of your methods.
24 Do you see that?
25 A. Yes.

04:53 1 Q. And he's telling us that this sample is from
2 petroleum discharged less than a year before, isn't he?
3 A. Yes, he is.
4 Q. And you would be in no position to disagree with
5 his conclusion on that, would you?
6 A. No, I rely on Dr. Short for that sort of thing.
7 Q. And so, if he's right about that, then the hazard
8 index that you have calculated under all six of your
9 methods, that would be attributable to the activities of
10 Petroecuador rather than TexPet, wouldn't it?
11 A. I have no idea who it would be attributable to.
12 Q. Okay.
13 MS. SILVER: Ms. Renfroe, I just noticed that this
14 document said draft. I'm just wondering if it is a draft.
15 I don't know, but--
16 MS. RENFROE: That's how it was sent to us.
17 MS. SILVER: That's how it was sent to you? All
18 right.
19 MS. RENFROE: From your Expert from your office.
20 MS. SILVER: Okay. Just checking.
21 MS. RENFROE: So, if I might, Members of the
22 Tribunal, if I might take five minutes and evaluate where I
23 am and how much more I have.
24 PRESIDENT VEEDER: Let's take a five-minute break.
25 MS. RENFROE: Thank you.

04:54 1 PRESIDENT VEEDER: Again, please don't discuss the
 2 case or your testimony away from the Tribunal.
 3 THE WITNESS: I will be very careful.
 4 (Brief recess.)
 5 PRESIDENT VEEDER: Let's resume.
 6 BY MS. RENFROE:
 7 Q. Dr. Strauss, I would move to a different topic
 8 now. And I'd ask our colleague, Mr. Johnson, if he could
 9 put what I'm going to call Slide 2 up on the screen.
 10 Slide 2 is another quote from Opening Statement of
 11 the Respondent, again describing the extent of your work
 12 and then our arguing about the effect of it. So, could I
 13 ask you to take a moment and read this, and then I'll have
 14 a few questions.
 15 (Witness reviews document.)
 16 Q. Are you ready?
 17 A. Yes, I am.
 18 Q. Right.
 19 And so, the point that I want to explore is the
 20 statement by counsel that there is no reason to believe
 21 that what you, referring to you, Dr. Strauss, that what you
 22 found at the nine sites that you examined, wouldn't be
 23 replicated at most all of the other 344 TexPet sites. I'd
 24 like to explore that for a moment.
 25 A. Okay.

05:04 1 A. Well, I don't quite agree with that, either.
 2 Would you like me to elaborate?
 3 Q. Well, let me see if I could understand the basis
 4 for that because you've told us that you've not sampled or
 5 you've not considered data from the Production
 6 Stations--that's one difference, one group of sites that's
 7 been separate from what you've done; right? We've
 8 established that.
 9 A. We have established that I have not evaluated
 10 Production Stations, yes.
 11 Q. Right. And we've also established that you've not
 12 evaluated sites where there's been significant expansion
 13 activity by Petroecuador?
 14 A. That's correct.
 15 Q. Or at least not insofar as LBG has represented
 16 that to you?
 17 A. Well, I have seen each of the sites.
 18 Q. All right. So--and then there may be other
 19 changes or contamination events, for example, at some of
 20 the other sites that you have not evaluated at the nine
 21 sites that you did consider?
 22 A. There I lost you. Ask me one more time.
 23 Q. Sure. So, for example, there was a major spill at
 24 Sacha 77 by Petroecuador, several hundred thousand--excuse
 25 me, several thousand barrels of crude oil, that the

05:02 1 Q. All right. So, I understand that the data
 2 developed by LBG for the nine sites that you examined
 3 purposefully excluded sample sites from Production Stations
 4 within the former Concession Area; is that your
 5 understanding?
 6 A. It's certainly my understanding that they did not
 7 include them.
 8 Q. Right.
 9 And so, you've not provided any health-risk
 10 calculations with respect to Production Stations, have you?
 11 A. No, I have not.
 12 Q. And likewise, another category of sites that was
 13 excluded for sampling by LBG were sites where LBG concluded
 14 that there were significant or active Petroecuador
 15 operations. Did you understand that?
 16 A. I understood it generally. I really think you
 17 should take up with LBG the sites that they selected.
 18 Q. I understand, and I will be glad to do that, and I
 19 appreciate that guidance from you.
 20 But the point that I want to make is that, to the
 21 extent that there are various differences in the conditions
 22 and in the operating history and in present-day operations
 23 at the other sites besides the nine that you went to, then
 24 we would not be able to use or extrapolate from your
 25 calculations to those other nine sites, would we?

05:05 1 information is in this record. So, you've not considered
 2 an event like that and the effects of that with respect to
 3 the nine sites that you did evaluate?
 4 A. My understanding of the source of the nine sites
 5 that I evaluated was mostly pits and a spill, I think, at
 6 Yuca 2.
 7 Q. Right. And so, to the extent that there have been
 8 pipeline leaks during Petroecuador's operations, those are
 9 very different factual circumstances than those that you
 10 considered at the nine sites you looked at?
 11 A. There are certainly some different facts; there
 12 may be some of the same facts. I'm having a hard time
 13 answering that question.
 14 Q. You haven't examined those other facts, have you?
 15 A. I have not; correct.
 16 Q. Now, moving to, if I might move to your cancer
 17 risk calculations, and so that will take us to a different
 18 chart, if we can turn to your final chart, the March 2015
 19 chart.
 20 Now, I believe you told us in your opening or your
 21 direct presentation that the method that you used is the
 22 same approach as the method that Dr. McHugh used?
 23 A. In terms of how we evaluated the toxicity, we
 24 differed in our exposure factors.
 25 Q. Right. So, here we don't have as many differences

05:07 1 perhaps between you and Dr. McHugh. You pretty much used
2 the same approach?
3 A. I believe we did, yes.
4 Q. Right.
5 And then can you explain or confirm to the
6 Tribunal that, as we look at the calculations in the
7 right-hand column that you have provided, those values in
8 white represent areas that--for which there is no concern
9 and need no further evaluation?
10 A. Yes, based on those exposure pathways and the
11 currently available data, that is correct.
12 Q. The areas in yellow or those estimates in yellow,
13 those do not represent your conclusions that there will be
14 an elevated risk of cancer, but rather, as you state at the
15 bottom of your table, yellow is simply, "risk in the range
16 of concern," and that, "further evaluation is necessary."
17 A. Yes. That continues to be my opinion.
18 Q. Right. So, you're not in a position to declare to
19 this Tribunal that there will be an elevated risk of cancer
20 from these locations, but rather more evaluation is needed?
21 A. Not exactly. What it says is that these are the
22 health risks that I calculate using my methodology and the
23 decision criteria; it's within the range of the decision
24 criteria.
25 Q. And as you say beneath, "risk in range of concern,

05:08 1 further evaluation is necessary."
2 A. That's right. So, it doesn't mean there's no
3 health risk. It means, as a regulatory matter, there is
4 some reason for concern. It's not a condition that I would
5 say would cause an immediate action.
6 Q. Right, okay.
7 And then with respect to the two red conclusions,
8 those two locations you are telling us that there is a
9 significant risk of an elevated or an elevated cancer risk;
10 correct?
11 A. Yes. That's above the range of which action is
12 almost always taken under any regulatory--environmental
13 regulatory regime.
14 Q. And the action to be taken, in your view, is that
15 some remediation may be needed at these two locations?
16 A. I'm not sure about the maybe, but yes.
17 Q. Okay. You're saying some remediation is needed?
18 A. Yes.
19 Q. But you have formed no opinions about the extent
20 of remediation that may be needed?
21 A. No, I think that needs to be determined.
22 Q. That's to be determined in another process?
23 A. Yes.
24 Q. Your Reports in no way tell us the extent of
25 remediation, the remediation standard, the area to be

05:10 1 remediated, you don't address those issues, do you?
2 A. No, I do not.
3 Q. Right. Nor do you, for any of the other
4 locations? That's just not something you're speaking to?
5 A. That is not something I tend to do, either.
6 Q. Right, okay.
7 So, now if we might turn to Tab 22 in the first
8 bundle that I gave you, the original one. And I'm not sure
9 if you were here for the testimony of Dr. Greg Douglas, you
10 may have heard it, but what I'm going to ask you about are
11 some of the conclusions he has reached about the data that
12 you relied upon for purposes of your cancer-risk
13 calculations, and so I'm showing you some of the slides
14 that he presented about problems with the reliability of
15 that data, and so I'll direct you for a moment to his
16 Slide 33 and ask you if you can confirm that the compounds
17 that are highlighted in yellow there are the--
18 (Pause.)
19 Q. Will you confirm, Dr. Strauss, that the compounds
20 highlighted in yellow on Dr. Douglas's slides are some of
21 the PAHs that you relied upon for your cancer risk
22 calculations?
23 A. This is the calculation that I said in the
24 beginning I had made a spreadsheet error on, and so I have
25 withdrawn my opinion that there's a cancer risk with this

05:12 1 location.
2 Q. At Shushufindi 43?
3 A. TW2, that's the one I was talking about.
4 Q. Okay, so we need to mark that out on your table.
5 So, that's one less site for which you are saying there's a
6 potential elevated risk of cancer?
7 A. Based on the data we have now, yes.
8 Q. Okay. Now, would you also, if you would, look
9 through the next couple of slides, and I guess all of these
10 deal with Shushufindi 43, and so perhaps you've already
11 conceded the point that I was going to make, and I
12 appreciate your candor there, but have you taken the steps
13 to evaluate whether the rest of the PAH data that you've
14 relied upon does not suffer from any blank contamination
15 problem?
16 A. Perhaps we're not understanding each other. The
17 mistake that I made was a spreadsheet error on my part.
18 Q. Oh?
19 A. And it was not that I used a non-detect or
20 whatever. I didn't really quite get what Dr. Douglas
21 inferred. There was a spreadsheet error in that
22 calculation that I own up to.
23 Q. I understand, and I appreciate your candor, so
24 we're talking about two different things, and thank you for
25 clarifying that.

05:13 1 A. You're welcome.
 2 Q. The problem that Dr. Douglas is presenting in
 3 these slides that are at Tab 22 is a problem of the fact
 4 that the data validator who evaluated the data that you
 5 relied upon did not follow the National Functional
 6 Guidelines and, therefore, did not report the data as
 7 non-detect or undetect as they should have. Have you
 8 concerned yourself at all with that issue?
 9 A. I know it's been raised as an issue. I have not
 10 dealt with it. I have relied on the data of LBG and its
 11 data validators.
 12 Q. And to the extent that the data developed by LBG
 13 suffers from blank contamination and/or is otherwise not
 14 reliable because it doesn't comply with the National
 15 Functional Guidelines, then you would not feel comfortable
 16 relying upon those samples in calculating a potential
 17 cancer risk, would you?
 18 A. I would certainly--if the data were revised, I
 19 would certainly revise my cancer risk. It doesn't pertain
 20 at all, as I understand it, to my hazard index and my
 21 non-cancer risk. It's only an issue with the level
 22 concentrations of PAHs, which coming to the cancer risk,
 23 but really are subsumed under the Total Petroleum
 24 Hydrocarbons rubric for the non-cancer hazard.
 25 Q. Right, but let's not confuse things. I'm not

05:17 1 the Republic of Ecuador has not published or does not
 2 publish any protocols or requirements for even performing
 3 human health-risk assessments in petroleum oil fields?
 4 A. Well, I believe they have some regulations related
 5 to petroleum, but I have not concerned--again, that's in
 6 LBG's opinion and not in mine. I'm not aware of like a
 7 human--I'm not aware of an equivalent to EPA risk
 8 assessment guidance.
 9 Q. Okay. And as far as you know, Petroecuador does
 10 not perform human health risk assessments for the sites
 11 that it operates and impacts, does it?
 12 A. I have no idea what they do.
 13 Q. Okay. Thank you very much, Dr. Strauss. I
 14 appreciate it.
 15 MS. RENFROE: I have no further questions.
 16 PRESIDENT VEEDER: Thank you.
 17 Are there any questions from the Respondent?
 18 MS. SILVER: I believe I may have a few questions,
 19 but if I could take maybe a 10-minute break and get back to
 20 you?
 21 PRESIDENT VEEDER: Let's take a 10-minute break.
 22 MS. SILVER: Thank you.
 23 (Brief recess.)
 24 PRESIDENT VEEDER: Let's resume.
 25 MS. SILVER: Thank you, Mr. President.

05:15 1 talking about your non-cancer calculations right now. I'm
 2 only talking about your cancer calculations which are on
 3 the table, your March 2015 table. And my question is very
 4 focused on the PAH data that you relied upon to develop
 5 these estimates or calculations of potential cancer risk.
 6 If the data validator did not follow the National
 7 Functional Guidelines and reported PAH values that were
 8 actually non-detect, would that concern you about
 9 presenting these cancer calculations?
 10 A. Again, I relied on LBG. If they find that they
 11 were--the validation was incorrect and there were different
 12 data, I would be--then that would change my calculations,
 13 my cancer risk estimates, yes.
 14 Q. And to be very clear, you have not undertaken any
 15 independent analysis of the validity of the PAH data?
 16 A. I have not, no.
 17 Q. Now, completely apart from your risk
 18 calculations--and I'm now going to ask you this question
 19 that has to do with either cancer risk or non-cancer
 20 risk--am I correct that the Republic of Ecuador did not
 21 provide you with any quantitative risk assessment for any
 22 of the sites that Petroecuador has impacted in the former
 23 Concession Area?
 24 A. Did they provide that to me? No.
 25 Q. Right. And, in fact, isn't it also correct that

05:27 1 REDIRECT EXAMINATION
 2 BY MS. SILVER:
 3 Q. Dr. Strauss, I'm sure you're going to be delighted
 4 to hear I don't have a ton of questions for you, but I
 5 would ask if you could please put up from Dr. Strauss's
 6 presentation Slide Number 31. Thank you.
 7 Dr. Strauss, could you clarify whether the VPH-EPH
 8 Method is protective of human health.
 9 (No microphone.)
 10 A. My bad.
 11 EPH-VPH, and I would say also Method 8015 measure
 12 fractions of--fractions of crude oil. They don't measure
 13 all of crude oil. In particular, they don't measure the
 14 higher end and other components of crude oil, so it's my
 15 understanding that these approaches measure between one
 16 quarter and one third of the thousands of chemicals that
 17 compose crude oil.
 18 So, while it's considered a method that's
 19 protective for refined fuels for which it's very good at
 20 finding things, I think it's less applicable to crude oil
 21 and may or may not be protective of crude oil. In my
 22 opinion, it probably isn't, but you can see here the
 23 difference in what the proportion of chemicals that are
 24 evaluated and found and detected under those methodologies.
 25 Q. Okay. Thank you.

05:28 1 But in your Reports, you do use and rely on the
 2 VPH-EPH Method; is that correct?
 3 A. Yes, it is.
 4 Q. Could you just maybe direct us to where in your
 5 Reports you do rely on it.
 6 A. Well, I think--well, I rely in the hazard
 7 around--in the non-cancer hazard evaluations at all nine
 8 sites, so in the tables that we've been discussing, I
 9 present those calculations.
 10 Q. And do you rely on it at all for your cancer
 11 assessment?
 12 A. No, the cancer assessment is based on PAHs and not
 13 on VPH-EPH.
 14 Q. Okay. And can you just explain for us briefly why
 15 you rely on the whole mixtures approach, why you believe
 16 that that is a better method.
 17 A. Well, I believe that's a better method because,
 18 well, the whole product approach, so the toxicity
 19 evaluation, that's in accordance with guidelines from EPA,
 20 from ASTM, and other organizations that really the best
 21 approach to a complex mixture is to evaluate the toxicity
 22 of the entire mixture.
 23 The problem is we often don't have the data to do
 24 that, and also once a mixture is in the environment and
 25 you're just sampling chemicals, you don't always know the

05:30 1 source. In this case, we know the source. I mean, the
 2 locations were sampled in relation to a particular source,
 3 and so we know it's crude oil. And so, in my opinion, the
 4 whole--one can use a whole-mixtures approach for this site
 5 and others that might be similar because we have the
 6 toxicity measure of whole oil, and I believe that's the
 7 best approach.
 8 You can't always do it, and I didn't do it in my
 9 Initial Reports because the TEM measurement only was first
 10 used in 2014. It wasn't used in 2013.
 11 And to fully utilize the data I began thinking
 12 about how to use a whole-mixtures approach, and the
 13 appropriate data were there from the industry documents.
 14 Q. And are there other institutions or organizations
 15 that endorse the whole-mixtures approach?
 16 A. Well, USEPA does; in its initial mixtures document
 17 in 1986, it reiterated its support of it in a document
 18 about PAHs, and I think it was 2011. ASTM, the petroleum
 19 guidance document that Dr. McHugh relied on, endorses they
 20 call it a whole-products approach and not a whole-mixtures
 21 approach, but it's the same thing.
 22 If you want to measure the toxicity of something,
 23 you ought to measure the toxicity of the whole thing. The
 24 problem is you don't often have the data here. We are
 25 lucky enough to have the data.

05:32 1 Q. Okay. Thank you, Dr. Strauss. I think that's all
 2 I have. Thank you.
 3 QUESTIONS FROM THE TRIBUNAL
 4 PRESIDENT VEEDER: There may be an objection to
 5 this question, so please don't answer until we see whether
 6 there is or not, but are you involved in any way with the
 7 proposed site visit by the Tribunal? Obviously not.
 8 THE WITNESS: No, I don't know whether to answer
 9 it or not.
 10 PRESIDENT VEEDER: Well, you mentioned sites, and
 11 I think you suggested that some sites on your Slide 4 were
 12 sites which would be visited by the Tribunal during its
 13 site visit.
 14 THE WITNESS: That's true.
 15 PRESIDENT VEEDER: You do know that?
 16 THE WITNESS: I do know that. I will be there
 17 with you.
 18 PRESIDENT VEEDER: That's what I wanted to ask
 19 without asking.
 20 Could I ask you to look at Slide 4.
 21 If there is an objection to this, please make it,
 22 but I don't think there need be, but if there is, you ask
 23 the witness not to answer.
 24 Could you just confirm which are the sites which
 25 it is proposed the Tribunal will visit. I understand it's

05:33 1 Lago Agrio 16--I'm sorry, Lago Agrio 2.
 2 THE WITNESS: Yes.
 3 PRESIDENT VEEDER: It's here marked as Guanta 6,
 4 but it has another name. And then also Shushufindi 34.
 5 THE WITNESS: I don't think Guanta 6 is one of
 6 them. I may not be the best person, but I believe it's
 7 Aguarico 6, Lago 2, Shushufindi 34, and Shushufindi 55,
 8 which is not on this list because I didn't conduct a
 9 quantitative risk assessment of it, but LBG evaluated it.
 10 PRESIDENT VEEDER: That's all I had to ask.
 11 Thank you very much.
 12 Are there any questions arising from the
 13 Tribunal's questions?
 14 We ask the Claimants first.
 15 MS. RENFROE: No questions.
 16 PRESIDENT VEEDER: And the Respondent?
 17 MS. SILVER: No questions.
 18 PRESIDENT VEEDER: Thank you very much.
 19 We have come to the end of your testimony. Thank
 20 you for coming to assist the Tribunal. You may leave the
 21 table.
 22 THE WITNESS: Thank you. It's been my pleasure.
 23 (Witness steps down.)
 24 QUESTIONS FROM THE TRIBUNAL TO THE PARTIES
 25 PRESIDENT VEEDER: It's late in the day and late

<p>Sheet 62</p> <p style="text-align: right;">2112</p> <p>05:34 1 in the week, but we did promise that we would give some 2 indication of the topics that we would wish the Parties to 3 address at some point subsequent to today. 4 Can I say, first of all, they're topics rather 5 than questions, and it would have been I think easier if we 6 had had time to put them in writing, but we don't, so 7 they're somewhat imprecise, but can I please ask you not to 8 read into the questions anything more than the question. 9 We have not started our deliberations. We have not formed 10 a view, and this is simply a Request for Information and 11 assistance. And you may think you already provided it, in 12 which case you need to draw attention to it, or, as we see, 13 you may have to clarify what you have given us already. 14 I shall be putting the topics, but, in fact, it's 15 the work of all three of us, and my colleagues will join in 16 if they think I have missed out anything or they wish to 17 add anything for themselves as we go through topic by 18 topic. 19 This will take about ten or 15 minutes. 20 The first thing relates to legal materials on 21 denial of justice under international law. As a matter of 22 general practice as arbitrators, the three of us don't like 23 referring or using legal materials that have not been cited 24 to us by the Parties. So, although we could have access to 25 these materials, we would rather raise it with the Parties;</p>	<p style="text-align: right;">2114</p> <p>05:38 1 look at the whole work. 2 I turn to the next topic, which is jurisdiction, 3 and this is primarily addressed to the Respondent, and the 4 question is a question this time: If TexPet had been sued 5 as a named Defendant in the Lago Agrio Litigation and had 6 been held liable as was Chevron under the Lago Agrio 7 Judgment, does the Respondent dispute that TexPet could 8 bring, as a matter of jurisdiction, a claim for denial of 9 justice or breach of the effective-means obligation under 10 the BIT? 11 A related question is the effect of this 12 Tribunal's Third Interim Award on Jurisdiction. We heard 13 submissions in opening on the status of Chevron as an 14 investor with or without a direct investment, but what is 15 the effect of our Jurisdiction Award on Chevron for its 16 status as an investor with an indirect investment--that is, 17 TexPet--under the BIT? 18 Another question more directed at the Claimants, 19 we know very well that the date of the Claimants' claims 20 for denial of justice--and by that I include effective 21 means--was made after this arbitration had commenced in 22 respect to the Judgment and subsequent actions omissions 23 which also took place after this arbitration had commenced. 24 Does this timing have an effect on our jurisdiction or the 25 admissibility of those claims under public international</p>
<p style="text-align: right;">2113</p> <p>05:36 1 and, if you think it appropriate, we will be asking you to 2 submit the materials to us. 3 The first set of materials relates to the Loewen 4 Case. We've heard a lot about the Loewen Case from the 5 Parties, and obviously we have the Decision or the Award 6 and its clarification. But we do know that there were some 7 interesting legal opinions submitted by the Parties in the 8 Loewen arbitration, in particular by, as he then was, 9 Mr. Christopher Greenwood, now Judge Greenwood, and as he 10 was already, Judge Jennings. There may well have been 11 other legal opinions on denial of justice and exhaustion of 12 local remedies, and if there were, we would like to see 13 them or at least get your permission for us to see them. 14 These are public documents. 15 As regards Judge Greenwood, the Respondents have 16 put in part of his Article, State responsibility for the 17 decisions of national courts in RLA-305, but we would like 18 the whole Article. 19 Similarly, we have multiple extracts from 20 Professor Paulsson's book on denial of justice, but we 21 would like your consent for us to refer, if we need to, to 22 the whole book. That is principally in RLA-61, but it's in 23 other places, too. 24 The Freeman work is in RLA-310, but again, I think 25 we would like more pages. Could we have your consent to</p>	<p style="text-align: right;">2115</p> <p>05:40 1 law, the BIT, the UNCITRAL Arbitration Rules or the lex 2 arbitri? 3 Another question addressed to both sides but more 4 perhaps to the Claimants: How does the Claimants' ripeness 5 theory, which was proposed by Professor Paulsson in the 6 Claimants' opening oral submissions at T-1, Page 143, he 7 called it a consummation; that is, the denial of justice as 8 a claim was consummated when the Lago Agrio Appellate Court 9 affirmed and certified the underlying Lago Agrio Judgment 10 as enforceable in Ecuador and elsewhere? How does that 11 work consistent with the Loewen Award? As you will recall 12 there, the Judgment was enforceable and effectively 13 enforced. But when, if we apply the ripeness theory 14 proposed in this case, does that work with regard to 15 Claimants, both of them, claims in the Loewen arbitration? 16 Next topic, which is the scope of the Respondent's 17 obligations under the BIT, the first one is perhaps again 18 more directed to the Claimants. In this particular case, 19 do the BIT's other standard of protection--FET, FPS--bring 20 any relevant additional protection to the Claimants' case 21 on denial of justice, or are we limited or concentrated on 22 denial of justice under public international law and the 23 provision on effective means? 24 Second question: Is the obligation under the BIT 25 regarding effective means a broader legal protection for an</p>

<p>Sheet 63</p> <p style="text-align: right;">2116</p> <p>05:43 1 investor than denial of justice or the same? If it's 2 different, how does that affect the Claimants' case as 3 regards not the Lago Agrio Court itself but rather the 4 Appellate Court and the Cassation Court? And if so, how? 5 In that regard, the question address more to the 6 Respondent, as regards the claim for effective means under 7 the BIT, is it common ground between the Parties that the 8 requirement to exhaust local remedies is the same? We saw 9 the reference to the Commercial Cases Partial Award at 10 Paragraph 244. 11 I will now turn to the next topic, which relates 12 to the Lago Agrio Court and Judgment issues, and there were 13 a variety of queries. 14 Is it in evidence why Texaco and TexPet were not 15 pursued by the Lago Agrio Plaintiffs as Defendant Parties 16 as distinct from Chevron in the Lago Agrio Litigation? And 17 we say that in particular because we know that Texaco was 18 named as a Defendant, Texaco, Inc. in the Lago Agrio 19 Complaint. And it was suggested in opening by Mr. Bishop, 20 Day 1, Page 68, that the Lago Agrio Plaintiff's lawyers had 21 made a mistake, and this was either expressly or implicitly 22 acknowledged by Mr. Donziger. If that were so, could we 23 have the reference to that piece of evidence. 24 And whilst we're talking about Mr. Donziger, 25 again, I think it was Mr. Bishop, Day 1, Page 18, who</p>	<p style="text-align: right;">2118</p> <p>05:47 1 standard of proof--again, I'm using a common law 2 terminology--the "balance of probabilities," but there 3 should be perhaps a different term for public international 4 law, the UNCITRAL Rules, or lex arbitri, if it's a balance 5 of probabilities as regards an allegation which is not an 6 allegation of criminal conduct, does that standard of proof 7 change when the allegations are extremely serious 8 allegations amounting to or equivalent to criminal conduct? 9 Again, a question about the burden of standard of 10 proof. And all these questions are phrased under public 11 international law, the UNCITRAL Rules and the lex arbitri: 12 Is there, and if so what is it, an inference from a Party's 13 omission to produce relevant evidence either within its own 14 control or if not within its own control, with more 15 availability than its opponent? And in this case, we're 16 clearly looking at names such as Mr. Zambrano, Ms. Calva, 17 Mr. Fajardo and possibly Mr. Donziger himself. 18 We move to a different topic: Merger--that is the 19 merger between Texaco and Chevron. Now, the Lago Agrio 20 Judgment addresses the merger at some length--this is 21 Exhibit C-931--and in that consideration, it refers several 22 times to the concept of fraud or abuse as grounds to pierce 23 the corporate veil. Do we find in the Lago Agrio Judgment 24 or indeed in any allegation made by the Parties before that 25 Court, a statement that Chevron was guilty of fraud or</p>
<p style="text-align: right;">2117</p> <p>05:45 1 referred to Mr. Donziger's unforgettable words about going 2 over to the dark side. Again, if that's in evidence, could 3 we have the reference. 4 Next question: We would like it clarified as a 5 matter of Ecuadorian law and practice in evidence what is 6 the legal rule or rules that precluded Chevron or Texaco 7 from bringing a third-party claim in the Lago Agrio 8 Litigation against Petroecuador for consequential relief or 9 indemnity, that is in the same legal proceedings as those 10 that were brought by the Lago Agrio Plaintiffs? And if not 11 a third-party claim, what rule precluded Chevron or Texaco 12 to bring Petroecuador in as an additional Defendant facing 13 the Claims by the Lago Agrio Plaintiffs directly or 14 indirectly through Chevron? 15 Now, when we look at the allegations of 16 ghostwriting against Judge Zambrano, which are very serious 17 allegations, we need some assistance, as a matter of public 18 international law, the UNCITRAL Rules and the lex arbitri 19 as to the burden and standard of proof. Now, in my legal 20 system and other common law systems, the legal burden never 21 shifts. It's on the person who makes the allegation, but 22 the evidential burden can shift backwards and forwards. 23 Now, is that the same position under public international 24 law? 25 And a related question, when we look at the</p>	<p style="text-align: right;">2119</p> <p>05:49 1 abuse in merging with Texaco? 2 Same topic, different question. What if the 3 Fusión Memo was an accurate reflection of Ecuadorian law, 4 including its conflict of laws and laws of procedure? If 5 so, could that be a denial of justice by itself? Is it 6 arbitrariness for an Ecuadorian Court to take correct 7 account of an applicable foreign law, subject, of course, 8 to respecting the Parties' procedural rights? Again, we're 9 talking about denial of justice and irrationality. 10 What is the position as a matter of public 11 international law as regards punitive or multiple damages 12 amounting to a denial of justice per se? 13 We would like some factual explanation again from 14 the evidence as to what happened in regard to prosecutions 15 or professional disciplines for some of the individuals 16 involved in the Lago Agrio Litigation? For example, was 17 Mr. Cabrera, Judge Zambrano, or Mr. Fajardo, were any of 18 them investigated or prosecuted or otherwise disciplined in 19 relation for what did or did not take place in the Lago 20 Agrio Litigation? There may be other names which the 21 Parties should consider. 22 Next topic, the appellate courts. As we 23 understand the Claimants' pleading, they are alleging 24 independent denials of justice against the Appellate Court 25 and the Cassation Court. But are we right in understanding</p>

05:52 1 that those allegations are allegations of omission only,
 2 that these courts failed to do something, which it is said
 3 they should have done because they could have done, or is
 4 the position that they didn't have the power to do what
 5 others might think they should have done?
 6 And a related question, we understand there is an
 7 outstanding appeal to the Constitutional Court. We would
 8 like some information about the timing of those
 9 proceedings.
 10 Now, a different topic relating to the relief
 11 sought by both sides in these proceedings. In the
 12 Claimants' Track 2 Reply Memorial, Page 232, Paragraph 435,
 13 Subparagraph (a) (v), the Claimants seek a declaration of
 14 nullity as a matter of international law regarding the Lago
 15 Agrio Judgment. What is the precedent for an arbitration
 16 tribunal making such a declaration of nullity as opposed to
 17 a declaration that there has been a breach of international
 18 law, leaving others to work out the consequences of such a
 19 breach? And in particular, what legal materials would
 20 suggest that this Tribunal is competent with jurisdiction
 21 to make such a declaration of nullity?
 22 Another question on the Claimants' relief, what if
 23 there were a partial denial of justice, for example, if it
 24 were irrational, grossly irrational, for the Lago Agrio
 25 Court to award non-compensatory damages to the extent that

05:54 1 it did but that it would not have been irrational to have
 2 awarded a lesser sum for compensatory damages, say, of
 3 500 million or \$1 billion? As a matter of international
 4 law, does this Tribunal face an all or nothing decision?
 5 And if there is to be something less than all or nothing,
 6 how could that properly be achieved if the Tribunal wished
 7 to do that?
 8 If we can come to the Respondent's claim for
 9 relief, and that is the status of the environmental claims.
 10 As we understand the Respondent's Track 2 Supplemental
 11 Rejoinder--there is a reference in Footnote 953--the
 12 Respondents are raising these environmental claims only as
 13 an offset or a setoff against liabilities to the Claimants
 14 and not as an independent counterclaim. We understand this
 15 is an issue between the Parties, but we would like that
 16 clarified certainly as regards to the Respondent. And if
 17 we're talking about a setoff at the likely time of our
 18 award, what would the setoff be against?
 19 Now, we're going to hear Expert evidence next
 20 week, so we don't want to foresee too much what Mr. Andrade
 21 will be telling us, but we have a debate in the Expert
 22 Reports between him and Mr. Barros as regards causation as
 23 it was addressed in the Lago Agrio Judgment, and Dr. Barros
 24 makes a broader comment in his Fifth Expert Report about
 25 the minimum requirements to establish causation in civil

05:56 1 law systems, Dr. Andrade, in his Third Expert Report,
 2 replies to that, but we would like it clarified, not
 3 necessarily before their evidence, obviously, but
 4 afterwards, as to the relevance of such minimum
 5 requirements to the Claimants' denial of justice claim to
 6 the extent premised on the alleged failure by the Lago
 7 Agrio Judgment properly to establish a factual or legal
 8 causation link for the damages awarded to the Lago Agrio
 9 Plaintiffs as alleged by the Claimants in these
 10 proceedings?
 11 Last topic are just factual matters. It would be
 12 very helpful for us to have an updated and completed and,
 13 dare I say it, agreed dramatis personae.
 14 We would also request the names of the Lago Agrio
 15 Plaintiff lawyers both in the United States and in Ecuador.
 16 We would also request a list of all the Defendants
 17 in the RICO proceedings in New York, including those who
 18 settled with Chevron before the Judgment of Judge Kaplan.
 19 We're interested in the evidence of Ms. Calva.
 20 First, we would like to know a little bit more if it's in
 21 the RICO Trial Transcript as to why when she was supposed
 22 to be coming to give evidence orally she did not come, and
 23 we would also like some explanation for our purposes of the
 24 status of the two statements that we have in evidence
 25 before us. They're very similar. One seems to have been

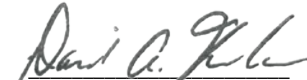
05:58 1 sworn before a notary in Ecuador, and the other looks as
 2 though it's been produced in some different manner. That's
 3 Ms. Calva.
 4 We understand that Mr. Fajardo did not give
 5 evidence in the RICO trial proceedings, but was he
 6 requested to do so? Was an adverse inference sought
 7 against the Defendants for Mr. Fajardo's omission to come
 8 and give evidence in New York?
 9 We would like to understand a little bit more
 10 about the RICO proceedings. I'm certainly not familiar
 11 with that particular form of legal process, and these
 12 certainly took an unusual form, but what happens now,
 13 assuming the Second Circuit does overturn or doesn't
 14 overturn their Judgment?
 15 A related question is: We understand the
 16 transcripts of the RICO proceedings are evidence in this
 17 proceeding, but that would not apply to the RICO Judgment
 18 nor, indeed, to the Decision of the Second Circuit, but we
 19 would like that confirmed because, in some of your
 20 submissions, you cited the RICO Judgment as if it were a
 21 piece of evidence, but I assume--we assume--that that is
 22 not the case.
 23 We would like to be informed a little bit more
 24 about the status of the reinforcement proceedings in the
 25 three jurisdictions in which we know, including, if any,

06:00 1 have reached an ex aequo stage.
 2 (Tribunal conferring.)
 3 PRESIDENT VEEDER: I didn't quite exhaust the
 4 question with regards to the Respondent's case on the
 5 environmental claims. Apart from the issue of responding
 6 to the Claimants' claims for denial of justice and
 7 irrationality, and I touched on the issue of setoff, we
 8 need a better understanding how these environmental claims
 9 fit into the legal structure of the BIT, but Professor
 10 Vaughan will now explain in more intelligent terms than I
 11 can possibly muster at this late hour.
 12 ARBITRATOR LOWE: In addition to what our
 13 President said quite rightly, I think it would be helpful
 14 if you could say a few sentences at the end of next week
 15 about where the technical evidence that we've heard over
 16 the last two weeks, and we will hear at the beginning of
 17 next week, fit into the case, just while it's fresh in our
 18 minds so that we can get some kind of clear perspective on
 19 the relevance in the overall context of each side's case.
 20 PRESIDENT VEEDER: That exhausts the topics and
 21 questions we had for you.
 22 Can we say, again, please don't read too much into
 23 it, even as to the questions we have not asked. Please
 24 understand that these are on the table. Whether you want
 25 to deal with them next week is up to you. It may require

CERTIFICATE OF REPORTER

I, David A. Kasdan, RDR-CRR, Court Reporter, do hereby certify that the foregoing proceedings were stenographically recorded by me and thereafter reduced to typewritten form by computer-assisted transcription under my direction and supervision; and that the foregoing transcript is a true and accurate record of the proceedings.

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.


 DAVID A. KASDAN

06:03 1 more time, in which case take more time.
 2 And lastly, it certainly won't exhaust our ability
 3 and our right to ask further questions of the Parties. So,
 4 we will have, I think, many more, but in response to what
 5 you requested for the purpose of next Thursday and Friday,
 6 we thought it helpful just to go through what was currently
 7 on our mind.
 8 Unless there is any more housekeeping, we will
 9 bring this long day to an end. We will ask Claimants
 10 first.
 11 MR. BISHOP: The Claimants have nothing further.
 12 And we are very grateful to the Tribunal for giving us some
 13 guidance. Thank you.
 14 PRESIDENT VEEDER: And the Respondents?
 15 MR. BLOOM: We have nothing further. And we do
 16 appreciate the guidance as well. Thank you.
 17 PRESIDENT VEEDER: And again, I apologize for the
 18 incoherence, but I hope the shorthand writers can clean it
 19 up.
 20 Thank you very much. We will see you Monday
 21 morning. I think we're on good time, so 9:30 Monday. Have
 22 a good weekend.
 23 (Whereupon, at 6:04 p.m., the Hearing was
 24 adjourned until 9:30 a.m., Monday, May 4, 2015 day.)
 25