



A P P E A R A N C E S

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A P P E A R A N C E S (Continued)

COUNCIL MEMBERS PRESENT:

William Lynch - Chair  
Jaime Rossman, Department of Commerce  
Cullen Stephenson, Department of Ecology  
Joe Stohr, Department of Fish and Wildlife  
Dennis Moss, Utilities and Transportation Commission  
Dan Siemann, Department of Natural Resources

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Bryan Snodgrass, City of Vancouver  
Greg Shafer, Clark County  
Larry Paulson, Port of Vancouver

A P P E A R A N C E S (Continued)

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15                  Janette K. Brimmer  
16                  EARTHJUSTICE  
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A P P E A R A N C E S (Continued)

FOR COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION:

Julie A. Carter  
COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION  
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ALSO PRESENT:

Amanda Kleiss, Paralegal  
Annalisa Provence, Paralegal

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## 1 PROCEEDINGS

2 JUDGE NOBLE: Good morning. We are back on  
3 the record. It's July 18, Monday morning, 9:01 a.m.  
4 Before the State of Washington Energy Facility Siting  
5 Council, Case No. 15-001 in the Matter of Application  
6 No. 2013-01, Tesoro Savage LLC Vancouver Energy  
7 Distribution Terminal.

8 Before we get started, I wanted to let  
9 everyone know that Councilman Stohr is not here today,  
10 will not be here due to illness, but as is the case for  
11 any of the council members, if they miss any portion of  
12 the hearing, they will read the transcript in its  
13 entirety. He sends his apologies.

14 Is there anything -- there is one thing. We  
15 have a new court reporter, Mr. Micheal Johnson. He's  
16 not new. But if any of you have not provided him with  
17 your cards, would you just do so at the break.

18 Is there anything we need to do on the  
19 record or off the record before we get started with  
20 today's testimony? Mr. Johnson?

21 MR. JOHNSON: There are a number of things I  
22 think we need to deal with. There's some exhibit  
23 issues, there are some witness issues, there are some  
24 scheduling issues, but perhaps the attorneys could, you  
25 know, cut their lunch break short or something so that

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1 we don't eat into the testimony time or do it at the end  
2 of the day or something.

3 JUDGE NOBLE: That's fine. Let's try to do  
4 it at lunchtime so the people don't have to stay late,  
5 and I'm happy to do that.

6 Ms. Boyles, are you ready to present your  
7 first witness today?

8 MS. BOYLES: Yes, Your Honor. Columbia  
9 Riverkeeper calls Mr. Brett VandenHeuvel.

10 JUDGE NOBLE: Mr. VandenHeuvel, would you  
11 raise your right hand, please.

12 (Witness sworn.)

13 JUDGE NOBLE: Thank you. Please proceed.

14 BRETT VANDENHEUVEL,

15 having been first duly sworn,

16 testified as follows:

17 DIRECT EXAMINATION

18 BY MS. BOYLES:

19 Q. Mr. VandenHeuvel, could you please state your  
20 name and spell your name for the record.

21 A. Brett VandenHeuvel, B-r-e-t-t  
22 V-a-n-d-e-n-H-e-u-v-e-l.

23 Q. And could you please give the council a summary  
24 of your current position and your background?

25 A. Sure. I'm the executive director of Columbia

## BOYLES / VANDENHEUVEL

1 Riverkeeper. I moved to the Pacific Northwest 20 years  
2 ago. I have a bachelor of science in geology from Hope  
3 College and -- where I studied contaminates and  
4 geohydrology and geochemistry and did a summer of  
5 research on techniques to clean up oil spills, including  
6 air sparging, which is currently being used in Mosier.

7 I taught field science for three years at  
8 various locations around the state of Oregon for the  
9 Oregon Museum of Science and Industry. I have a  
10 master's of science in quaternary and climate studies,  
11 which is a mouthful. Quaternary is the last two and a  
12 half million years, and I was studying in Antarctica,  
13 studying climate change in ice sheet fluctuations, to  
14 try to understand natural climate cycles as related to  
15 current climate change. Did that at University of  
16 Maine.

17 And I have a juris doctor from Lewis & Clark Law  
18 School and studied environmental law there. After that  
19 I had a solo law practice, hung up a shingle, as they  
20 say, and worked for a couple of years for a community  
21 and neighborhood associations, conservation groups, and  
22 Columbia Riverkeeper was one of my clients and they  
23 hired me. I became staff attorney prior to becoming the  
24 director, a position that I've held for the last --  
25 since 2009.

BOYLES / VANDENHEUVEL

1           **Q.    And could you briefly describe the mission and**  
2 **purpose of Columbia Riverkeeper as an organization.**

3           A.    Sure.  Yeah, Riverkeeper works to protect and  
4 restore the water quality of the Columbia River from the  
5 headwaters to the mouth and we -- which is an ambitious  
6 goal.  You know, we're a relatively small, regional  
7 nonprofit.  We have a staff of 12 FTEs, and our main  
8 office is in the Columbia River Gorge in Hood River,  
9 Oregon.  We also have an office in Portland, but we work  
10 throughout the watershed, primarily in the lower  
11 sections of the river but definitely up to the Canadian  
12 border and a little bit in Canada.

13                So our main -- we have three main areas we work  
14 to protect the Columbia and, just to keep this short,  
15 but in more -- that includes new threats to the river.  
16 In recent years, over the last ten years, probably a lot  
17 of that work has been related to fossil fuel terminals  
18 starting with liquified natural gas down in the Columbia  
19 River estuary.  There was five proposed at one time.  
20 Now there are none.  We've worked raising concerns in  
21 opposing coal export terminals, as well as the Tesoro  
22 Savage oil project in Vancouver.

23                Probably the main focus of our work is on toxic  
24 pollution in trying to restore the public right to be  
25 able to catch and eat fish and recreate and enjoy the

## BOYLES / VANDENHEUVEL

1 Columbia without fear of toxic exposure. So it's a  
2 little more wonky policy work, but we work on water  
3 quality standards trying to work with state agencies in  
4 Oregon and Washington, somewhat in Idaho, to pass more  
5 protective limits on toxic pollution. We review  
6 pollution discharge permits. We do some litigation  
7 against violators of those permits under the Clean Water  
8 Act.

9 We also work to clean up contaminated sites, a  
10 big one actually, at the beginning of our organization  
11 founded in 1989, about Hanford when they were shipping  
12 barges of nuclear waste up the Columbia River to the  
13 Hanford Nuclear site. It started as a citizens group  
14 around there, and we've been working on Hanford since  
15 that time.

16 We received a -- Department of Ecology public  
17 participation grants -- till that program was cut off  
18 this year -- for over a decade to do education and  
19 outreach around the Hanford Nuclear site. And then we  
20 also have a large citizen, kind of  
21 on-the-water-volunteer component, where we have citizen  
22 volunteer water quality monitoring. We sample for  
23 E. coli at major swim beaches, mostly in the Portland,  
24 Vancouver, Columbia River Gorge area, very popular  
25 recreation areas that aren't sampled by any other

BOYLES / VANDENHEUVEL

1 entity.

2 We do big cleanup events and try to work with  
3 partners throughout the Columbia River Basin.

4 **Q. Could you describe what happened around noon on**  
5 **June 3rd of this year; and, of course, I'm referring to**  
6 **the Mosier accident.**

7 A. I'm sure you've been hearing plenty about the  
8 details. So my -- you know, my perspective or  
9 involvement was soon after the derailment. Just after  
10 noon I received a call from one of our tribal allies  
11 that there was a derailment in Mosier, and our office --  
12 where I live -- and my office in Hood River is about  
13 six miles from the site of where the derailment was in  
14 Mosier. And so I, along with my coworker Liz Terhaar,  
15 jumped in my car and, you know, drove down there as fast  
16 as I could just to -- you know, I had no details. And  
17 we pulled on to the exit, the off ramp off of Highway  
18 84, and -- well, as we were approaching, we saw a large  
19 plume of black smoke, and I get a lot of calls reporting  
20 things and some of them end up being exaggerated or not  
21 true, and this one was very much true. Yeah, we saw the  
22 big plume of black smoke from a couple of miles away as  
23 we came around a ridge and pulled on to the exit and saw  
24 thick black smoke, saw flaming oil cars -- or flaming --  
25 saw flames and decided it wasn't safe to try to stay.

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1 It didn't appear there was emergency response. There  
2 was no one stopping us at the exit at this time. I  
3 don't know how long it was, but, you know, I think  
4 minutes after it occurred, not, you know, hours. And,  
5 you know, it was very shocking.

6 It was -- I had seen the videos, had been very  
7 concerned about oil trains since they've started  
8 shipping oil by rail, you know, in 2012, 2013, and I've  
9 seen them explode in very dramatic ways. And when we  
10 pulled up, the overpass -- or the off ramp is almost  
11 right above where the train was burning and so we left.  
12 We left quickly, because I thought it was a very  
13 dangerous situation and I knew there would be rapid  
14 emergency response and we didn't want to, you know,  
15 obstruct that or get in the way at all.

16 So we proceeded as fast as we could away,  
17 heading east on Highway 84 and then turned around and  
18 came back. The highway still wasn't closed at that  
19 time. When we were coming back just a few minutes  
20 later, there was a lot of sirens and we proceeded back  
21 to Hood River, were able to take some photos along the  
22 way from the highway.

23 **Q. Yeah, let me -- let me bring up one of those**  
24 **photos.**

25 MS. BOYLES: Ms. Mastro, could you bring up

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1 Exhibit 5623, please.

2 BY MS. BOYLES:

3 **Q. I don't know if you can see. Is this -- can you**  
4 **describe what this photo is?**

5 A. Yeah, this is a photo of the -- on the left is  
6 the plume of smoke from the Mosier derailment. This is  
7 looking downstream on the Columbia, looking back west  
8 after we've turned around and we're headed back past  
9 Mosier. Hood River would be in the distance. And  
10 that's -- I think this photo shows a good perspective on  
11 where it happened in relation to the Columbia River, but  
12 this was just taken from Highway 84 out the window of  
13 the car -- of my car.

14 MS. BOYLES: And, Ms. Mastro, 5622.

15 BY MS. BOYLES:

16 **Q. And what is this one?**

17 A. This is a photo that was taken by a gentleman  
18 named Sean Aiken, from the -- where we pulled off on the  
19 highway and then left, but this is -- there's an  
20 overpass over the railroad in Mosier. So this is a  
21 photo of the derailment, looking west showing the --  
22 this was probably very soon after it happened. The  
23 plume of smoke looks much smaller, but showing the  
24 derailed cars. There was 16 cars that derailed, and  
25 some of the initial smoke from those cars.

BOYLES / VANDENHEUVEL

1           **Q.    And then I understand you chartered a plane?**

2           A.    Yes.  So when we got back to Hood River, there's  
3 a small airport there and we fairly regularly try to  
4 take flights to see things when things like this happen  
5 or just take regular flights to, you know, observe and  
6 photograph the river.  So we were quickly able to get up  
7 in the air at about 2:00.

8                   MS. BOYLES:  Ms. Mastro, if you could put up  
9 Exhibit 5620.

10          BY MS. BOYLES:

11           **Q.    This is one of the photos.  Is there -- yes.**

12           A.    So this is a photograph from a small, little  
13 Piper Cub flying over Mosier.  There wasn't temporary  
14 flight restrictions put in place yet.  I think there  
15 were later in the day, but, you know, showing the plume,  
16 showing the proximity to the Columbia.

17                   In the lower left of that photo, those are  
18 homes.  There's Mosier Manor, which is -- thank you.  
19 No, it's kind of mid, lower left, photo raised a little  
20 bit.  But you can see the smoke and derailment site in  
21 proximity to those homes.  Mosier Manor is a mobile home  
22 community that was evacuated.

23                   MS. BOYLES:  Ms. Mastro, if you could put up  
24 5621.  I think that's also from the plane.

25           A.    Yeah.  So this is looking south, flying over the

BOYLES / VANDENHEUVEL

1 Columbia looking at the derailment just, again, showing  
2 the plume of smoke. In the -- try to point to one here.

3 BY MS. BOYLES:

4 **Q. Does that pointer not work?**

5 A. So the -- this is obviously where the cars were  
6 burning. This is a very -- this is called Rock Creek.  
7 It's a little creek coming down here. This is the Rock  
8 Creek recreation area, very popular recreation area of  
9 Mosier, and this is a swimming beach and a wind surfing  
10 launch. The sewer treatment plant, it's hard to see  
11 here, but it's about right here. I'll talk about it in  
12 a minute.

13 **Q. We have two other photos from the plane later in**  
14 **the day.**

15 MS. BOYLES: Ms. Mastro, 5627.

16 BY MS. BOYLES:

17 **Q. I don't know if this is a better view.**

18 A. Yeah. So this is -- after -- I was up for about  
19 20 minutes and we flew back and flew actually right back  
20 through the big plume of smoke because it was the  
21 easiest way back to the airport and Hood River. When I  
22 landed, I had the plane for a little bit longer, so  
23 Paloma Ayala, a photographer friend of mine, went back  
24 up and took two additional photos -- or some additional  
25 photos and this one. I think an interesting thing here

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1 is the -- apologies for turning my back on you  
2 temporarily, but -- so the length of the train, you can  
3 see the unit train of oil stretching, you can't see the  
4 end of it, but this is back to the east, stretching all  
5 the way along here, the derailment site and then it's  
6 continuing on to the west here. This is downtown  
7 Mosier. There's condominiums that people may have  
8 talked about down here. I remember hearing the fire  
9 chief talk about these that perch right on the tracks.  
10 Again, these are the communities that were evacuated.  
11 Well, the whole town was evacuated, but this was the  
12 Mosier Manor.

13 And then right here, you can see in the little  
14 gap in the smoke, is the Mosier Community School, which  
15 was also evacuated. Their playground is here in front,  
16 and the playground is just 300 feet from the rail yard.  
17 I have friends whose kids are at this school, and it was  
18 a very -- you know, it was a very dramatic scene for  
19 them. There was one person in particular there, her  
20 husband is a first responder, she was working, he was  
21 responding to the fire and their kid was at the school  
22 and they were evacuated. You know, there was many  
23 stories about that, where -- you know, very dramatic for  
24 the students and the community of Mosier. And, in fact,  
25 throughout the Gorge -- you know, there has been a lot

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1 of attention on Mosier, but the Gorge is a very tight  
2 community and even from my own kids, when they see an  
3 oil train go by, my young children will make comments on  
4 it, and I have no idea how it has affected them. I'm  
5 sure not nearly as much as the people who saw this  
6 explosion, but it's -- there's been impacts throughout  
7 our community.

8 MS. BOYLES: Ms. Mastro, could you put up  
9 5625.

10 BY MS. BOYLES:

11 **Q. Do you know when this photo was taken?**

12 A. Yes. This was the next day, which would've been  
13 Saturday, on the -- the derailment was Friday, June 3rd.  
14 This was Saturday, June 4th. And this was -- Paloma,  
15 who I mentioned was -- took the photos in the last  
16 slide, she has a photo drone that she flew over the site  
17 from the river, I believe, and that's showing in the  
18 lower part of the photo the derailment. This is just  
19 basically showing the next day. This again has a good  
20 perspective of where the school is, the large building  
21 in the middle, upper middle, and the fire -- the reports  
22 say the fire burned till about 2 p.m. -- I'm sorry,  
23 2 a.m. on Friday night, and this is the next morning  
24 showing the site of the derailment.

25 MS. BOYLES: Ms. Mastro, 5626.

BOYLES / VANDENHEUVEL

1           A.     Again, from an aerial drone the next day. I'll  
2 point out a couple things quickly on this. This is the  
3 overpass that I mentioned where that photo was taken --  
4 or many of the photos you've probably seen have been --  
5 or if you've seen them, have been taken from this  
6 bridge. The -- you see booms in the water. This is  
7 that beach called Rock Creek Recreation Area that I  
8 pointed out earlier, and then there's booms out in the  
9 Columbia River.

10           There were -- when we took the flight on that  
11 day and the Department of Ecology and others, you know,  
12 reported not seeing a sheen immediately, but after some  
13 time there was a sheen on the river. I don't know  
14 exactly when they put the booms out. You know,  
15 according to my conversations with some of the spill  
16 response people at Ecology and DEQ, they believe much of  
17 that oil reached the river through the sewage treatment  
18 plant.

19           MR. JOHNSON:   Objection, hearsay.

20           BY MS. BOYLES:

21           **Q.     Did you return --**

22           **JUDGE NOBLE:   Just a minute.   There's been**  
23 **an objection.   Do you have a response?**

24           MS. BOYLES:   No, Your Honor, I'll rephrase  
25 the question for him. Thank you.

BOYLES / VANDENHEUVEL

1 JUDGE NOBLE: All right. Objection is  
2 sustained. So a portion of his testimony, that response  
3 with hearsay, is stricken from the record.

4 BY MS. BOYLES:

5 **Q. When did you return to the area?**

6 A. I returned on -- well, I was in the area on the  
7 Saturday, the day after. I spent most of Sunday,  
8 June 5th, in Mosier. There was a community meeting that  
9 evening. I spoke to local elected officials on Sunday,  
10 and then I was also at an incident command briefing on  
11 Monday, June 6th.

12 At incident command, I learned more of the  
13 details. That was located in the Mosier Community  
14 School. The school was -- the last week of school was  
15 cancelled because of the derailment. The kids had their  
16 field days and last week activities planned, and the  
17 incident command was -- I was sitting in the gym and  
18 they had the stage with the play set up and it was a  
19 very active scene, as you can imagine, with all the  
20 different state and federal agencies had taken over the  
21 gym auditorium at the community school, and I received a  
22 briefing, along with some tribal allies and elected  
23 officials and many others, from the Department of  
24 Ecology, Oregon DEQ, Union Pacific, the F -- federal  
25 rail, as well as some local officials.

BOYLES / VANDENHEUVEL

1           **Q.     What have you recently learned about the spill**  
2 **and accident with respect to some of the oil spill**  
3 **issues?**

4           A.     The -- I have reviewed reports about the  
5 monitoring wells, that they continue to -- that there's  
6 monitoring wells to look at the groundwater near the  
7 spill --

8                   MR. JOHNSON:  Objection, hearsay.  This  
9 witness is identified as a fact witness.  If he was an  
10 expert witness, he could testify about reports that he's  
11 read and other information upon which he's basing expert  
12 opinion.  However, as a fact witness, he's restricted to  
13 provide testimonial evidence that he has personal  
14 knowledge of.

15                   MS. BOYLES:  Your Honor, I think he has been  
16 briefed in these incident reports, he has been part of  
17 the community response to the accident and what he is  
18 talking about are the things that he has learned  
19 personally and has personal experience with.

20                   JUDGE NOBLE:  Well, he may have learned them  
21 personally, but he learned them from a hearsay source.  
22 He has to testify from his personal knowledge, so, you  
23 know, I'll sustain the objection, but I'll allow him to  
24 continue testifying to anything that he has personal  
25 knowledge of.  Do you understand the ruling?

BOYLES / VANDENHEUVEL

1 MS. BOYLES: I do.

2 BY MS. BOYLES:

3 Q. Mr. VandenHeuvel, do you have any personal  
4 knowledge about continued well testing at Mosier?

5 A. Yes. There's -- Well 4 is very -- has shown  
6 very high levels in the groundwater of benzene,  
7 tylene --

8 MR. JOHNSON: Objection, hearsay. If he --  
9 if he has personal knowledge of the results of these  
10 testing -- of this testing, then he can testify to it.  
11 If he's read reports that reflect this information, it's  
12 hearsay.

13 JUDGE NOBLE: Well, it is, and I've tried to  
14 restrict the testimony to his personal knowledge, but we  
15 do have that statute that allows evidence, including  
16 hearsay, to be admissible if, in the judgment of the  
17 presiding officer, it's a kind of evidence on which  
18 reasonably prudent persons are accustomed to rely on the  
19 conduct of their affairs, RCW 34.05.452(1). So I'm  
20 trying to draw a fine line between things that this  
21 witness would have an understanding of through only  
22 hearsay or the things that he would have relied upon in  
23 the conduct of his affairs, which is as the executive  
24 director of Columbia Riverkeeper. So let's lay a  
25 foundation about that before we ask for additional

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1 hearsay testimony. So I'll sustain it unless he can lay  
2 a foundation for understanding the results of the well  
3 testing.

4 BY MS. BOYLES:

5 **Q. Mr. VandenHeuvel, without describing what the**  
6 **document says, what document are you referring to when**  
7 **you talk about "well testing results"?**

8 A. The Oregon Department of Environmental Quality  
9 wrote a short report based on testing from Union  
10 Pacific's contractor, CH2M, and it's publicly available  
11 and posted on their website, that has the results of  
12 their groundwater monitoring.

13 **Q. And did you go on the website and read that**  
14 **report?**

15 A. Yes.

16 **Q. Have you talked to anybody at Oregon Department**  
17 **of Environmental Quality about that result?**

18 A. No.

19 JUDGE NOBLE: Mr. VandenHeuvel, how did you  
20 use that in the conduct of your work with Columbia  
21 Riverkeepers?

22 THE WITNESS: I received a phone call from  
23 the City of Mosier asking to come talk to their city  
24 council about that report and try to discuss it with --  
25 present it to council, to use my expertise in both

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1 groundwater and toxics and present it to the city  
2 council this week. And so I read that report in that  
3 regard. I also read it to understand. I have tracked  
4 very closely the continued cleanup efforts and  
5 contamination into the Columbia River. So it's a great  
6 concern of mine that, you know, because the groundwater  
7 is so close and it's connected to the Columbia, that  
8 additional oil is reaching -- could be reaching the  
9 Columbia River.

10 JUDGE NOBLE: All right. I'm going to allow  
11 it based upon the APA statute.

12 MR. JOHNSON: Your Honor, I'm going to  
13 maintain my objection, and I understand the latitude  
14 that you're allowed under the statute and I think it's  
15 analogous to the residual hearsay exception. However,  
16 you know, there needs to be some indicia of reliability  
17 of the evidence, and I would propose that the reports  
18 themselves would be better evidence than  
19 Mr. VandenHeuvel's recitation of what is in those  
20 reports.

21 JUDGE NOBLE: Thank you. You can maintain a  
22 continuing objection to this testimony, but I think  
23 there has been indicia of reliability based upon where  
24 he got the information.

25 MS. BOYLES: And we would be -- we could

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1 submit it as -- we could submit the report, Your Honor,  
2 as a late exhibit. I did not do that because I didn't  
3 want to be introducing exhibits at the last minute, but  
4 it would be easy to be able to do that by the end of the  
5 day.

6 JUDGE NOBLE: I would like you to submit  
7 that as an exhibit.

8 MS. BOYLES: Okay. Thank you, Your Honor.

9 JUDGE NOBLE: And then if there's an  
10 objection about it at that time, we'll hear that, but I  
11 think that, as far as I know now, it would be admitted.

12 BY MS. BOYLES:

13 **Q. Mr. VandenHeuvel, now that we've had that back**  
14 **and forth, could you state again what the -- what you**  
15 **read in that report that will be an exhibit from the**  
16 **Department of Oregon Environmental Quality?**

17 A. Yes. And it's a very short report. That there  
18 is testing done on two dates in late June, I believe the  
19 24th and 30th. DEQ said they received the data on  
20 July 6th and this report was dated July 8th. And it  
21 essentially had a chart showing the levels of pollutants  
22 found and then some of the levels that determined the  
23 criteria for drinking water standards, so a comparison,  
24 and it had a list of volatile organic compounds, VOCs,  
25 as well as semi-volatile organic compounds, compared to

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1 the drinking water levels, as well as a couple other  
2 screening levels. Just to summarize, benzene and  
3 several other volatile organic compounds were much  
4 higher than the groundwater drinking -- sorry, the  
5 drinking water standard. Benzene, for example, was  
6 orders of magnitude higher than the safe level.

7 MS. BOYLES: Ms. Mastro, if we could have  
8 Exhibit 5624.

9 BY MS. BOYLES:

10 **Q. Mr. VandenHeuvel, what does this final picture**  
11 **show?**

12 A. This is a photo that I took on Sunday evening,  
13 Sunday, June 5th, and it shows a Union Pacific train,  
14 one of the first trains that came through after the  
15 track was repaired. And on the left side of the photo,  
16 it shows the oil cars that had been pushed off the track  
17 to make way so they could repair the tracks to allow  
18 more trains to come through.

19 This was taken -- there was a community meeting  
20 in Mosier on Sunday night and there was a lot of tension  
21 in the room; you know, people had been evacuated, they  
22 couldn't use -- their water was -- they were being asked  
23 to not use water because the sewage treatment plant  
24 wasn't functioning. There was oil that had flowed into  
25 the sewage treatment plant. And there was a lot of

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1 tension in the room. And people were asking questions  
2 about, well, what does this mean for oil trains? When  
3 is the next -- you know, when are they going to resume  
4 trains? Is it safe to have these trains that are -- or  
5 these cars that have derailed that still contain some  
6 oil, you know, on their sides while they're actively  
7 doing work on this rail? And there was discussion about  
8 when trains would resume at the community meeting, and  
9 then we came out -- and this is in the evening at  
10 probably about 8:30 -- and heard -- heard horns from the  
11 trains, so people ran down to this overpass and this is  
12 when I took a photo.

13 I walked down on the -- on the left side of  
14 that, there's a road. I walked along that road and saw  
15 the carcasses of the rail cars. They were -- several of  
16 them had white tarps underneath them that had oil on  
17 those tarps. They were -- you know, it's kind of hard  
18 to see from this photo, but you can see that they are  
19 obviously compromised. You know, there was piles of  
20 axles on one side and the cars were crumpled in places,  
21 valves were ripped off and I, personally, was very  
22 concerned about the restarting of trains prior to  
23 cleaning up the rail cars that were there on the side,  
24 as well as thoroughly cleaning up the oil that had  
25 contaminated the soil and has now reached the

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1 groundwater.

2 **Q. So as sort of a final question, why is Columbia**  
3 **Riverkeeper opposed to building this oil shipping**  
4 **terminal?**

5 A. Riverkeeper's mission is to protect the water  
6 quality of the Columbia, and we think that shipping oil  
7 is a serious threat to the Columbia River, both along  
8 the trains coming, you know, over 100 miles along --  
9 directly along the river and the tankers of oil that  
10 would be -- the ships that would be sailing down the  
11 Columbia. We've never had a significant amount of oil  
12 transported -- you know, exported out of the Columbia  
13 River. There's a lot of threats to the river, you know.  
14 We know -- if you think about it too much, it can worry  
15 you. People ask me sometimes what -- you know, what  
16 keeps you up at night and, you know, something happening  
17 at Hanford is certainly -- is certainly one of them, but  
18 oil supertankers going down the Columbia or an Exxon  
19 Valdez-type incident could be absolutely devastating to  
20 the work that so many people have put in to restoring  
21 the Columbia.

22 The other part of that is the community response  
23 to this. You know, we work not only to protect fish and  
24 wildlife and water quality and the ecosystem, but to --  
25 you know, we work very closely with communities. We

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1 have over 12,000 members, the majority of which are -- I  
2 mean, people are located throughout the basin, but the  
3 majority of which are in Vancouver, Portland, Columbia  
4 River Gorge, estuary area of Longview; we have a big  
5 membership. And, you know, these trains would directly  
6 impact people and their health and safety. The  
7 terminal. And so there's -- we've had a huge outcry  
8 from our membership, from the community, like I've never  
9 seen before, and that influences our concerns as well.  
10 You know, we want to try to be responsive to those who  
11 we represent, the people we represent.

12 And so -- I'll just give a quick example. I was  
13 standing on a stage a couple years ago at a community  
14 presentation in Vancouver at the Kiggins Theater in  
15 downtown Vancouver. This was just a -- you know, a  
16 learn more about the oil -- about the oil terminal. And  
17 it was -- you know, it was packed. It was sold out.  
18 There was 500 people there. And as I was on the stage  
19 with a prominent waterfront developer, local doctor,  
20 local pastors, the head of the longshore union, city  
21 council, all of which were speaking very strongly  
22 against the terminal. And I've never seen such a -- not  
23 only in terms of size of concern of people coming out to  
24 raise concerns about something, but the breadth of  
25 concerns of people who typically may have concerns but

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1 don't speak about it publicly, from developers to some  
2 of the unions, firefighters. And so that's formed the  
3 basis of some of our concerns, not only the ecological  
4 damage to the Columbia and setting back the huge amount  
5 of effort we've made for salmon recovery and to clean up  
6 the Columbia, but also the public health and safety  
7 concerns.

8 MS. BOYLES: Thank you. Nothing further.

9 JUDGE NOBLE: Any cross-examination?

10 CROSS-EXAMINATION

11 BY MR. JOHNSON:

12 Q. Mr. VandenHeuvel, I'm Dale Johnson. I'm one of  
13 the attorneys for the applicant in this case. I'm  
14 curious, when you learned of the incident in Mosier,  
15 what did you understand had occurred?

16 A. That an oil train derailed.

17 Q. Okay. And so your immediate reaction was to  
18 drive to the scene of the derailment?

19 A. Yes.

20 Q. Okay. Why?

21 A. Well, one of our jobs is a -- is to try to  
22 respond to incidents. We receive from federal and state  
23 agencies reports of when things happen, you know, when  
24 there's incidents. I wanted to try to observe it, and  
25 we have a broad network of members that we put warnings

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1 out to. We have a -- we have a smartphone app that  
2 monitors for pollutants and is realtime data on E. coli  
3 right now and can warn people about water quality. We  
4 are have a lot of people that use the river. So I  
5 wanted to get a better sense of, you know, what the  
6 problem was and whether we could alert our members to  
7 try to stay out of the river if there was a spill, if  
8 there was anything we could do to be of assistance to  
9 the state and federal agencies and the first responders.  
10 When I got there and saw the extent of it and that it  
11 was a, you know, very dangerous situation, I,  
12 personally, quickly left.

13 **Q. Okay. So probably a good idea to leave.**

14 **Presumably you wouldn't recommend your members drive to**  
15 **the scene of an accident of that nature in the future?**

16 A. Yeah, I mean, if -- if there was an oil train  
17 burning, I wouldn't recommend anyone. I mean, the first  
18 responders, you know, have to do their jobs, but --

19 **Q. And you're not a first responder, are you?**

20 A. I'm not a first -- I'm not an emergency first  
21 responder.

22 **Q. You're not a firefighter?**

23 A. No, sir.

24 **Q. Okay. You're not employed by any state or**  
25 **federal agency charged with responding to an accident**

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1 such as the event in Mosier?

2 A. I'm employed by a nonprofit organization whose  
3 mission is to protect the Columbia River.

4 **Q. Okay.**

5 A. So we do respond to things. You know, I think  
6 there's --

7 **Q. You've answered --**

8 **JUDGE NOBLE: Mr. Johnson, would you let him**  
9 **finish his answer, please.**

10 A. I think there's a real place in our society for  
11 a community response, for community members to  
12 understand what's happening, to be able to have an  
13 organization who can alert other people who may or may  
14 not be paying attention to state or federal websites,  
15 and to be able to -- you know, there's a lot of  
16 recreation on the Columbia River, and to be able to  
17 share that information in as many ways as possible. You  
18 know, I know that during the incident response, Union  
19 Pacific and the -- well, Union Pacific was very -- you  
20 know, they wanted to control what was said publicly and  
21 what was kept internal, and that's something that I have  
22 a lot of concerns about.

23 BY MR. JOHNSON:

24 **Q. Okay. Is that why you rented a plane to go take**  
25 **pictures of the incident?**

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1           A.     Is that what?

2           **Q.     Is that why you rented a plane to go take**  
3 **photographs during the incident?**

4           A.     My concerns about the incident.

5           **Q.     Okay.  So you rented a plane.  So are you aware**  
6 **that there could be aviation assets deployed as a part**  
7 **of the emergency response?**

8           A.     Yes.  So, you know, I spoke to the pilot, we  
9 wanted to check very clearly if there was TFRs,  
10 temporary flight restrictions.  There was none showing  
11 up.  He actually called down -- we wanted to be very  
12 careful about that.  We wanted in no way try to impede  
13 anything.  He called down to the main statewide TFRs and  
14 confirmed very clearly that there were not TFRs,  
15 temporary flight restrictions, and so, you know, they  
16 were aware of the incident and didn't put them in place.  
17 I don't know if they were ever put into place.  I know  
18 the Department of Ecology had a helicopter, a plane up  
19 there taking some photos fairly early on, but we didn't  
20 see any other -- we didn't see any other aircraft.

21                 So, yeah, I think -- I think safety and  
22 emergency response are the absolute number one goal, and  
23 that's what we try to share with our members.  You know,  
24 we do some training on how people should respond if they  
25 see a spill or if they see something.  You know, most of

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1 it is of a much smaller nature than this and safety is  
2 always number one. It's, you know, call 9-1-1 if it  
3 feels like it's safety; otherwise we provide phone  
4 numbers and contact information with the state agencies.  
5 We've been trained by the Department of Ecology and DEQ  
6 on how to have a citizen -- you know, citizen watchdog  
7 response if anything's happening. So we provide cards  
8 to our members who do this thing. They do  
9 Adopt-a-River. But safety is always first.

10 **Q. That's good to know. Now, you talked about some**  
11 **other projects that Columbia Riverkeeper has opposed**  
12 **when you first started presenting your testimony. Is**  
13 **there any major project such as those that you've**  
14 **discussed that Columbia Riverkeeper has supported?**

15 A. There are -- you know, there's -- yes. I mean,  
16 there's thousands of different projects on the Columbia  
17 River. We support many restoration projects that are  
18 happening. We try to work with some of our allies at  
19 land trusts and tribes and some government agencies to  
20 support -- to support projects, to support big,  
21 large-scale restoration projects. There are dozens and  
22 dozens of, you know, housing tracts and smaller  
23 developments that we're just not involved in.

24 What we do is we try to focus on the projects  
25 with the largest impacts to the Columbia River and, you

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1 know, those that we can try to play a role that's  
2 helpful. And that's why the Vancouver Energy project,  
3 Tesoro Savage, has risen to the top of our list, and  
4 many other people's lists, as a major concern throughout  
5 our region due to the strong impacts on the Columbia and  
6 our communities.

7 **Q. Due to the strong impacts or the impacts that**  
8 **you believe may occur as a result of the project,**  
9 **correct?**

10 A. There's -- there's certainly impacts that would  
11 occur. Additional train traffic, additional oil trains,  
12 additional ship traffic, these have impacts. They have  
13 very real impacts.

14 The facility itself, as you know, have -- has a  
15 lot of infrastructure. There would be off-gassing. We  
16 have members in the neighborhoods directly adjacent to  
17 the -- where the terminal would be proposed, and a lot  
18 of the toxic gases that are discharged from the tanks is  
19 a big concern.

20 And so there are very real impacts that would  
21 happen regardless of if there is an incident. But, you  
22 know, certainly the biggest problems would occur when an  
23 accident happens. And from the draft environmental  
24 impact statement, from some of the expert testimony,  
25 it's not a matter of if; it's a matter of when. And

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1 that is certainly -- you know, the order of magnitude of  
2 an oil tanker ship spill on the Columbia or another  
3 trail derailment could be devastating on our river, on  
4 our communities and on our ecosystem. And so that is  
5 why this is certainly a project of great concern to me,  
6 personally, and to our members.

7 MR. JOHNSON: Okay. Thank you. Nothing  
8 further.

9 JUDGE NOBLE: Council question -- excuse me,  
10 redirect?

11 MS. BOYLES: No, Your Honor.

12 JUDGE NOBLE: Council questions?

13 MR. SHAFER: Mr. VandenHeuvel, thank you  
14 very much for your testimony this morning.

15 You spoke about the impact, I think it was  
16 that the -- I don't know the chemical, but benzene, the  
17 element in benzene. Is it your thought that that can --  
18 is it indisputable that that's directly attributable to  
19 the derailment event?

20 THE WITNESS: The report that I read from  
21 DEQ said that it was -- I don't know if it said it's  
22 direct -- you know, they said, due to the -- after the  
23 spill, they put in wells and that they believe that this  
24 was the eastern-most well and that the groundwater was  
25 flowing that way and they gave the results that way. Or

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1 they gave the results, you know, in the report about the  
2 oil spill. So I would need to go back and read it to --  
3 again, to say whether they, you know, made that -- this  
4 is what this is.

5 But these were not results that were just,  
6 you know, their standard groundwater that they've been  
7 doing for years. These were wells that were put in as a  
8 result of the derailment and DEQ is providing those  
9 results.

10 MR. SHAFER: Okay. And it's not my intent  
11 to necessarily challenge you. I'm just trying to  
12 understand the context in which the results came. I  
13 wasn't sure that was something that was being tracked  
14 clearly prior to the incident, you know, during the  
15 incident, after. I don't know if that detailed analysis  
16 was occurring that it's indisputable and it can be  
17 directly tied, you know, to the derailment event.

18 THE WITNESS: Yeah, these were new  
19 monitoring wells as a result of the spill. They were --  
20 they were -- you know, the chemicals -- there was a  
21 gasoline component and an oil component that were, you  
22 know, expected as a result of the Bakken crude that were  
23 very similar to it. So I guess it's certainly possible  
24 there could've been, you know, previous contamination  
25 there where there was a gasoline spill or something, but

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1 that's not what this report suggested.

2 MR. SHAFER: Okay. And the final question  
3 and very general in nature, perhaps maybe too general,  
4 but you spoke to the impacts on the groundwater. And at  
5 this point, and I know we're not too far removed from  
6 the event, but, in your judgment, are conditions  
7 improving with the groundwater? Is it worsening? Is it  
8 about the same? Help us with your thoughts on the  
9 status of impacts to groundwater.

10 THE WITNESS: I don't know the trend. What  
11 I have seen is there is two sample days and they gave  
12 the maximum concentration and those were, you know --  
13 those were at the end of June. So I would hope or I  
14 think that they're doing additional sampling, and those  
15 results I have not seen.

16 MR. SHAFER: Great. Thank you.

17 JUDGE NOBLE: Mr. Snodgrass?

18 MR. SNODGRASS: Good morning. A couple of  
19 quick questions to -- about the access in and out of the  
20 site as the incident unfolded to your knowledge, what  
21 you were able to observe. How soon after the incident  
22 did the -- was 84 closed?

23 THE WITNESS: Very quickly. I would say  
24 about an hour.

25 MR. SNODGRASS: Okay. And then when did it

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1 reopen for general traffic?

2 THE WITNESS: I don't know.

3 MR. SNODGRASS: Okay.

4 THE WITNESS: I don't know. I do know that  
5 it was a -- you know, both sides of the Columbia on 84  
6 in Oregon and on Highway 14 in Washington were an  
7 absolute parking lot for, you know -- throughout the day  
8 on Friday. You know, cars were rerouted through the  
9 city of Hood River so everything was jammed up. They  
10 cancelled multiple events in Hood River. But I don't  
11 know the exact time they restarted traffic.

12 MR. SNODGRASS: Okay. And during its  
13 closure, was it still open for emergency vehicle access;  
14 do you know?

15 THE WITNESS: I don't know. Yeah, I mean, I  
16 certainly expect that it was.

17 MR. SNODGRASS: Thank you.

18 JUDGE NOBLE: Any questions by anyone else?  
19 Any questions based on council questions?

20 MR. JOHNSON: None.

21 MS. BOYLES: No, Your Honor.

22 JUDGE NOBLE: Thank you for your testimony,  
23 Mr. VandenHeuvel. You are excused as a witness.

24 THE WITNESS: Thank you.

25 JUDGE NOBLE: Do you have another witness?

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1 MS. BOYLES: Yes, ma'am. Columbia  
2 Riverkeeper would like to call Dr. Joseph Wartman.

3 JUDGE NOBLE: Dr. Wartman, would you raise  
4 your right hand, please.

5 (Witness sworn.)

6 JUDGE NOBLE: Thank you.

7 You may proceed, Ms. Boyles.

8 JOSEPH WARTMAN,  
9 having been first duly sworn,  
10 testified as follows:

11 DIRECT EXAMINATION

12 BY MS. BOYLES:

13 **Q. Dr. Wartman, could you please state your name**  
14 **and spell your name for the record.**

15 A. Yes. My name is Joseph Wartman. My first name  
16 is spelled J-o-s-e-p-h, last name is W-a-r-t-m-a-n.

17 **Q. I'm going to hand you a copy of your prefiled**  
18 **testimony.**

19 A. Okay. Thank you.

20 **Q. Did you prepare the prefiled written testimony**  
21 **that I just handed you for this adjudication?**

22 A. Yes, I have.

23 **Q. And do you adopt that testimony under oath**  
24 **today?**

25 A. Yes, I do.

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1           Q.     Dr. Wartman, a copy of your CV has been provided  
2 to the council and that's at Exhibit 5600. We don't  
3 need that pulled up, but could you please just give the  
4 council a summary of your educational and professional  
5 background.

6           A.     Yes. I have a bachelor degree in civil  
7 engineering from Villanova University in Pennsylvania.  
8 I have three graduate degrees from the University of  
9 California, Berkeley. I have a master's of science in  
10 civil engineering focused on geotechnical engineering.  
11 I have a second master's degree in geological  
12 engineering with a civil engineering focus. And a Ph.D.  
13 from UC Berkeley in geotechnical engineering.

14           JUDGE NOBLE: Dr. Wartman, you're speaking  
15 very fast for our court reporter.

16           THE WITNESS: Okay. I'll slow down for you.

17           A.     I have experience as both a practitioner of  
18 civil engineering and as a researcher. I have five  
19 years' experience as a full-time engineering consultant,  
20 most recently for Golder Associates as a project  
21 manager. I have 15 years' experience as an engineering  
22 professor in civil engineering at Drexel University, and  
23 I'm currently an associate professor of civil and  
24 environmental engineering at the University of  
25 Washington in Seattle.

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1 I conduct research on geotechnical earthquake  
2 engineering and I have extensive experience  
3 investigating the effects of geologic disasters,  
4 particularly earthquakes, conducting field  
5 investigations on those effects.

6 BY MS. BOYLES:

7 **Q. In preparation for your testimony today, what**  
8 **did you review?**

9 A. I reviewed portions of the applicant's design  
10 package and application, as well as the filed written  
11 testimony from Mr. Rohrbach and Mr. Shanahan, as well as  
12 excerpts of the video testimony of Mr. Rohrbach and  
13 Mr. Shanahan.

14 **Q. Could you give the council an overview of the**  
15 **seismic situation, the seismic issues in this region and**  
16 **the concerns that are going to be addressed here for**  
17 **building this facility?**

18 A. Yes. So the project, of course, is situated in  
19 the Pacific Northwest. It's -- the Pacific Northwest is  
20 a seismically active region. It's unique in the sense  
21 that it is subject to large magnitude subduction  
22 earthquakes. We know that many such earthquakes have  
23 occurred in the past and they'll continue to occur in  
24 the future.

25 Within ten miles of the site are a number of

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1 active shallow seismic sources. Those are tectonically  
2 different or seismologically different, but those are  
3 closer to the site in seismic -- and when I talk about  
4 "shallow sources," I'm talking about sources that are  
5 closer to the ground surface.

6 As a result, the peak design ground acceleration  
7 at the site, which is the -- essentially the horizontal  
8 ground shaking that can be anticipated. The site is  
9 relatively high. It's .42 G, which means that, at least  
10 during an earthquake, during -- during pulses of high  
11 amplitude shaking, about 40 percent of gravity would be  
12 acting horizontally on structures and facilities and so  
13 forth.

14 That peak ground acceleration's also significant  
15 because it exceeds the threshold necessary to trigger  
16 soil liquefaction. Soil liquefaction is a phenomenon  
17 whereby pore pressure or water pressure is generated in  
18 the soil as a result of earthquake shaking causing the  
19 loss of strength of that soil and also loss of  
20 stiffness. The loss of stiffness is significant because  
21 that implies that deformation or ground displacements  
22 can occur as a result.

23 **Q. What is the controlling geotechnical concern for**  
24 **seismic design at this site?**

25 A. It's soil liquefaction.

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1           **Q.     And then do you know what the basis for the**  
2 **design peak ground acceleration is for this site?**

3           A.     The design peak ground acceleration that I had  
4 mentioned is based on maps that had been prepared by the  
5 United States Geological Survey, as well as  
6 site-specific analyses.  Those are based on  
7 probabilistic analyses that considered the contribution  
8 of various seismic sources to the seismic hazard at the  
9 site for a given return period.  So I'll try to  
10 illustrate that with a simple example.

11                 Where we sit here, we're surrounded by a number  
12 of active faults within 25 miles of the site.  There --  
13 say we had two active sources.  We could look at a  
14 single worst-case scenario and design for that, or we  
15 could say that we have contributions that could both  
16 contribute to the risk at this site and we're going to  
17 probabilistically weight those for a given exposure  
18 period.  So those are fundamentally different  
19 approaches.  One is called a probabilistic approach; one  
20 is called a deterministic approach.  The significance  
21 is, is that it's representing various sources of  
22 seismicity, it's not representing a single worst-case  
23 event.

24           **Q.     And is the design for the Tesoro Savage project**  
25 **a probabilistic approach?**

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1       A.     The .42 value, .42 G value that I made reference  
2 to is based on a probabilistic seismic hazard analysis.

3       **Q.     And what is "long-duration shaking"?**

4       A.     Long-duration shaking refers to extended periods  
5 of ground shaking that are associated with large  
6 magnitude subduction earthquakes. And so, for example,  
7 in the Tohoku earthquake in Japan in 2011, that was also  
8 a subduction earthquake, strong shaking carried on for  
9 close to 90 seconds. It varied a little bit depending  
10 on where you in the country.

11           By contrast, shallow sources of seismicity, like  
12 the Nisqually earthquake which actually wasn't  
13 particularly shallow, it was a bit deeper, but strong  
14 shaking in the squally was for about 20 seconds. The  
15 practical significance of long-duration shaking for soil  
16 liquefaction is that you can have additional cycles of  
17 motion that accrue. You have a long time for these  
18 motions to cycle through the soil, which can raise that  
19 pore pressure that I mentioned that triggers soil  
20 liquefaction.

21           The second consequence is that soil will remain  
22 in the liquified state for a longer period of time  
23 because you have a longer duration of this shaking.

24           MS. BOYLES: Ms. Mastro, could you bring up  
25 page 11 of Dr. Wartman's prefiled testimony.

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1 BY MS. BOYLES:

2 Q. And this is a diagram from a page of your  
3 prefiled testimony. Why is liquefaction such a concern?

4 A. So liquefaction is a concern. There's a wide  
5 range of effects of soil liquefaction and these effects  
6 are usually quite pronounced at quarts because of their  
7 setting along rivers and the nature of the geologic  
8 processes that have deposited soil at these locations.

9 There are three principal effects, practical  
10 consequences of these, in the ground surface. The first  
11 one -- this is an excerpt of a paper that was prepared  
12 by Professor Raymond Seed, who is based at the  
13 University of California, Berkeley, that was providing  
14 an overview of the effects of liquefaction. But those  
15 consequences include settlement of the ground surface.  
16 That's vertical displacement of the ground surface. So  
17 one of the things that's significant about that is that  
18 rarely do you have uniform settlement of the ground  
19 surface. It's almost always differential. So it  
20 doesn't uniformly settle one foot. It might settle  
21 eight inches in one location, three inches in another  
22 location and one foot in another location. And that  
23 just has to do with the subsurface variability. The  
24 differences in the geologic properties that underlie a  
25 facility.

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1           A second consequence is horizontal movement,  
2 sometimes called lateral spreading of the ground  
3 surface. That's illustrated right here. And with  
4 lateral spreading, you have sometimes on the order of  
5 many feet. At the project site in question, it -- with  
6 the site as it is right now, it's estimated that there  
7 could be lateral deformation up to about 12 feet at some  
8 locations at the site. That occurs because the soil has  
9 lost its strength and so it begins to flow in a  
10 liquefied state, hence the name "soil liquefaction,"  
11 until, in a sense, it resolidifies and stops moving.

12           A third consequence is that because you have  
13 significant strength loss, you have what is in effect a  
14 large landslide developing. That's what's shown up here  
15 where you can have collapse of banks, and this would  
16 be -- an effect that would be most pronounced in this  
17 particular case along the banks of the Columbia River.

18           There are other effects and these effects, I  
19 should note, don't necessarily occur by themselves but  
20 typically occur in combination with each other.

21           **Q. Is there any particular concern about**  
22 **liquefactions at ports?**

23           A. Because of their setting in a fluvial  
24 environment, and "fluvial" just refers to the fact that  
25 soils in these kind of environments are deposited by

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1 water and under water that tend to be deposited in a  
2 loose condition, ports are highly susceptible to soil  
3 liquefaction. There's two prerequisites for soil  
4 liquefaction. One is saturation of the ground surface  
5 and that occurs at ports because of the proximity to  
6 water, and the second is the density of the grounds and  
7 that has to -- again, has a lot to do with the fact that  
8 these are soil deposits along river systems. So ports  
9 are highly susceptible to soil liquefaction.

10 **Q. And I believe you said this, but just -- I'm**  
11 **just checking my own notes. Landslides into the**  
12 **Columbia River Gorge from a large earthquake event are**  
13 **possible?**

14 A. Yes. So let me try to clarify that point. The  
15 landslide-like mass that I made reference to with  
16 respect to soil liquefaction that I had pointed to over  
17 here would be a consequence of soil liquefaction. I  
18 would expect in an earthquake -- even moderate magnitude  
19 earthquakes typically trigger thousands of landslides in  
20 the absence of soil liquefaction. So I think you would  
21 have both of these occurring together. But responding  
22 to your question, yes, I would expect landslides in the  
23 Columbia River Gorge and beyond.

24 **Q. Would those landslides affect the rail line?**

25 A. From my observations, landslides tend to

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1 disproportionately affect linearly distributed  
2 infrastructure systems, like pipelines and roadways and  
3 rail lines and so forth, just because of their linear  
4 exposure. So, yes, I would expect those to impact rail  
5 lines. A practical significance would be potentially  
6 closing those rail lines because of landslide deposits.  
7 If there was the presence of a train, landslide debris  
8 could potentially strike the train.

9 **Q. Are there additional impacts to be concerned**  
10 **about due to aftershocks?**

11 A. Aftershocks are frequent after all earthquakes.  
12 They're especially pronounced after large magnitude  
13 subduction earthquakes. There's typically hundreds of  
14 aftershocks, if not thousands, depending again on the  
15 magnitude. They tend to diminish in magnitude. They  
16 rarely exceed the magnitude at the original event. So  
17 as a result the kind of worst-case that is kind of  
18 considered for design purposes is the main event itself.  
19 There's not really a formal consideration of  
20 aftershocks.

21 I say in my experience. The practical  
22 consequence of aftershocks is that they occur with --  
23 decrease in frequency with time, but immediately after  
24 the earthquake, they tend to inhibit or impede rescue  
25 and recovery efforts, particularly if you have damaged

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1 structures and are trying to either conduct rescue  
2 operations or recovery or cleanup operations and so  
3 forth.

4 **Q. What are your geotechnical or civil engineering**  
5 **concerns at the project site?**

6 A. My concerns principally pertain to soil  
7 liquefaction. And the reason is, is, as I've mentioned,  
8 ports are highly susceptible to soil liquefaction. The  
9 Port of Vancouver, almost the entire port, is mapped by  
10 the State of Washington as having a moderate to high  
11 level of liquefaction hazard. And the test borings that  
12 have been performed have played this out, as well as the  
13 analyses that have been conducted thus far. So my  
14 principal concerns are the currents of soil liquefaction  
15 at the port. I think that's the driving geotechnical  
16 concern.

17 JUDGE NOBLE: Dr. Wartman, you need to slow  
18 down.

19 THE WITNESS: Okay. Thanks for the  
20 reminder. I'll try my best.

21 BY MS. BOYLES:

22 **Q. Specifically, what are your concerns about**  
23 **Tesoro Savage's proposed ground improvements?**

24 A. In Area 200, which houses rail cars, my concern  
25 is that there's -- is the absence of ground improvement

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1 in that area, despite the predicted soil liquefaction  
2 and despite the fact that ground deformation on the  
3 order of up to 16 inches I believe of vertical  
4 settlement is predicted.

5 In Area 300, I'm concerned the ground  
6 improvement hasn't been implemented under the secondary  
7 containment berms. This is the backup system in the  
8 event that there's tank leakage from an earthquake or  
9 from any other kind of source.

10 In Area 400, which is the terminal facility, is  
11 probably the most dangerous part of the facility and I'm  
12 concerned that the ground improvement doesn't fully  
13 extend through the liquefiable soils in that particular  
14 area.

15 And then likewise, in area 500, the concern is  
16 that the liquefaction ground improvement measures do not  
17 fully extend through the extent of the liquefiable  
18 ground at those locations.

19 **Q. There has been testimony in this proceeding that**  
20 **not anchoring the stone columns all the way to --**  
21 **through the liquefiable layer isn't a problem. Do you**  
22 **agree with that?**

23 A. I disagree with that because I feel as a -- that  
24 what that does, in effect, is it leaves liquefiable  
25 soils in place and untreated. And I think that

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1 liquefiable soils -- particularly given the significance  
2 of the industrial nature of this facility, the storage  
3 and handling of hazardous materials, it's particularly  
4 important to mitigate all of the liquefiable soils  
5 rather than to leave some in place unmitigated. So I  
6 think it's best to extend the liquefaction mitigation  
7 measures all the way through to competent soils.

8 **Q. And what about the deep soil mix panels in**  
9 **Area 400? That's the area by the marine terminal.**

10 A. My concern with the ground improvement scheme  
11 involving deep soil mix panels is that it's a  
12 combination of multiple ground improvement types that  
13 are intended to work in combination with each other.  
14 And I think that that is an innovative design and I  
15 think it's a very cost-effective approach, but it  
16 doesn't have a long history of use and practice. It has  
17 been implemented in some locations. But I think more  
18 importantly it hasn't been tested in large earthquakes  
19 in other places, such as other more traditional ground  
20 improvement measures, such as stone columns. So my  
21 concern is that that has not really been -- we have not  
22 really seen how these perform seismically.

23 And secondly, I think that the analysis that has  
24 been used to support that design has relied on very  
25 simplified procedures that do not capture the full

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1 three-dimensional nature of that ground improvement  
2 scheme. So I don't have a high degree of confidence in  
3 that system as it stands right now without additional  
4 confirmatory analyses.

5 **Q. What are Class F soils?**

6 A. Class F soils are soils that are susceptible to  
7 soil liquefaction.

8 **Q. And where --**

9 A. It's a provision of the building code.

10 **Q. Are there Class F soils on this facility site?**

11 A. Yes, there are. Class F soils underlie most of  
12 the facility site.

13 **Q. Could you further discuss the importance of**  
14 **doing ground improvements under Area 200, under the rail**  
15 **tracks.**

16 A. Yeah, the significance of Area 200 is that it  
17 houses rail cars and, as I've noted, there is the  
18 absence of ground improvement at this point in the  
19 current design. The consequences of that would be  
20 deformation of the ground surface, movement of the  
21 ground surface, and what I'm concerned about in  
22 particular is differential movement of the ground  
23 surface. As I've suggested earlier, it's not uniform  
24 displacement that occurs when soil liquefaction -- when  
25 the ground undergoes soil liquefaction, so the movements

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1 are differential. That could lead to movement of the  
2 rail cars and overturning the rail cars. To the best of  
3 my knowledge, there's not a secondary containment system  
4 in that area to contain that fuel in the event of one of  
5 those cars overturning because of liquefaction-related  
6 movements.

7 **Q. There's also been testimony that the water level**  
8 **at this site reduces the level of seismic risk. Do you**  
9 **agree with that, and why or why not?**

10 A. I do agree with that. As I mentioned earlier,  
11 there's two prerequisites for soil liquefaction. One is  
12 the presence of loose soils which exist throughout the  
13 site, and the second is having saturated soils. So if  
14 soils are not saturated, if the groundwater table is  
15 very low, they can't liquefy. And so because they can't  
16 liquify, we don't have that concern at the immediate  
17 ground surface at least of the significant loss of  
18 strength. It doesn't mean that the underlying soils  
19 when liquified would move or fail in some of the manners  
20 that I've demonstrated with the figure above, but it  
21 does indeed lower the risk.

22 I think it's also important to keep in mind that  
23 while those soils may not lose strength, they will  
24 continue to deform and settle. That is independent of  
25 whether the soils are saturated or not. So when the

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1 soils settle as a result of earthquakes shaking in the  
2 dry condition, we refer to that as a phenomenon known as  
3 seismic impression, and when that same thing happens to  
4 saturated soils, we call it soil liquefaction. But the  
5 ground will deform under those partially saturated or  
6 unsaturated conditions.

7 **Q. One of the papers that you have written on the**  
8 **2003 Tecomán, Mexico, earthquake has been submitted as**  
9 **Exhibit 0365 in this case, and that discusses ground**  
10 **improvements. Are those ground improvements similar to**  
11 **those proposed here?**

12 A. Portions of those ground improvements are  
13 similar and, specifically, the utilization of stone  
14 columns. And I'll just briefly summarize what we found  
15 in that work. So that is -- shortly after the Tecomán  
16 earthquake, I had deployed to that area with a research  
17 team to investigate the effects of the earthquake, and  
18 one thing we were particularly interested in is to see  
19 the effects of ground improvement at porous and to  
20 see -- to judge their efficacy.

21 And what we found is that as the ground  
22 improvement was implemented at that site, it was quite  
23 effective in reducing ground deformation and in  
24 basically overall preserving the facilities that were on  
25 top. So I would say it was an effective implementation

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1 of the ground improvement measure. As I noted, that was  
2 stone columns. So an obvious question is how does that  
3 pertain and how do you extrapolate those findings to the  
4 facility that's in question here today in Vancouver?  
5 And I just caution that it is not a one-for-one  
6 comparison, although there are certainly implications  
7 that you can make about how effective these ground  
8 improvement systems can be. But I'll point out what the  
9 differences are. The key differences are, first, that  
10 the system in Mexico fully mitigated all liquefiable  
11 soils, both the full depth of those liquefiable soils  
12 and in some cases extended about 8 meters beyond the  
13 structure that it was supporting, so that's close to  
14 about 25 feet beyond the structural supports.

15 The second is that those were simple stone  
16 column measures and those have been shown, working by  
17 themselves, to perform well. This was an opportunity to  
18 test some of the more complex ground improvement  
19 mitigation measures, such as the deep soil wall combined  
20 with other ground improvement methods.

21 **Q. One of the concerns you raised in your prefiled**  
22 **testimony was that failure to do modern numerical**  
23 **modeling for this site, was it not?**

24 A. Correct.

25 **Q. There has been some concern that this modeling**

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1 is not necessary. Do you have a response to that?

2 A. I disagree with that contention. Modern  
3 numerical methods have been used in practice for the  
4 last 25 years. They've been used with significant  
5 frequency over the last 15 years, particularly as  
6 computational time has become less expensive.

7 They're not simple to perform. They require  
8 someone with advanced training to conduct and to oversee  
9 the modeling and to develop the models. But when  
10 properly performed, they're very reliable and they  
11 provide very good predictions, system-level predictions  
12 at the interaction of soils and structures and different  
13 ground improvement methods, for example, to provide very  
14 good predictions of the amount of deformation that the  
15 ground can experience and they can also reveal problems  
16 that are not apparent or not captured in otherwise  
17 simple analyses. So I'm a very strong supporter of  
18 those kind of analyses, and I think that most others are  
19 in practice as well, particularly for critical  
20 geotechnical engineering projects.

21 **Q. Are you aware that Tesoro Savage has sent a**  
22 **letter on June 7th to the EFSEC staff discussing the**  
23 **additional seismic modeling it now intends to pursue?**

24 A. Yes, I am.

25 **Q. And for the record, that letter is at**

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1 Exhibit 0362. Does this additional modeling address  
2 your concerns in that regard?

3 A. Yes, it does. I think that that's -- would  
4 provide additional confidence on the ground improvement  
5 measures as they've been proposed at the site.

6 **Q. Mr. Rohrbach stated in his testimony that the**  
7 **oil storage tanks are designed to a risk Category 2**  
8 **standard. Can you explain what a risk category means to**  
9 **seismic design?**

10 A. Risk category is typically selected by the  
11 structural engineer and it is -- it's a building code  
12 provision and it's a function of both the use and  
13 occupancy of a facility. That's the -- there's  
14 Categories, I believe, 1 through 5 on risk categories.

15 **Q. And do those translate into differences in the**  
16 **way things are built?**

17 A. Yes. As the risk category increases, a more  
18 robust design is required. And so with the increasing  
19 risk category, they typically pertain to higher  
20 consequence event failure facilities. So, for example,  
21 the difference between a Category 3 and a Category 2  
22 facility is in effect a 25 percent increase in  
23 structural robustness. There's a 25 percent increase in  
24 the inertial loads that were applied to a structure for  
25 a Category 3 versus a Category 2. So what that would

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1 translate to is, in a practical sense, a more robust  
2 structural system, enhanced structural supports, perhaps  
3 larger beams and columns and so forth.

4 **Q. Does the use of risk Category 2 here cause you**  
5 **any concern?**

6 A. It does, because by definition from ASCE 7-10,  
7 the facility that handles or stores hazardous fuels is  
8 categorized as Class 3, risk Class 3, risk Category 3.

9 **Q. What is your final conclusion about this project**  
10 **in this area with the currently proposed ground**  
11 **mitigations?**

12 A. So it's a -- my collective professional and  
13 research experience has given me the opportunity over  
14 the last 20 years to work closely with issues such as  
15 this and to investigate the effects of earthquake  
16 disasters.

17 I think that fundamentally, and this is a rule  
18 that pertains not just to Tesoro Savage or Vancouver,  
19 but applies to precipitous terrain anywhere, is that we  
20 should not be citing potentially dangerous facilities in  
21 lands that are geologically unstable or otherwise  
22 geologically hazardous. I think that that is a basic  
23 rule.

24 I know that such facilities exist and decades  
25 ago we built those kind of facilities without the kind

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1 of understanding that we have of geologic hazards that  
2 we have today, and those have become legacies that are  
3 expensive for us to maintain and they pose a risk to us  
4 societally as well. So I'm opposed to siting those kind  
5 of facilities in that kind of terrain.

6 I recognize that industrial facilities are part  
7 of modern life and I know that those are not going to go  
8 away and I'm not suggesting that they will, but I prefer  
9 to see those sited in more stable areas so as to prevent  
10 the occurrence or to minimize the occurrence of  
11 disasters that are related to failure of those  
12 facilities, earthquakes and so forth.

13 The second point is that I think it's important  
14 to recognize that even with mitigation measures in  
15 place, there is no mitigation strategy that is  
16 100 percent foolproof. There will always be some level  
17 of residual risk. That can't be eliminated, even with  
18 careful thought and analysis. And I'll offer an example  
19 of the Fukushima Power Plant, and I'm in no way  
20 suggesting that Tesoro Savage can relate -- can result  
21 in a nuclear meltdown, but I just want to simply  
22 illustrate the way that complex engineered systems can  
23 break down.

24 Fukushima was subject to an earthquake that was  
25 much larger than what was anticipated during the design

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1 stage. It wasn't anticipated that Japan could have a  
2 magnitude 9 subduction earthquake. The systems  
3 functioned properly in the sense that the power plant  
4 shut down, but the backup power generation was  
5 overwhelmed by a tsunami that came and overtopped a wall  
6 that was intended to deflect that tsunami and to prevent  
7 it from entering the facility. So that caused a  
8 cascading or chain reaction that ultimately led to the  
9 disaster that occurred there.

10 Fukushima was a very carefully designed facility  
11 and a lot of thought went into those individual  
12 components, but it wasn't always clear in the way in  
13 which those components interacted. And, again, I think  
14 that that just illustrates the nature of this residual  
15 risk, these kind of unforeseen occurrences that can take  
16 place at complex industrial facilities, so I think we  
17 should recognize that nothing is foolproof and it will  
18 always exist to some degree.

19 MS. BOYLES: Thank you. Nothing further.

20 JUDGE NOBLE: Cross-examination,  
21 Mr. Johnson?

22 CROSS-EXAMINATION

23 BY MR. JOHNSON:

24 Q. Thank you, Dr. Wartman. I'm Dale Johnson.  
25 Again, I'm counsel for -- or one of the counsel for the

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1 applicants. Thanks for being here this morning. I want  
2 to start off where you left off. You had testified that  
3 you're opposed to siting these types of facilities in  
4 sites that pose this type of seismic risks; is that  
5 right?

6 A. Correct.

7 Q. Okay. I just want to make sure I'm accurately  
8 characterizing your testimony. And then you also said  
9 that ports are inherently unstable. So that leads me to  
10 ask, how can commercial enterprises industry in the  
11 state of Washington provide infrastructure and get a  
12 product from land to sea, from, you know, somewhere on  
13 the land to a boat, given the seismic risk in the state?

14 A. You know, I just want to clarify one point is  
15 that I -- I don't think I suggested that ports are  
16 unstable, but rather that because of their setting on  
17 rivers, they are situated in geologically hazardous  
18 terrain, just a subtle point about that.

19 But getting directly to your question, how do  
20 you do this, short of completely shutting down the  
21 energy industry. You site and store and handle these  
22 facilities on non-liquefiable ground, and in the process  
23 of transferring them perhaps to ships which would  
24 require you to pass through liquefiable ground, you  
25 implement ground control measures that have a high

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1 degree of reliability that are carefully designed. You  
2 carefully think through this at the system level design  
3 of a facility with multiple backup systems. You leave  
4 no room for failure.

5 **Q. And so it's your testimony that hasn't occurred**  
6 **here?**

7 A. That's correct, in my opinion.

8 **Q. So GRI's work wasn't satisfactory in terms of**  
9 **its geotechnical analysis, in your opinion?**

10 A. No, I did not suggest that. What I suggested is  
11 that the ground -- the ground modification efforts do  
12 not fully extend through the liquefiable materials. I  
13 can just review that once more. In Area 200, ground  
14 modification has not been implemented despite the  
15 presence of liquefiable soils.

16 In Area 300, there's no ground improvement under  
17 the containment berm.

18 In Area 400, which is perhaps the most dangerous  
19 part of the facility because there's an extended depth  
20 of liquefiable soils and it's located on the river bank  
21 where the terrain is most susceptible to landsliding  
22 into the Columbia River, ground improvement doesn't  
23 appear to extend fully through the liquefiable soils.

24 And in Area 500, it's the same concern, ground  
25 improvement not extending through the liquefiable soils.

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1 I think the GRI has done a good job in characterizing  
2 the site, and that's not been my concern that I've  
3 expressed.

4 Q. Have you reviewed the applicant's response to  
5 EFSEC Data Request 10?

6 A. Offhand, I don't know what that --

7 Q. Okay. That addressed some of the concerns that  
8 you have raised about ground improvements under the  
9 berm, and it also provided some fairly complex  
10 engineering calculations and sketches related to the  
11 efforts that have been undertaken to reinforce the  
12 wharf. Does that ring a bell?

13 A. It sounds generally familiar. Does the  
14 possibility exist that I could actually see that as an  
15 exhibit?

16 Q. Sure.

17 MR. JOHNSON: Could you pull up Exhibit 0370  
18 TSS.

19 BY MR. JOHNSON:

20 Q. And while we're waiting -- because sometimes it  
21 takes us a minute to get that up and that's a pretty big  
22 file. Again, back to the close of your testimony. And  
23 something you said at page 4 of your prefiled, you said,  
24 "Even if this plan is modified or enhanced, it should be  
25 recognized that there are no mitigation measures capable

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1 of completely mitigating geologic risks at the  
2 facility."

3 Complete elimination of geologic hazards is not  
4 a published design standard; isn't that right?

5 A. That's correct.

6 Q. I --

7 A. Let me clarify --

8 Q. Mr. Wartman, I'm going to allow you to do that  
9 through your counsel, because I have a series of  
10 questions I just want answers to, and then your counsel  
11 has an opportunity to ask you questions based on my  
12 questions. Okay?

13 A. Okay.

14 Q. All right. So it's not a published design --  
15 complete elimination of geologic hazards is not a  
16 published design standard, correct?

17 A. That's correct.

18 Q. It is not a code requirement, correct?

19 A. That's correct.

20 Q. Okay. And it's not a basis for structural  
21 performance, correct?

22 A. That's correct.

23 Q. Okay.

24 MR. JOHNSON: Could you go to page 10 of  
25 that exhibit, I think. Or page 8 -- maybe start on

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1 page 8.

2 BY MR. JOHNSON:

3 Q. And I should ask you, Dr. Wartman, you asked to  
4 see this. Maybe -- maybe -- I'm sorry, maybe the first  
5 page would help you refresh your memory as to whether or  
6 not you've seen it. It doesn't do us much good to talk  
7 about something you haven't seen.

8 A. Okay. If we could go through the pages of this  
9 document. I've reviewed a number of documents related  
10 to the --

11 Q. And I recognize it's hard to read there. I  
12 don't know if you can.

13 A. Yes, I have seen this document.

14 Q. Okay. And the discussion of the berm in that  
15 document didn't change -- didn't change your opinion  
16 that you expressed today?

17 A. The discussion of the berm in this document  
18 doesn't change my opinion, because the discussion that's  
19 presented in this document refers to uniform settlement  
20 of that berm. As I explained earlier, it's very rare to  
21 have uniform settlement, just because of natural  
22 variability in the subsurface condition.

23 So my concern with the berm is not that it might  
24 undergo some ten inches of settlement, or whatever has  
25 been predicted here, but rather that the nature of that

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1 settlement will be differential, and a consequence of  
2 that would be that it would in effect crack the berm.  
3 Berms are compacted materials that are brittle. If you  
4 build a sandcastle at the beach, it's going to be a  
5 brittle material. If you move the sandcastle a small  
6 amount, you're going to see that it cracks and crumbles.

7 So my concern is more the differential  
8 settlement which is not addressed here, not the  
9 freeboard that is cited here as the provision that's  
10 justifying the lack of ground improvement.

11 **Q. Okay. Let's move to Area 200, because you**  
12 **expressed some concerns about that and you said**  
13 **something along the lines, there will be no secondary**  
14 **containment in that area.**

15 A. I'm not aware of secondary containment for that  
16 facility in the same manner that exists for tanks.

17 **Q. Okay. How about at the unloading facility**  
18 **itself? Are you aware of the design with the unloading**  
19 **facility?**

20 A. I'm generally aware of that, but I'm not  
21 familiar with the specific details at this point.

22 **Q. Okay. So you're not familiar with the specific**  
23 **details about how that's designed to capture spilled oil**  
24 **if that were to occur?**

25 A. Not at that facility, not right now.

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1 Q. And is it your understanding that this area  
2 includes both an unloading facility and then some  
3 additional track; is that right?

4 A. That's correct.

5 Q. Okay. All right. And are you aware that the  
6 application, the design includes pilings under the  
7 unloading facility and other buildings in that area?

8 A. I am, yeah.

9 Q. Okay. So --

10 A. My concern pertained more directly to the lack  
11 of ground improvement under the track area.

12 Q. Okay. And that's the track area that's already  
13 built; is that correct?

14 A. Yes, that's leading to -- that's part of 200.

15 Q. Okay. And you're not testifying about the  
16 likelihood of a spill in the event of a seismic event or  
17 a fire or something if a train were to essentially tip  
18 off the tracks as a result of an earthquake; is that  
19 right?

20 A. I'm going to ask you to restate that question.  
21 I'm not clear what you're asking.

22 Q. You said you have some concerns about there not  
23 being ground improvements under the existing track  
24 structure at the port facility, and I'm just trying to  
25 clarify. You're not here to testify about the

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1 likelihood or the probability that if that were to  
2 occur, that is, an earthquake with a, you know,  
3 follow-on incident related to, you know, a car tipping  
4 over, for instance, you're not testifying that there  
5 will be a spill as a result of that; is that right?

6 A. No, I'm not -- I think I am not brave enough to  
7 make a specific prediction like that. But my concern is  
8 that if there is a seismic event, there's a 15 percent  
9 chance there's going to be a large magnitude subduction  
10 earthquake that would affect this project during its  
11 50-year design life. So it's a -- it's judged to be a  
12 high probability, that should that occur or should  
13 another seismic event occur, since there are a number of  
14 other seismic sources in the region, that would induce  
15 soil liquefaction that could result in ground  
16 deformation and that ground deformation could overtop  
17 the train cars that are stored in 200.

18 **Q. Okay. A couple other -- and just thinking back**  
19 **on your berm -- your berm response, you are aware that**  
20 **berm is lined, aren't you?**

21 A. Yes, I am.

22 **Q. Okay. And the intent of that liner is to**  
23 **account for the, if you will, sandcastle effect that you**  
24 **just described?**

25 A. That's part of the purpose of that second --

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1 that geosynthetic lining system.

2 **Q. Okay. And --**

3 A. But since you've asked that question, I'll just  
4 expand on that and -- because I don't think perhaps I  
5 was clear in explaining what the consequences were  
6 beyond that sandcastle effect, which is that the  
7 geosynthetic lining system that covers that berm  
8 requires the berm to remain -- it's -- essentially it  
9 can maintain its integrity. And so if cracks were to  
10 develop in the berm, if there were to be differential  
11 settlements, that imparts a tension force on  
12 geosynthetic reinforcing systems that can tear them at  
13 their welds and can reduce their efficacy.

14 **Q. All right.**

15 A. That's part of my concern.

16 **Q. Okay. You just said something about a**  
17 **15 percent chance of an earthquake. Last night in**  
18 **preparing, I went back and looked at the Peterson,**  
19 **Cramer, Frankel article. Is that what you're relying**  
20 **on, USGS calculations related to whether or not there's**  
21 **a 15 percent chance of --**

22 A. Could you cite the full name of -- full name of  
23 that reference?

24 **Q. Yeah. It's simulations of seismic hazard for**  
25 **the Pacific Northwest of the United States from**

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1 earthquakes associated with the Cascadia subduction  
2 zone.

3 JUDGE NOBLE: Just a minute. You're talking  
4 over one another and the court reporter can't get that.  
5 So you need to wait until the other is finished  
6 speaking.

7 THE WITNESS: Thank you.

8 JUDGE NOBLE: Thank you. You can answer  
9 now.

10 A. And where was that published, just to be clear?  
11 I review a lot. This is the area I work in.

12 BY MR. JOHNSON:

13 Q. Where was it published?

14 A. Yes.

15 Q. I would have to pull it up for you. It's  
16 Peterson, Cramer and Frankel, and if it doesn't ring a  
17 bell, that's okay.

18 A. Let me take a look at the -- just to make sure  
19 that we're referring to the same document. The  
20 15 percent figure that I was referring to is, in my  
21 opinion, the best available science that is from the  
22 USGS. Art Frankel, who is one of the authors that  
23 you've mentioned has contributed to that work. I'm not  
24 familiar with the other authors, and I just --

25 Q. Okay.

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1       A.    I want to make sure that we're clear about --  
2 exactly what publication we're talking about.

3       **Q.    Well --**

4       A.    But it's my opinion that they're -- that is the  
5 best available science --

6       **Q.    Okay.**

7       A.    -- that I'm citing.

8       **Q.    I'm sorry. I'll let you finish. You done?**  
9 **Okay. Because that article specifically gives a range**  
10 **of 6 to 15 percent, and so I just wondered what your**  
11 **thoughts were about that. There's actually something in**  
12 **the literature suggesting that there is a lower**  
13 **probability of such an event.**

14       A.    I'm part of a large research effort at the  
15 University of Washington called M9, which stands for  
16 magnitude 9, where we're making predictions of the  
17 effect of a large 9.2 subduction earthquake. It's a  
18 project that's sponsored by the National Science  
19 Foundation. So as part of that work, I work closely  
20 with Art Frankel. He's part of the project team. I'm  
21 not familiar with the 6 percent that you're making  
22 reference to, but I will reinforce again that the  
23 15 percent estimate is based on the best current  
24 available science. I know this area well.

25       **Q.    All right. Have you designed a project -- an**

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1 industrial-type project such as this one? When I say  
2 "this one," I mean the Vancouver Energy terminal.

3 A. I am -- not exactly like that, but I have  
4 designed projects that are ports. I have conducted  
5 seismic analyses for projects in ports while working as  
6 an engineering practitioner. I've also designed  
7 hazardous waste facilities. And so I have not designed  
8 an exact equivalent, but I have designed very similar  
9 projects.

10 **Q. Okay. And were those designs here in the state**  
11 **of Washington?**

12 A. Those were designed in California and several on  
13 the East Coast.

14 **Q. Okay. And if you had the opportunity to design**  
15 **such a facility here in Washington, could you do that?**

16 A. Yes.

17 **Q. Are you licensed --**

18 A. Let me be clear about that. I could contribute  
19 to the design. I could not do the water routing and  
20 other civil engineering aspects that are outside of my  
21 particular technical domain, but I would could do the  
22 geotechnical engineering design.

23 **Q. Okay. And is that the same design -- ground**  
24 **improvement design that Mr. Rohrbach testified to?**

25 A. Yes, it is.

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1 Q. Okay. All right. So you're licensed here in  
2 the state of Washington as a professional engineer?

3 A. No. I had been licensed in California and  
4 Pennsylvania as a professional civil engineer when I was  
5 practicing. I'm not practicing any longer, so I don't  
6 maintain those licenses.

7 Q. I see. Okay. And did you read -- you said you  
8 reviewed Mr. Rohrbach's testimony when he discussed the  
9 efforts that were undertaken to identify, if you will,  
10 the designed earthquake event. Did you review his  
11 testimony about that?

12 A. I did.

13 Q. Okay. And Mr. Rohrbach said that they didn't  
14 just look at one earthquake. They looked at a number of  
15 scenarios and then they -- for instance, with regard to  
16 the Cascadia subduction zone earthquake, they attenuated  
17 the effects of that earthquake for the site. Do you  
18 recall that testimony?

19 A. Yes, I do.

20 Q. And did you draw any conclusions about that --  
21 about his description of that effort?

22 A. What he was describing was disaggregating or  
23 taking apart the probabilistic seismic hazard analysis  
24 that I made reference to. So you can -- he presented  
25 diagrams that were three-dimensional bar diagrams that

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1 showed the relative contribution of the hazard to the  
2 site, and it's -- the seismic hazard to the site is  
3 dominated by a large magnitude Cascadia subduction  
4 event, but it also shows contribution from other events.  
5 So I agree with that testimony that there are multiple  
6 sources of seismicity affecting this site.

7 MR. JOHNSON: Okay. Nothing further.

8 JUDGE NOBLE: Redirect?

9 REDIRECT EXAMINATION

10 BY MS. BOYLES:

11 Q. Dr. Wartman, as you were attempting to respond  
12 to Mr. Johnson's questions about whether the removal of  
13 risk is a published design standard, you were going to  
14 continue on and have a further comment. Could you do  
15 that now?

16 A. Yeah. I wanted to clarify that the question  
17 that was asked was about reducing hazard. And what I  
18 had made reference to was reducing risks. And those are  
19 two very different things. And I'm going to cite the  
20 engineering definition of "risk," which is, risk is  
21 hazard times the consequences of that hazard. "That  
22 hazard" is defined as a probability that that event  
23 could occur during the design of a facility, during the  
24 designed life of a facility, and the "consequences" are  
25 what would happen given that hazard actually takes

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1 place.

2 So the implication of that is that even  
3 low-probability events, if they are associated with  
4 significant consequences, are of high hazard. And so I  
5 think it's important to just make the distinction  
6 between what hazard is and what risk is. Risk is far  
7 more practical and really defers more directly to the  
8 consequences of an event. We can't do that much about  
9 the hazard. Sorry. But we can reduce the risk by  
10 minimizing the consequences. That's the distinction.

11 **Q. The exhibit that Mr. Johnson was asking you**  
12 **questions about, that's Exhibit 0370, do you recall the**  
13 **date of that exhibit?**

14 A. No, I don't.

15 **Q. The date of that exhibit was June 17th, but you**  
16 **had reviewed that, even though it post dates your**  
17 **prefiled written testimony?**

18 A. Yes, I have.

19 **Q. Is it appropriate to call the chance of an**  
20 **earthquake in this region from the Cascadia subduction**  
21 **zone a low-probability event, given the immense amount**  
22 **of research that's been done about the probability of**  
23 **that occurring in the near future?**

24 A. I don't think it is. There's specific words  
25 that are used to describe the probability in the work of

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1 Art Frankel, and I'm not sure if we're still referring  
2 to the same document that's -- I don't remember  
3 precisely the words that are used there, but it's not  
4 considered a low-probability event. It's considered a  
5 significant probability in terms of likelihood.

6 MS. BOYLES: Thank you. Nothing further.

7 JUDGE NOBLE: Council questions, to my left?

8 Mr. Rossman?

9 MR. ROSSMAN: Thank you for your testimony,  
10 Dr. Wartman.

11 THE WITNESS: You're welcome.

12 MR. ROSSMAN: I would like to pick up on  
13 something you mentioned in your testimony about the  
14 ASCE 7-10 standard in Category 2 versus Category 3. I  
15 believe you testified that that means that the -- can  
16 you explain a little bit more what that difference  
17 means?

18 THE WITNESS: In terms of its practical --  
19 what the difference is between Category 2 and  
20 Category 3?

21 MR. ROSSMAN: Yeah, both in terms of  
22 practically for design and then also for what that means  
23 for standards.

24 THE WITNESS: So I'll be happy to try to  
25 elaborate on that. Which is -- Category 2 is in effect

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1 ordinary facilities. Category 3 is a special category  
2 that requires a more robust design for facilities that  
3 meet several criteria. One of those criteria is stated  
4 in the design standard. It's stated in one of the  
5 tables of ASCE 7. I don't remember the specific name of  
6 that table or the reference of that, that can be  
7 provided, but that table says that material -- that  
8 facilities that handle, store or process hazardous fuels  
9 or materials shall be designated as Category 3.

10 So the practical consequences of moving from  
11 Category 2 to Category 3 is that Category 3 is in effect  
12 a 25 percent more robust design. When I say it's  
13 25 percent more robust, it means that the design loads,  
14 the seismic design loads on the facility are 25 percent  
15 higher than those for a Category 2 facility. What that  
16 would translate to is that if you have larger seismic  
17 demands, you would have to have a more robust structural  
18 system to remain safe in a designed earthquake.

19 MR. ROSSMAN: So we have previous  
20 testimony -- and I'm not sure how familiar you are with  
21 Washington building codes, but we have previous  
22 testimony that the relevant building code here is the  
23 International Building Code, either the 2012 or 2015  
24 version, which relies on ASCE 7-10. So I'm trying to  
25 get a sense of -- like, is the implication of designing

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1 to that different category, that if it were a  
2 Category 3, it would not be considered compliant with  
3 the code. Do you know the answer to that?

4 THE WITNESS: My interpretation is that it  
5 would not be compliant with the code. But I'm going to  
6 caution that that's not my particular expertise. These  
7 codes change. There's always a lag between when they're  
8 issued and when they're formally adopted by the State,  
9 and then they often make reference to other codes, for  
10 example, the cross reference between ASCE and the  
11 International Building Code. But it's my understanding  
12 that the code that's been adopted and applicable here is  
13 ASCE 7-10, and that that code contains provisions  
14 referring to Category 2 and Category 3 structures. So I  
15 understand that that's the relevant code here.

16 MR. ROSSMAN: Do you know that the  
17 facility's designed to Category 2 or if that was based  
18 on earlier testimony?

19 THE WITNESS: I don't. I know that I've  
20 read in earlier testimony that it's designed to  
21 Category 2. So I'm basing that opinion and I'm basing  
22 that understanding on prior testimony that's been  
23 presented here.

24 MR. ROSSMAN: Okay. Thank you. I'm  
25 wondering in terms of the ground improvements under the

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1 tanks themselves, we have testimony that with those  
2 improvements in place that there will be no more than, I  
3 believe, two inches of settlement. Are you able to sort  
4 of comment as to whether that's a reasonable estimate?

5 THE WITNESS: I think the two-inch  
6 settlement criteria is very aggressive and it's a design  
7 standard. Whether the design can actually achieve that  
8 or not is another question. But I think in the case of  
9 the tanks for 300, I think that that is achievable.

10 MR. ROSSMAN: With the present --

11 THE WITNESS: With a ground improvement  
12 program that fully penetrates through the liquefiable  
13 soils.

14 MR. ROSSMAN: And in any of the recent very  
15 large earthquakes, besides the Mexico example that was  
16 brought up, have you seen the performance of these types  
17 of ground improvements in the Japan earthquake, for  
18 example?

19 THE WITNESS: I've not seen the same ground  
20 improvement measures implemented in Japan.  
21 Unfortunately, I've seen a lot of damage at ports as a  
22 result of the partial ground improvement or lack of  
23 ground improvement at those facilities.

24 Tecomán served as a unique example of a  
25 well-improved site, but I have not seen that in my work

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1 in Japan which began a couple weeks after the Tohoku  
2 earthquake. I did spend some time along the coast, but  
3 I did not witness other ground improvement -- the  
4 efficacy of other ground improvement measures.

5 MR. ROSSMAN: And I think my last question,  
6 as a general matter, would you expect the water  
7 infrastructure serving the facility to be impacted by an  
8 earthquake of this magnitude?

9 THE WITNESS: I would in the sense that  
10 water supply may be conveyed through pipelines, and some  
11 of those may be above ground. I don't know the nature  
12 of the water conveyance system that's serving the  
13 facility. I've seen water pipelines that have been  
14 water supply -- critical water supply pipelines in Latin  
15 America that have been ruptured by landslides that cut  
16 off water that was needed later, not just for health and  
17 sanitation reasons but also for firefighting. I'm not  
18 entirely familiar with that system here, though.

19 I would say that there's two threats to  
20 pipelines. One would be certainly landslides, if those  
21 are above ground. But even those that are below ground,  
22 pipelines have very poor performance in -- when they're  
23 embedded in liquefiable soil. That's something that  
24 became apparent after the Christchurch earthquake  
25 sequence, which is a series of multiple earthquakes that

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1 occurred in 2010 and 2011 in Christchurch, New Zealand.  
2 A majority of the damage to the underground  
3 infrastructure resulted from soil liquefaction and  
4 rupture of the below ground pipe network.

5 MR. ROSSMAN: Just to be sure, when you're  
6 saying "pipelines," that would include water mains?

7 THE WITNESS: Yes.

8 MR. ROSSMAN: All right. Thank you very  
9 much.

10 JUDGE NOBLE: To my left, any questions?  
11 Mr. Siemann?

12 MR. SIEMANN: Good morning.

13 THE WITNESS: Good morning.

14 MR. SIEMANN: We heard testimony -- I'm  
15 going from my notes from previous testimony a few weeks  
16 back that this facility was designed to a magnitude 9  
17 and a .37 PGA, or peak ground acceleration. If I  
18 understand correctly, your testimony suggested that the  
19 more appropriate level would be .42 PGA?

20 THE WITNESS: That's correct.

21 MR. SIEMANN: What's the practical  
22 difference for a design between .37 and .42?

23 THE WITNESS: The most significant  
24 difference would probably pertain to the design of the  
25 structure itself, the facility itself, the above-ground

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1 portion of the facility, because the PGA is a direct  
2 input to the design of the structure. It's representing  
3 the inertial forces that will be acting in the  
4 horizontal direction.

5 In terms of soil liquefaction, the higher  
6 the PGA, the greater the likelihood of soil  
7 liquefaction, but it's not quite as critical because we  
8 have well exceeded at the threshold at which soil  
9 liquefaction will occur. And so the practical  
10 significance of it from a soil liquefaction perspective  
11 is really not that great.

12 MR. SIEMANN: And you, in some ways, have  
13 answered this in the negative in sort of saying what is  
14 the -- what are your concerns with the site. If you  
15 were to design this site, what changes would you make to  
16 the seismic aspects that you're familiar with here to  
17 make it such that you would feel comfortable with it?

18 THE WITNESS: I would aim to move the  
19 majority of the processing and handling facilities and  
20 storage facilities to non-liquefiable ground. Again, I  
21 would recognize that if it were to be this site, you  
22 need to get the stored product to the ships, they're  
23 going to have to trans -- they're going to be conveyed  
24 across liquefiable ground to get there because those  
25 flank the river. I would fully ground improve the -- or

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1 I would implement full ground improvement in the  
2 sections that are supporting pipelines that are going to  
3 be transferring the products. I would extend that all  
4 the way through and somewhat beyond the liquefiable  
5 materials.

6 I would also try to espouse a culture of  
7 safety in the design in having multiple backup systems  
8 and would submit the work for rigorous peer review for  
9 others to look at the kind of worst-case scenarios, did  
10 we miss this? What might happen if this were -- ground  
11 improvement system were to fail and we were to have  
12 liquefaction? Do we have a secondary containment system  
13 that would back that up?

14 That is a lot of the thinking exercise that  
15 goes through the planning and design of critical  
16 industrial facilities. I would implement a lot of those  
17 kind of ideas if I were to participate in the design.

18 MR. SIEMANN: Thank you.

19 JUDGE NOBLE: Further questions to my left?  
20 Questions to my right? Mr. Stone?

21 MR. STONE: Good morning, Dr. Wartman.

22 THE WITNESS: Good morning.

23 MR. STONE: I wonder if you could help us  
24 understand whether or not the design of the facility is  
25 adequate with respect to earthquakes and ground

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1 improvements and, specifically, do the ground  
2 improvements extend deep enough into the ground.

3 A prior witness testified, and this is in  
4 regard to Area 400 near the -- or underneath the  
5 transferred pipelines, the testimony was that the stone  
6 columns extend to the non-liquefiable soils at  
7 approximately elevation minus 50 feet. I believe your  
8 testimony is that in this same area the ground  
9 improvement does not fully extend to a competent layer.  
10 Is this a disagreement over how deep the liquefiable  
11 soils are or something else?

12 THE WITNESS: I think the disagreement is --  
13 I don't think there's disagreement -- there's widely  
14 accepted design standards and design analyses standards  
15 that exist for assessing the potential of soil  
16 liquefaction under a given PGA. So I don't think that  
17 the question pertains to whether -- what's liquefiable  
18 or not. I think that we can agree on that.

19 I think that the question pertains to  
20 whether a partial mitigation effort would be sufficient  
21 to mitigate much of the hazard but not necessarily all  
22 of it to meet a two-inch criteria. And so I think that  
23 the disagreement may pertain more not to the occurrence  
24 but rather to predicting the performance of the system.

25 I'll say that philosophically I'm opposed to

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1 leaving any area unimproved because it in effect leaves  
2 a weak link in the system. And if you're going to make  
3 the effort to undergo ground improvement, you should  
4 finish the -- you should fully implement the work.

5 MR. STONE: So in this particular case, this  
6 location, it would be your recommendation to not just  
7 extend to the bottom of the liquefiable soils but to  
8 penetrate into the competent layer some distance to  
9 further ensure the competency of the ground improvement?

10 THE WITNESS: Correct, but to a degree. You  
11 don't really need to extend it that far into the  
12 underlying competent materials. You could really extend  
13 it down to the point that it rests on those materials,  
14 but it doesn't really need to sufficiently penetrate  
15 into those to any significant depth.

16 MR. STONE: Have you examined geotechnical  
17 soil borings for the site to have a good idea of the  
18 different soil layers at the site?

19 THE WITNESS: Yes, I have.

20 MR. STONE: Thank you.

21 THE WITNESS: You're welcome.

22 JUDGE NOBLE: Mr. Snodgrass?

23 MR. SNODGRASS: Good morning. Just a couple  
24 of questions. You had mentioned other sources of  
25 seismicity. Could you give us a sense of the general

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1 probability in terms -- of those quakes occurring and if  
2 they -- significant and distinct from a Cascadia  
3 subduction earthquake, what is the time and probability  
4 and do those pose any threats to the facility?

5 THE WITNESS: I'm not familiar offhand with  
6 the probability of like the Portland Hills fault and  
7 some of the other faults that are nearby. Those are all  
8 associated with specific probabilities that are assessed  
9 by the USGS, but they are ultimately captured in that  
10 probabilistic seismic hazard analysis that I made  
11 reference to that provides a peak ground acceleration of  
12 about .2.

13 In order to compute that, you have to look  
14 at the probability on each of these individual faults  
15 and then bring those sources to the site. So in terms  
16 of timing of the shallow seismic events, I don't -- I  
17 can't provide specific details on those right now. It's  
18 possible to obtain what those are and that information  
19 could be developed. It exists. It's in the  
20 probabilistic mechanism from USGS, but I don't know what  
21 that is offhand.

22 MR. SNODGRASS: Okay. And you had mentioned  
23 also that -- in the Fukushima example, that a 9.0 quake  
24 was simply not anticipated and that comes somewhat as a  
25 shock given the reputation that the Japanese having sort

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1 of the gold standards in these matters. Briefly, why  
2 was that? Why?

3 THE WITNESS: The data exists somewhat in  
4 the Pacific Northwest as to whether you have a partial  
5 rupture or a full rupture of the fault that's offshore.  
6 And prior to Tohoku, there was a lot of doubt that you  
7 could have a full length rupture. The length of the  
8 rupture is directly proportional to the magnitude. So  
9 the smaller the length of the rupture, if it ruptures in  
10 smaller individual segments, it will produce lower  
11 magnitude earthquakes.

12 Part of the reason is that we're so doubtful  
13 about that, is that we didn't have a lot of historic  
14 evidence and recordings of earthquakes. There was a  
15 large event in Chile over the last 40 or 50 years that  
16 was something on the order of about a magnitude 9, and  
17 in Alaska we had a very large magnitude event. Those  
18 events weren't particularly well recorded. So there's  
19 still a lot of uncertainty about what the origin of  
20 those was and the sense of the precise areas that are  
21 rupturing and so forth.

22 It's only now with improved instrumentation  
23 and seismological arrays, that we've been able to kind  
24 of really better understand that Tohoku event and see  
25 that these don't necessarily rupture small individual

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1 segments but instead combine and spread across the  
2 entire region. I think it just had to do with the lack  
3 of empirical evidence that this could exist.

4 MR. SNODGRASS: Turning to the Mexico quake  
5 you cite, just to be clear, you had mentioned 8 meters  
6 or 25 feet improvements from the site. Laterally, I  
7 assume that's what that was referring to?

8 THE WITNESS: That's correct, horizontal  
9 distance.

10 MR. SNODGRASS: And I just want to -- you  
11 had mentioned also that was somewhat of a unique event  
12 and I just want to confirm that. Is that, are you aware  
13 of any other cases, other than that, where ground  
14 improvements to the competent layer were demonstrated to  
15 secure a facility during a quake comparable to what  
16 we're looking at here?

17 THE WITNESS: I'm not aware of any offhand.  
18 But that's not to say that that doesn't exist. I did  
19 work in Tecomán, Mexico, so I'm intimately familiar with  
20 it. I spent a lot of time at the port looking at this  
21 and working with the team and publishing a journal paper  
22 on just this specific topic. So that's the one that's  
23 closest to what I know.

24 But offhand, I'm not familiar with other  
25 references that describe that. But again, it's not to

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1 imply that that does not exist in the literature.

2 MR. SNODGRASS: You had also mentioned sort  
3 of a general desire to improve all aspects of the site  
4 in terms of water conveyance to the water pipelines  
5 essentially. Would you recommend -- subject those to  
6 ground improvements or some other nature of enhanced  
7 improvement?

8 THE WITNESS: If those are necessary in the  
9 aftermath of a large earthquake, to -- for rescue  
10 efforts or for recovery efforts, for cleanup, yes. I  
11 think that part of that safety culture, safety thinking  
12 that I had made reference to earlier is having multiple  
13 backup systems. In the event that this happens, in the  
14 event that this next event happens, what is our third  
15 line of defense?

16 If the water lines are down, that's going to  
17 be a concern for fighting fires presumably, and I'm not  
18 an expert in fire science, but that's one of the  
19 principal reasons why we try to maintain water  
20 conveyance networks that are in liquefiable terrain.  
21 That's one of the issues in the Christchurch earthquake.  
22 It's one of the reasons why San Francisco has invested  
23 close to a billion dollars in retrofitting their water  
24 conveyance system, is in anticipation of fires  
25 afterwards and having the ability to fight those.

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1 MR. SNODGRASS: Thank you.

2 THE WITNESS: You're welcome.

3 MR. SHAFER: Dr. Wartman, thank you very  
4 much for your testimony.

5 Again, a general question, hopefully not too  
6 general, but I'm interested in the context of the  
7 project in terms of general civil engineering and  
8 geotechnical engineering. And maybe just a hypothetical  
9 here.

10 If the project were put out to several  
11 well-established, long-tenured civil or geotechnical  
12 engineering firms and perhaps those firms even more to  
13 specialized working in and around port environments  
14 similar to this, are you of the opinion that the  
15 response back from a rigorous independent review would  
16 show that the project data ought to be absolutely  
17 rejected, that maybe the design is woefully inadequate  
18 or the condition's too harsh, or perhaps more to the  
19 fashion of, no, actually the design's in pretty good  
20 shape, they've got some tough conditions but, you know,  
21 with more rigorous modeling, with maybe a little bit  
22 more improvements here or there, structurally or ground  
23 improvements, that the project is a viable project?

24 THE WITNESS: Yeah, it's a -- you raise an  
25 important point. It would be difficult for me to assess

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1 that for the larger context of the project. I really  
2 focused on the geotechnical aspects, and I know there's  
3 many other components. The industrial facility is very  
4 complex. And so it's difficult for me to speak to how  
5 that might be perceived or, you know, how that might  
6 be -- what might be the outcome in a rigorous peer  
7 review. What I can say is that I know that there has  
8 been an independent peer review of the geotechnical  
9 aspects of the project that have revealed some  
10 significant concerns with the ground improvement scheme  
11 as it's been implemented and they have offered some  
12 suggestions, both pertinent to the type of analysis that  
13 would be undertaken to support that work, and also to  
14 the matter in which ground improvement is implemented  
15 and what might be its efficacy if it is.

16 MR. SHAFER: All right. Thank you.

17 THE WITNESS: You're welcome.

18 JUDGE NOBLE: Mr. Lynch?

19 MR. LYNCH: Good morning.

20 THE WITNESS: Good morning.

21 MR. LYNCH: You used the term  
22 "probabilistic" in terms of one of the methods that you  
23 can look at a potential earthquake. What was the term  
24 that you used for the other type?

25 THE WITNESS: The second one is

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1 deterministic. And so the idea with a deterministic is  
2 that we're not going to say there's a particular  
3 probability; we're going to say that this is the  
4 absolute worst case, and we're going to adopt a  
5 deterministic analysis and say we have five faults in  
6 the area, we've analyzed all of those faults, this is  
7 the fault that is going to produce the highest level of  
8 ground shaking at the site and we're going to design for  
9 that. That's a single deterministic event.

10 That doesn't consider how frequent that  
11 event might occur. If it occurs every 10,000 years or  
12 it has a recurrence interval of every 300 years; they're  
13 simply adopting that. That's the standard from some  
14 agencies. For many years the Army Corps of Engineers  
15 has used that as the standard for designing dams. I'm  
16 not certain that that's still their current standard,  
17 but for a long time that's how we designed critical  
18 facilities, is based on that deterministic event.

19 We've moved more now to a probabilistic  
20 event because it's a richer description of all of the  
21 sources of seismicity and the manner in which they  
22 contribute to the hazard at the site for a given return  
23 period. So that .42 value that I mentioned could go up  
24 or down if you considered a different period of  
25 exposure. And so it's inherently a risk-based measure

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1 and the probabilistic part refers to the fact that there  
2 might be a certain probability you would have an event  
3 on this fault, you might have a certain probability  
4 there would be an event on the second fault and so  
5 forth; that gets integrated over in some cases hundreds  
6 of faults that could affect the site. So it's  
7 deterministic and probabilistic were the two fundamental  
8 approaches for assessing the seismic hazard.

9 MR. LYNCH: Thank you. And my last  
10 question, you testified that pipelines generally don't  
11 hold up very well in the case of an earthquake. Do you  
12 know if they hold up any differently if there's product  
13 in the pipeline? Does the pipeline behave any  
14 differently in the case of an earthquake or not?

15 THE WITNESS: I'm going to begin my answer  
16 by saying that that's a bit beyond my area of expertise.  
17 But I am a civil engineer and it's my understanding that  
18 the product itself, whether it be oil or water, short of  
19 being any kind of a caustic element, would not affect  
20 the pipeline in its susceptibility to damage in an  
21 earthquake.

22 MR. LYNCH: So just the motion of the liquid  
23 in there would not affect the integrity of the pipeline?

24 THE WITNESS: That's correct. The concern  
25 more is the differential settlement and the differential

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1 movement of the ground underneath the pipeline or around  
2 the pipeline should it be submerged below the ground  
3 surface and rupture the pipeline as a result. But  
4 that's largely independent of what's inside it.

5 MR. LYNCH: Thank you.

6 THE WITNESS: You're welcome.

7 JUDGE NOBLE: Any further council questions?

8 Questions based on council questions?

9 RECROSS-EXAMINATION

10 BY MR. JOHNSON:

11 Q. Dr. Wartman, isn't it true that ground  
12 improvements don't always penetrate the liquefiable  
13 soil?

14 A. That's true.

15 Q. Okay. And with regard to your work on M9 that  
16 you referred to --

17 A. Yes.

18 Q. -- have you, as a group or as a project,  
19 considered generally the impacts on infrastructure  
20 throughout western Washington if a major Cascadia  
21 subduction earthquake event were to occur?

22 A. That's one of the project goals. It's a  
23 four-year project and we haven't reached that stage yet.  
24 We're working on developing the anticipated ground  
25 motions and looking at the seismic hazards at this

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1 point, but that has not been -- that is an ultimate goal  
2 of the project. It's not available yet. We haven't  
3 begun that phase of work.

4 **Q. Do you have any opinion maybe unrelated to your**  
5 **work on M9 about the impacts on a city, say, the size of**  
6 **Vancouver in the event of a major earthquake approaching**  
7 **a magnitude 9, for instance?**

8 A. I think a magnitude 9 earthquake would result  
9 in -- as I've mentioned before, I'm going to focus on  
10 what's most familiar with me in my area of expertise,  
11 would result in many landslides, thousands of  
12 landslides. It tends to be a very widely distributed  
13 phenomenon. I think there would be -- soil liquefaction  
14 is going to be a significant issue, particularly because  
15 of the long duration of the earthquake magnitude. In  
16 terms of the effects on structures, it's a little bit  
17 beyond my domain since I'm not a structural engineer.

18 **Q. Okay.**

19 A. So I'm not going to comment on that.

20 **Q. Okay.**

21 MR. JOHNSON: Nothing further.

22 JUDGE NOBLE: Ms. Boyles?

23 REDIRECT EXAMINATION

24 BY MS. BOYLES:

25 **Q. Is there any interplay between areas which**

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1 are -- have ground improvements and areas which have not  
2 had ground improvements, say legacy places where we  
3 haven't had those ground improvements, that are  
4 concerned about it at places like ports?

5 A. Yes. So at the scale of a port -- I can answer  
6 that question in multiple scales, particularly for  
7 pipelines and railways and so forth. But at the scale  
8 of a port -- I'll cite a specific example from the Port  
9 of Manzanillo as a result of the Tecomán, Mexico,  
10 earthquake, is that portions of the port that were  
11 ground improved performed well, where the ground  
12 improvement fully mitigated the liquefaction hazard.

13 The portions that were immediately adjacent to  
14 those that had not been improved underwent significant  
15 ground deformation, including lateral spreading and many  
16 of the kind of things that I had talked about and  
17 illustrated with the figures earlier.

18 In terms of practical consequences for port  
19 operations, there's a -- there's quite a contrast in  
20 the -- and this is going back a number of years now,  
21 2003, but there's quite a contrast in the seismic  
22 performance, and so what that might mean is that I  
23 recall the entrance to the Port of Manzanillo was  
24 largely inaccessible because the access road had been so  
25 severely deformed by soil liquefaction, yet some of the

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1 facilities had remained intact. And so there is an  
2 interplay between those two. And I think that perhaps  
3 the outcome of that is that with differential ground  
4 improvement, you would expect to have differential  
5 performance across some kind of facility or some kind of  
6 region or site.

7 MS. BOYLES: Thank you. Nothing further,  
8 Your Honor.

9 JUDGE NOBLE: Dr. Wartman, thank you for  
10 your testimony. You are excused as a witness.

11 THE WITNESS: Okay. Thank you.

12 JUDGE NOBLE: This is a good time to take a  
13 morning break, I think. We will be in recess until  
14 11:20.

15 (Recess taken from 11:06 a.m. to 11:25 a.m.)

16 MS. REED: The City of Vancouver would like  
17 to call Assistant Police Chief Mike Lester.

18 JUDGE NOBLE: Chief Lester, would you raise  
19 your right hand.

20 (Witness sworn.)

21 JUDGE NOBLE: Thank you. Please be seated.  
22 You may proceed, Ms. Reed.

23 MICHAEL S. LESTER,

24 having been first duly sworn,

25 testified as follows:

## 1 DIRECT EXAMINATION

2 BY MS. REED:

3 Q. Chief Lester, did you file prefiled written  
4 testimony in this proceeding?5 JUDGE NOBLE: Just a minute. He should  
6 identify himself for the record.

7 MS. REED: I'm sorry. Of course.

8 BY MS. REED:

9 Q. Could you please state and spell your name for  
10 the record.

11 A. It's Michael S. Lester. It's L-e-s-t-e-r.

12 Q. Chief Lester, did you prepare and file prefiled  
13 written testimony in this proceeding?

14 A. Yes, I did.

15 Q. And that testimony is what you have before you?

16 A. Yes, ma'am.

17 Q. And do you hereby adopt this testimony under  
18 oath as your testimony in this proceeding?

19 A. I do.

20 Q. Now, your resume is in the record as  
21 Exhibit 3012, so -- but could you just briefly discuss  
22 your background, your education, your work experience  
23 and your current position with the Vancouver Police  
24 Department.

25 A. I've been in law enforcement for approximately

1 28 years. I started my career in 1989 with the  
2 Vancouver Police Department in Vancouver -- or sorry,  
3 the La Grande Police Department in Eastern Oregon. I  
4 worked there until about December of 1992, when I took a  
5 lateral position as a police officer with the Vancouver  
6 Police Department. I've been with Vancouver since 1992.  
7 I started as a patrol officer. I have worked my way up  
8 through. I was assigned to investigations. I was  
9 assigned to internal affairs. I have worked at Clark's  
10 Community Drug Task Force as a supervisor, reassigned  
11 back at internal affairs again as a sergeant and a  
12 lieutenant, and then was assigned as a commander over  
13 the west precinct and a commander over the special  
14 operations division, and I'm currently the assistant  
15 police chief over the patrol operations division.

16 Throughout my career -- I started as an officer;  
17 I promoted up through the ranks to assistant chief. I  
18 have attended a few ICS classes as required through our  
19 department; ICS 100, 200, I believe 700 and 800. It's  
20 crowd control training courses as well. Trying to  
21 think. Oh, I have a bachelor's degree in business  
22 management. I think that's about it.

23 **Q. Okay. Could you describe what your current job**  
24 **responsibilities include?**

25 A. The current responsibilities as the patrol

1 operations assistant chief is I manage both patrol  
2 districts -- or precincts and districts. So I have two  
3 precincts, I have a west precinct and the east precinct.  
4 My staffing consists of one commander at each precinct.  
5 Each of those commanders has two lieutenants assigned  
6 under them. We have about 12 sergeants assigned to both  
7 precincts separately, so there's about six at each  
8 precinct. And then about 87 currently, between  
9 corporals and officers, assigned to patrol.

10 **Q. How many total officers are authorized for the**  
11 **Vancouver Police Department?**

12 A. Currently, we are authorized at 198 sworn. We  
13 currently have approximately 190 of those positions  
14 filled. Out of those positions, there's roughly, at any  
15 given time, 24 of those 190 that are either in the  
16 police academy, a field training program and/or on a  
17 modified duty due to an injury or maybe a family leave.  
18 So roughly 24 to 25 on any given time are missing from  
19 the 190 that are currently employed as sworn officers  
20 assigned to Vancouver police.

21 **Q. How long does it take from the time that you**  
22 **recruit a new police officer until they are ready to go**  
23 **on patrol?**

24 A. Takes approximately -- from the last  
25 conversation I've had with our background's unit, it

1 takes about a hundred applicants to get through --  
2 applications to get one applicant that actually makes it  
3 through the process. Currently, depending on the  
4 backlog at the training center, it could be roughly 12  
5 to 18 months to hire, get them to the academy, get them  
6 back from the academy, get them into our FTO program and  
7 get them off the field training program, which is the  
8 FTO program, where they actually are assigned as a staff  
9 person that I can count as staffing in a patrol.

10 **Q. And how many officers, in your opinion, would be**  
11 **ideal for Vancouver to have as a staffing level?**

12 A. Well, there's always different opinions out  
13 there what -- the optimum staffing level for any police  
14 agency. I know historically, there's been several  
15 assessments with the City of Vancouver and our  
16 department. We've always come out as a very lean  
17 department for a city of our size. If you take one, I  
18 guess, philosophy which is -- you know, at times can be  
19 controversial for staffing -- 1.8 officers per thousand,  
20 roughly, would put us at a need of about 300 sworn  
21 officers.

22 **Q. And you currently have about 200 authorized**  
23 **positions?**

24 A. Yes, ma'am. We're authorized at 198; we  
25 currently have about 190 of those positions filled.

1           **Q.     And what about the Vancouver Police Department**  
2 **budget in terms of staffing and -- is that a limiting**  
3 **factor?**

4           A.     We -- I think currently, if I remember right, we  
5 spent about \$2 million in our budget in overtime last  
6 year. According to the -- our budget director that I  
7 spoke with, about 50 percent of that was for back-filled  
8 staffing. We operate in patrol on an A and B day  
9 schedule which basically splits my patrol division into  
10 two shifts. Each shift works approximately 15 days a  
11 month out of a 30-day working period. There are two  
12 days a month where we have both A and B day working.  
13 Those days are used for training, training our specialty  
14 assignments, SWAT training folks that are assigned to  
15 SWAT, firearms, defensive tactics, et cetera.

16           **Q.     And when you talk about back-filling positions,**  
17 **what do you mean by that?**

18           A.     That would be voluntary, signed up, prefilled  
19 overtime to maintain minimum staffings on our patrol  
20 shifts, or we also have a lot of mandatory holdovers.  
21 That would be that -- if a sergeant posted, an officer  
22 needed for graveyard shift to maintain the minimum  
23 staffing levels, and no officer voluntarily signed up  
24 for it, then that sergeant would mandatorily hold over  
25 an officer to fill that. I received an e-mail,

1 actually, from my chief on Friday before I went home, I  
2 sat in his meeting with the guild union, the police  
3 officer's union on Thursday, that they were complaining  
4 about the mandatory overtime that seems to be occurring  
5 quite frequently, especially on the graveyard shifts,  
6 and they were concerned about that.

7 **Q. How do you determine minimum staffing and**  
8 **staffing levels throughout the day and night?**

9 A. Well, we just kind of try to come up with a  
10 formula with what officers and staff that we have  
11 assigned on what best meets the officer's safety and  
12 calls for service need throughout the city. Working  
13 with the unions, we have for day shift, which starts at  
14 6:30 in the morning and runs till 4:30 in the  
15 afternoon -- actually, their briefing's at 6, they  
16 usually hit the road about 6:30. Their minimum staffing  
17 levels are ten, and that would be ten citywide. So I  
18 might have five officers sitting at the west precinct  
19 briefing and five officers at the east precinct briefing  
20 for that time frame.

21 We did a study a couple years back to try to  
22 deploy our staff a little better to meet the peak calls  
23 for service time frame throughout the department. So a  
24 couple years ago we did that research. We came up that  
25 we needed to reinstate our supplemental shift, which is

1 allowed by contract. So we now have some officers  
2 starting at 10:30 in the morning. I think they run till  
3 about 7:30 or 8 at night, and then swing shift starts at  
4 3:00 in the afternoon. So there's a peak time window  
5 between about 10:30 and 1:30 in the morning where we  
6 have our most staffing available. And then again, we  
7 drop back down about 1:30 in the morning to a minimum  
8 staffing of ten city wide, which again is that -- you  
9 could have five officers working the west side and five  
10 officers working the east side.

11 **Q. Could you describe some of the options that you**  
12 **have for filling gaps in service levels? You did**  
13 **already mention mandatory overtime. Are there other**  
14 **ways that you can fill gaps in service levels?**

15 A. Well, we have a system set up through the  
16 regional dispatch center, CRESA, which is the Clark  
17 Regional Emergency Service Agency. What we do with that  
18 is we prioritize our calls from a priority 1 down to a  
19 priority 9. Priority 1s and 2s are emergency,  
20 life-threatening-type calls that would come in. Those  
21 would take a priority over a 3, 4, 5, 6, or a priority 9  
22 call.

23 **Q. Can I just interrupt you a second? You're just**  
24 **a tad fast.**

25 A. I'll try to slow down here. So what the

1 sergeant has to do when we are at minimum staffing and  
2 if the calls for service are as much that we can't keep  
3 up with it, is we will direct our officers or direct  
4 dispatch that will send officers priority 1 or 2 calls;  
5 we will get to the priority 3 calls when we can.

6 We have police service technicians, also  
7 referred to as PSTs, that work precincts between 8 and 5  
8 Monday through Friday. Some of those priority 9 calls,  
9 which would be an example of a cold theft or a cold call  
10 with no suspect or no emergency pending, and those may  
11 pend until the following work day when a police service  
12 technician can call the citizen and take a report over  
13 the phone.

14 **Q. Could you discuss mutual aid and what sort of**  
15 **mutual aid is available to the police department and**  
16 **what some of the limitations on that are?**

17 A. Well, there's a mutual aid plan that's always in  
18 place with our -- with Clark County law enforcement, and  
19 it includes the agencies across the river in Portland.  
20 For an example, our mutual aid, our backup SWAT team is  
21 the Gresham, Oregon, SWAT team for Clark County. So if  
22 we are either deployed on an incident or have had a  
23 prolonged deployment and our folks need some type of  
24 relief for rest, we will call the Gresham SWAT team for  
25 that.

1           We implement kind of a mutual aid any type of  
2 call. You might have a shooting or a pursuit that  
3 suspects have fled Clark County, sheriff's department  
4 may provide resources for staffing as far as the  
5 perimeter or a search for the suspects or street  
6 closures. We will do that for Clark County, as well as  
7 outside our jurisdiction, if they're requesting for  
8 help. Washington State patrol will assist at times,  
9 depending on what the event or emergency is.

10           **Q. Do you ever recall off-duty personnel?**

11           A. We have.

12           **Q. And how long does it usually take for -- or is**  
13 **there a range of lengths of time that it takes when you**  
14 **recall off-duty personnel?**

15           A. It would depend which officers we are recalling.  
16 It would be dependent on what type of event. Most -- if  
17 I want to put in an example of a recall, it might be we  
18 have a shift, all of a sudden somebody's either injured  
19 or they call in sick or there's a staffing need that  
20 wasn't identified, sergeants will then get on the phone  
21 and start calling off-duty officers to fill that  
22 vacancy. I've been told at times they haven't found  
23 anybody that would be willing to take that assignment or  
24 answer the phone. So we will then do a mandatory  
25 holdover, which somebody might end up working about 16,

1 17 hours to fill that slot.

2 We've had some critical events where we may have  
3 to call officers in early from a shift. So an example  
4 would be we have an incident on an early swing or a  
5 swing shift, it's taxed the staffing levels that we have  
6 and we will start calling in graveyard folks early to  
7 come in and help either supplement the 9-1-1 calls that  
8 are being needed or whatever the event is, they may come  
9 in and relieve those folks there.

10 **Q. Has the lean staffing of the Vancouver Police**  
11 **Department affected the ability to take advantage of**  
12 **training opportunities?**

13 A. Yeah, there's times that training requests that  
14 make it to my level are declined due to staffing. It's  
15 also declined due to what the assignment of the officer  
16 putting in for that training. So it's -- it can be a  
17 part of staffing levels and/or just the position itself.

18 **Q. Okay. Let's talk about some of the additional**  
19 **service demands related to the proposed project. You**  
20 **mentioned briefly that SWAT team. Could you discuss**  
21 **what their role would be if there were an event of**  
22 **terrorism or sabotage at the facility or at the train**  
23 **lines leading to the facility?**

24 A. Our SWAT team is a regional team and it's --  
25 everybody assigned to it is a collateral duty, meaning

1 that they perform another function throughout whatever  
2 agency that they work for prior to being a member of the  
3 SWAT. So you may be a detective; you may be a patrol  
4 officer. Right now, regionally, we support all the  
5 agencies within Clark County. For the SWAT team  
6 responses, it's priority -- the makeup of the team is  
7 mainly Vancouver police officers. We have ten positions  
8 assigned to that with a lieutenant that oversees it.  
9 And there's -- Clark County sheriff's department has ten  
10 positions assigned to that with a commander that  
11 oversees that. I believe Battle Ground PD has one or  
12 two officers assigned. The rest of the agencies do not  
13 have any staffing assigned to it, but we do deploy in  
14 their areas when needed.

15 So going back to the hypothetical, if an event  
16 happened at the port site where the terminal would be,  
17 it would really depend on the size of the event, but, of  
18 course, our SWAT would be used as the tactical  
19 deployment piece. So if there were hostages or a  
20 terrorist-type attack, they would be deployed in that  
21 manner.

22 We do have a MEDU, which is the bomb operator  
23 assigned as well, that -- we actually have one assigned  
24 to a Portland team. That's where they receive their  
25 training. Portland would send that staff over along

1 with the staff that we have, if there was a threat of a  
2 bomb planted somewhere, to do that search. Our SWAT  
3 team would more than likely be the perimeter security  
4 for something like that. So it really would depend on  
5 the event itself and what is going on to determine  
6 exactly what the SWAT team would do.

7 **Q. And did you say that Gresham also might provide**  
8 **mutual aid?**

9 A. They're our backup SWAT team, so if we ever need  
10 additional SWAT team resources, we have used -- outside  
11 of any major event for multiple search warrant  
12 deployments on any given deployment of SWAT, we have  
13 used their resources to fill those vacancies as well.

14 **Q. Could you describe sort of generally if there**  
15 **were a natural disaster, how the disaster response**  
16 **process would be activated and describe what ICS is, I**  
17 **think you referred to that, and if you know what it**  
18 **stands for.**

19 A. Well, I think it's changed throughout the years,  
20 but incident command system, and I believe it's also  
21 referred to as NIMS, the national incident management  
22 system, if I recall right. So if there was a need --  
23 first, we would try to address the problem with the  
24 on-duty staff that we had available. So depending on  
25 what hour of the day the event would occur would depend

1 on what our staffing levels would be. We would  
2 certainly reach out to other agencies that are working,  
3 what their staffing levels are, if they could provide  
4 resources.

5 At the end of the day, Vancouver's response on a  
6 major incident would be more of probably helping  
7 evacuation processes, scene security, depending on the  
8 scene, and also probably traffic control. If we needed  
9 more staffing than what was available, we would start  
10 that callout procedure of trying to call in folks that  
11 are on days off.

12 **Q. Okay. And could you talk about what resources**  
13 **it would take for -- to evacuate about, say, 13,000**  
14 **citizens?**

15 A. Do you mind if I look at my testimony? I can't  
16 remember the exact numbers.

17 **Q. Sure.**

18 A. I worked with Scott Johnson from the CRESA  
19 emergency management team to come up with a couple of  
20 studies that he had. So an incident roughly about 7 to  
21 13,000, based on the information I received from  
22 Mr. Johnson, we were looking at approximately seven  
23 sergeants, 38 officers for an estimated 13,000, and four  
24 sergeants, additional 26 officers for a 7,000 event.

25 **Q. And given what we've just discussed about the**

1 **staffing -- current staffing levels for the police**  
2 **department, wouldn't both of those scenarios require**  
3 **more staffing than you would typically have available?**

4 A. Yes.

5 **Q. Could you describe what sorts of different**  
6 **assignments officers might have -- I think you mentioned**  
7 **maybe security and traffic and management and**  
8 **evacuation. Could you talk about what's involved in**  
9 **performing those tasks?**

10 A. Well, since I've never physically had to  
11 experience a live incident, we've done some tabletops  
12 throughout my career. You know, it depends on what the  
13 event is. But for the most part we don't have the  
14 training within our organization that we have officers  
15 trained for hazmat-type events or entering a hot zone.  
16 So honestly, it kind of depends on where it would occur  
17 in the city or county -- or where our jurisdiction would  
18 be within our 49 square miles that we patrol throughout  
19 the city of Vancouver, but mainly it would be just  
20 coordination through the incident command structure. We  
21 would do a joint unified command with fire, whatever  
22 other agency may be involved in the incident, or would  
23 have resources to provide to that and just provide our  
24 staffing where that request would be needed.

25 **Q. And if you were involved in evacuating, you**

1 **know, say 7 to 13,000 citizens, what would you do when**  
2 **you evacuated them? I assume they would need things**  
3 **like shelter, food, medical attention, et cetera.**

4 A. Oh, those would have to be identified through  
5 more likely the unified command for the incident  
6 command. We don't have any vehicles that size to  
7 transport a large group of citizens to get out. We  
8 would need equipment for handicapped folks needing  
9 assistance in wheelchairs or medical facilities or  
10 retirement homes. We would probably more likely reach  
11 out to school districts for the use of their buses,  
12 C-TRAN for the use of buses and drivers for an incident  
13 like that.

14 Clark County Fairgrounds has been used as a  
15 unification point for some drills for active shooter  
16 scenarios within schools. That would be a resource or  
17 an area that those type of resources could start to be  
18 developed and arrive there. But for Vancouver Police  
19 Department, we just -- we don't have that. We don't  
20 have large tents. We don't have mass evacuation  
21 equipment or really the training to even enter any zone  
22 that would be outside of conducting security, traffic  
23 control and assisting with evacuation.

24 Q. So would you have to rely on nonprofit  
25 organizations, like the Red Cross, say, for things like

1       **tents?**

2           A.     Yes.  We would -- Red Cross, any other agencies  
3     that are across the river or in Clark County that would  
4     have those resources.

5           **Q.     Could you talk a little bit about some of the**  
6     **unique challenges that might be posed with respect to**  
7     **implementing an evacuation by the location of the rail**  
8     **line with respect to the river?  And what I'm**  
9     **specifically talking about is -- are the areas that are**  
10    **south of the rail line in between the rail line and the**  
11    **river.  What sorts of challenges would you face trying**  
12    **to evacuate those areas?**

13          A.     Well, for Vancouver police, we have no vehicles  
14    available for water-type incidents.  I believe fire has  
15    one boat that they purchased.  We would probably have to  
16    rely on Multnomah County, Portland Police Bureau, for  
17    boats to address any evacuation that would be south of  
18    the tracks down to the river.

19          **Q.     And would that be due to limited access from the**  
20    **north?**

21          A.     Well, kind of dependent, I guess, where it would  
22    be.  It would be limited access if we had to shut down  
23    I-5, for an example.  We could lose officers that live  
24    over on that side of the river coming over through that.  
25    We could lose the access for emergency vehicles coming

1 from another jurisdiction to assist in that area. That  
2 could be a factor.

3 **Q. Let's talk a little bit about populations**  
4 **needing special consideration in the event of an**  
5 **evacuation. For example, incarcerated persons, how**  
6 **would that be handled?**

7 A. More likely that would be handled through the  
8 sheriff's department. They manage the -- both  
9 correctional facilities, the main one downtown and the  
10 one out on the Columbia River. We certainly would  
11 provide possible security or resources to help the  
12 evacuation process for one of those sites, but that  
13 would be managed by the Clark County Sheriff's Office.

14 **Q. And what about people who are institutionalized,**  
15 **you know, for example, that need nursing care, are in**  
16 **hospitals, how -- what sorts of resources do you have to**  
17 **address evacuation for those people?**

18 A. Well, again, we don't -- the Vancouver Police  
19 Department does not have any of those resources, but we  
20 can reach out to community partners, as was mentioned  
21 earlier, the Red Cross, C-TRAN, school district, any  
22 other agency that I'm not getting off the top of my head  
23 that might have access to types of transportation that  
24 could be used.

25 **Q. And -- now, let's assume that we have an**

1     **evacuation of the scale we've been discussing that's**  
2     **ongoing. Could you discuss what other responsibilities**  
3     **beyond that particular emergency response that the**  
4     **Vancouver Police Department would have and how you would**  
5     **try to balance managing those sort of competing demands**  
6     **for resources?**

7     A.   Well, we would still always have 9-1-1 calls  
8     coming in from the rest of the community. And, again,  
9     we would have to go back to what I discussed a little  
10    earlier, is the prioritization of the calls. We  
11    would -- more likely than not in an event that size,  
12    would be probably only responding to priority 1 and 2  
13    calls. There may be a delay in that. That's again  
14    where we would reach out to other resources, the  
15    Sheriff's department, maybe even Camas PD, Ridgefield  
16    PD, Battle Ground PD, could send officers at our request  
17    to help field those calls for service generated through  
18    9-1-1 so that we could focus our staffing at the event.

19    **Q.   Do you have a target response time for 9-1-1**  
20    **calls?**

21    A.   No, we do not.

22    **Q.   I would like to address -- I think I forgot to**  
23    **ask you what you reviewed in connection with preparing**  
24    **for this testimony. So I'm going to do that now. What**  
25    **did you review before testifying today?**

1           A.    I have reviewed the prefiled testimony that I  
2 submitted.  Also I was given and I hope I don't butcher  
3 the names up too bad, but Rhodes, Sawicki and Haugstad  
4 prefiled testimony.

5           Q.    Okay.  So what I wanted to do is talk about some  
6 of that other prefiled testimony that you reviewed.  
7 First I wanted to discuss Mr. Rhodes' testimony.  He  
8 testified in his prefiled written testimony that local  
9 emergency responders do not need to maintain resources  
10 to handle significant rail emergencies on their own  
11 because the rail carriers, such as BNSF, will respond  
12 with their internal emergency personnel and will  
13 mobilize contracts, emergency response and remediation  
14 personnel.

15           Do you have -- in your experience, do you have a  
16 sense of how much time it would likely take for these  
17 responders from the rail carrier to arrive on the scene  
18 of an incident?

19           A.    Well, with my experience, I'm not aware of where  
20 those resources are stored or available, so it would be  
21 hard to say what -- how much time it would take for them  
22 to respond.  Just in my experience, I would -- it could  
23 take hours, I guess.  It's hard to say, I guess, because  
24 I'm not sure where it's coming from.

25           Q.    Are you aware that the employees at the proposed

1 **terminal would not be trained to respond to such an**  
2 **event?**

3 A. Am I aware of that?

4 **Q. Yes.**

5 A. No, I'm not.

6 **Q. Okay. Do you agree with Mr. Rhodes, that local**  
7 **emergency responders do not need to maintain the**  
8 **resources to respond to significant rail emergencies on**  
9 **their own?**

10 A. Meaning that -- that is, that you're asking  
11 "we," Vancouver police or the City of Vancouver,  
12 shouldn't have those resources?

13 **Q. That's essentially -- he's saying that you don't**  
14 **need to handle it all by yourself.**

15 MR. KISIELIUS: Your Honor, I'm going to  
16 object as a mischaracterization of Mr. Rhodes'  
17 testimony. He was responding -- he was explaining spill  
18 response and fire response. We're talking about police  
19 response. And the characterization that the witness  
20 just gave that she just confirmed is inconsistent with  
21 Mr. Rhodes' testimony.

22 JUDGE NOBLE: Response?

23 MS. REED: I was quoting Mr. Rhodes'  
24 testimony. He specifically said local -- quote, "local  
25 emergency responders do not need to maintain resources

1 to handle" -- and then he -- in the preceding sentence  
2 he referred to "significant rail emergencies." In the  
3 sentence I was quoting, he just said "these events" and  
4 then "on their own" and that is what he said.

5 JUDGE NOBLE: I think this police department  
6 falls within the definition of early -- of emergency  
7 responders. I'll overrule the objection.

8 You may answer the question.

9 A. I would find that statement problematic, I  
10 guess, from my point of view.

11 BY MS. REED:

12 Q. Let's talk about Mr. Sawicki's testimony. He  
13 testified that the proposed project's plans and manuals  
14 with respect to safety and emergency management meet or  
15 exceed industry standards and align with federal and  
16 state regulations. He also acknowledged, however, that  
17 various required plans and documents have not yet been  
18 prepared, such as a hazard and operability study and  
19 processed safety management program documents.

20 In your professional opinion, is it possible to  
21 evaluate whether safety and security plans satisfy  
22 applicable standards when they have not yet been  
23 prepared or exist only in an outline form?

24 MS. MARTIN: Your Honor, Connie Sue Martin  
25 on behalf of the Port of Vancouver. I would object in

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1 that this witness has not demonstrated that he has  
2 industry experience under which he could form a basis  
3 for an expert opinion about the ability to respond.

4 JUDGE NOBLE: Response?

5 MS. REED: This witness has testified that  
6 he has decades of experience in emergency response. And  
7 what I'm asking about is whether or not it's possible to  
8 evaluate the adequacy of plans that relate to safety and  
9 security, which is what he's been doing for his entire  
10 career.

11 JUDGE NOBLE: I'll overrule the objection.  
12 The witness may answer.

13 A. From my perspective, it would be difficult to  
14 make an evaluation if the documents do not exist or  
15 the -- I forgot how you actually posed the question, but  
16 the process evaluated and put on paper for plans to be  
17 reviewed.

18 MS. REED: I have no further questions.

19 JUDGE NOBLE: Cross-examination?

20 CROSS-EXAMINATION

21 BY MR. KISIELIUS:

22 **Q. Assistant Chief Lester, my name is Tadas**  
23 **Kisielius. I'm one of the attorneys for the applicant**  
24 **and I have just a couple of questions for you.**

25 A. Okay.

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1           Q.    You had some testimony about the need to respond  
2 to a potential terror incident -- terrorist incident at  
3 the facility or along the rail route.  And your written  
4 testimony, I think, addresses this as well.  Did you  
5 review the applicant's site security plan in evaluating  
6 that risk?

7           A.    I don't recall if I had that document or not.  I  
8 believe it was more just kind of talking with the SWAT  
9 command on, you know -- and just kind of my knowledge as  
10 being a former commander over the SWAT operation team  
11 that it could be a risk, is kind of what I looked at  
12 just from my perspective.

13          Q.    Did you look at the port's emergency response  
14 plan, safety plan and facility site -- facility security  
15 plan?

16          A.    I don't recall if I had that or not.

17          Q.    Okay.  Did you look at the Department of  
18 Homeland Security's energy sector specific plan in terms  
19 of evaluating that risk?

20          A.    I don't recall reviewing that.

21          Q.    Did you look at Homeland Security threat  
22 assessment evaluating threats to determine the nature of  
23 that risk?

24          A.    I don't recall reviewing that.

25          Q.    Okay.  Are you familiar with the Marine

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1 Transportation Security Act as it applies to an  
2 operation of a facility like this type?

3 MS. REED: I have to object to that  
4 question. It's asking whether the witness is familiar  
5 with marine -- federal marine security regulations, and  
6 the witness did not testify about marine events at all.

7 MR. KISIELIUS: Your Honor, the witness has  
8 testified to security issues at the site. I'm asking  
9 about his familiarity with regulations that govern the  
10 operation of facilities like this that directly address  
11 security risks.

12 JUDGE NOBLE: I'll sustain the objection.

13 BY MR. KISIELIUS:

14 **Q. Let's -- a couple of questions about the**  
15 **staffing levels to which you testified. First, to your**  
16 **knowledge, does the City have a level of service**  
17 **standard for police?**

18 A. Could you clarify I guess what you're asking?

19 **Q. Sure. You were talking I think about an ideal**  
20 **level of staffing based on a population unit. And I**  
21 **guess I'm wondering whether you know if the City has**  
22 **adopted a threshold in its comprehensive plan or**  
23 **development regulations that would sort of set that**  
24 **level that you try to maintain?**

25 A. Well, when I brought up the 1.8 per thousand, as

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1 I said, it can be controversial. A lot of cities are  
2 going away from that standard, per se, but I remember  
3 when I first came to Vancouver in the first annexation  
4 periods, I believe that was in about 1997, I think is  
5 where they had the biggest annexation, a part of that  
6 conversation that I recall from my perspective is trying  
7 to maintain that 1.8 per thousand at which level the  
8 City was currently very close to, it was my  
9 understanding, before the major annexation. So that's  
10 kind of the number that we've used throughout the years  
11 but also understanding that it is controversial at times  
12 and there are other methods to evaluate the need of  
13 staffing.

14 **Q. And I guess I was asking something more**  
15 **specific. To your knowledge, is that 1.8 adopted in**  
16 **City code or --**

17 A. Yeah, I don't have that knowledge, so I can't  
18 say yes or no. But I'm not sure on that, if the City  
19 has adopted that.

20 **Q. Okay. So your -- in your written testimony, I**  
21 **think you referred to it today, that the staffing that**  
22 **you would need to address evacuation, I think in your**  
23 **written testimony you had referred to the source of that**  
24 **information as the University of California Crowd**  
25 **Control matrix?**

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1 A. Yes.

2 Q. I think Mr. Johnson refers to it as the  
3 University of California post-event crowd movement data.

4 A. Yeah, I remember -- at least, whatever  
5 information he shared with me, that's what I recall that  
6 study -- he sent me those two studies that I have in my  
7 testimony. So I kind of acknowledge the difference in  
8 the last couple of verbiage on it.

9 Q. Okay. But you've reviewed that document?

10 A. Yes, I reviewed the information that he sent me  
11 and that's what I remember it being titled.

12 Q. Had you seen that information before this case?

13 A. No, I have not.

14 Q. Okay. And I understand your testimony was to  
15 the staffing needs to evacuate 7,000 or 13,000 people.  
16 Let's assume you have to evacuate 1500. Under that  
17 matrix, are you familiar with how many -- on how much  
18 staff you would need to address that type of a  
19 situation?

20 A. Not off the top of my head, but if I could get  
21 ahold of it, I would look at it and try to determine it  
22 from there.

23 Q. So I think if you look at your testimony on  
24 page 6, you suggest that it's for every 3,000 people  
25 needing evacuation, staffing should be two sergeants and

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1 eight officers. So does it stand to reason it's half of  
2 that?

3 A. So half of the 13,000?

4 **Q. No, half of 3,000.**

5 A. Half of 3,000.

6 **Q. If you have to evacuate 1500 people.**

7 A. Yes. I would agree with the numbers on there.

8 **Q. I guess, just to be clear, that that -- the**  
9 **numbers in there says for every 3,000, so I guess I'm**  
10 **asking you, if you just divide that by two, is that**  
11 **about what you need to get to get to the staffing needs**  
12 **for a 1500-person evacuation?**

13 A. That's probably what I would use for the  
14 process.

15 **Q. So is that one sergeant and four officers?**

16 A. Well, if I go off that standard, but I know that  
17 I would use more than that because I would have more  
18 than one sergeant and four officers. And if there was  
19 an event where 1500 people needed to be evacuated, I  
20 wouldn't only send four officers and a sergeant.

21 **Q. You would have more?**

22 A. I would send what I could get from -- that was  
23 working. Depending on the time of day or the week, I  
24 may even use detective resources as well.

25 **Q. But you have enough staffing to address that**

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1 kind of a need?

2 A. The numbers that you just gave me, yes, I would  
3 have one sergeant and four officers.

4 Q. Let me ask you, there's another standard that  
5 you referenced in your written testimony that you didn't  
6 talk about today, which was a traffic-related standard.  
7 I think it's on the next page if you want to refresh  
8 your recollection. But you referenced the testimony of  
9 Scott Johnson as providing that information. I think,  
10 again, this is a Washington State Patrol document.

11 A. Yes.

12 Q. So, again, I assume you've seen that document  
13 before?

14 A. I had not seen it till I received information  
15 from Mr. Johnson.

16 Q. Okay. I want to change subjects and talk about  
17 mutual aid. Ms. Reed asked you a couple of questions  
18 about mutual aid and I think -- well, let me just ask a  
19 basic question.

20 In your experience is it standard to rely on  
21 mutual aid when you have a low probability but a high  
22 consequence event?

23 A. I guess could you be more specific on the event  
24 that I would be looking at that?

25 Q. Well, let's talk about a derailment incident.

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1 Would something that -- along those lines, would it be  
2 standard practice to rely on mutual aid?

3 A. It would depend, I guess, what occurred after  
4 the derailment. Do we have a large explosion? Fire?  
5 Do we have a hazmat incident?

6 We may not, personally as Vancouver police,  
7 reach out for mutual aid, but certainly I'm sure the  
8 city of -- the fire department would be asking for other  
9 additional resources to address that event. So it would  
10 honestly depend and it could depend on the location. So  
11 if we needed a freeway shut down, something that the  
12 Washington State Patrol would have jurisdiction over,  
13 then, yeah, we would look at them for that assistance  
14 for that.

15 A waterway, if they needed something on the  
16 waterway shut down or blocked off, we would have to rely  
17 on -- Clark County Sheriff's Department has a couple of  
18 marine craft that I'm aware of, Multnomah County, City  
19 of Portland.

20 Q. In terms of the nature of the event, I sort of  
21 talked about a derailment. How about anything that  
22 would trigger implementation of the Clark Regional  
23 Comprehensive Emergency Management Plan? Would that  
24 type of an event typically rely on mutual aid among the  
25 various departments that respond?

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1 A. I guess depending on the type of event, yes.

2 Q. And in that type of an event, is it uncommon, do  
3 you think, that you would not be able to respond to all  
4 types of the usual requests for police aid? If you're  
5 responding to an emergency of that nature, is it  
6 problematic, in your mind, that you can't respond to all  
7 natures of calls and you have to prioritize?

8 A. That we could not respond?

9 Q. Correct.

10 A. More likely than not, probably, yes. We would  
11 have to prioritize the 9-1-1 calls coming in and  
12 determine how we would respond to those.

13 Q. And isn't that the fundamental planning  
14 assumption of the Clark Regional Emergency Management  
15 plan?

16 A. I believe it addresses -- I have not looked at  
17 that document recently, so if you have something in  
18 particular you want me to read out of it, fine, but I'm  
19 not a hundred percent familiar with it from cover to  
20 cover.

21 Q. Mutual aid, I think you had specified, it's  
22 helpful to hear sort of there's the police angle,  
23 there's the fire department angle, that different  
24 departments rely on different mutual aid agreements.

25 Are you aware in the event of an emergency,

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1 whether you have any federal or state government aid --  
2 mutual aid that would come into play?

3 A. I'm not sure how our agreements -- I know that  
4 we dealt with the jurisdictional law enforcement across  
5 the river and on our side. We have officers, detectives  
6 assigned to federal agency-type units. So I know that  
7 with my experience, our local FBI will provide some type  
8 of resource, depending on the event, or at least intel,  
9 or whatever it may be. I do not -- I'm not aware of any  
10 other mutual-aid relationships, at least that I am  
11 involved with on a -- any, you know, frequency with the  
12 federal agencies.

13 Q. And maybe -- maybe I used the wrong phrase.  
14 Maybe it's not technically mutual aid. But are you  
15 aware of any state resources or federal resources that  
16 would come into play in the event of an emergency of the  
17 type that's envisioned in the comprehensive emergency  
18 management plan?

19 A. Yeah, I think under UASI in region 4, there's  
20 resources available through that channel.

21 Q. Are you -- well, are the issues you discuss, the  
22 types of police response that would be needed, for  
23 example, for an evacuation, or the other types of risks  
24 of an incident involving a train, is that unique in your  
25 opinion to the trains that are traveling to this

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1 facility?

2 A. Are you asking if I've -- if we've been involved  
3 in a drill within --

4 Q. No. No, no. I just wonder whether the things  
5 to which you're testifying, the staffing needs, is that  
6 an issue now with the train traffic going through the  
7 city of Vancouver?

8 A. If you're asking whether I'm addressing any  
9 needs along the railroad line with my staff for any  
10 events, no.

11 Q. Are you familiar with the testimony of existing  
12 crude oil unit train traffic going through the city of  
13 Vancouver right now?

14 A. I'm not a hundred percent familiar with all the  
15 testimony. I mean, I've seen some media, you know, on  
16 the news, read a few articles here and there, different  
17 opinions about that.

18 Q. Are you familiar -- are you, personally,  
19 familiar with the fact that there are currently crude  
20 oil unit trains going through the city right now?

21 A. Yes, I am.

22 Q. And in your opinion, would the staffing needs  
23 that you addressed be the same staffing needs if one of  
24 those trains derailed?

25 A. And, again, I guess it would depend on the type

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1 of derailment. If it's just off the tracks, I doubt we  
2 would have any resources down there.

3 **Q. Assuming the same scenarios that you assumed in**  
4 **your written testimony as applying to the trains**  
5 **traveling to the facility, assume that same derailment**  
6 **occurs to another train, another crude oil unit train,**  
7 **is it the same staffing need or is there some unique**  
8 **issue about the trains traveling to this facility?**

9 A. I guess I'm -- I'm not tracking on the unique  
10 issue that we would have. I think it would be exactly  
11 what I've talked to about earlier, the need of either  
12 road closures, evacuation what those numbers would be in  
13 my estimation, if that's answering your question. I  
14 know we don't have any special equipment or anything  
15 like that that we could bring to that event.

16 MR. KISIELIUS: I have no further questions.

17 JUDGE NOBLE: Ms. Reed, it is now 12:14, and  
18 I don't know whether you have a lot of  
19 cross-examination -- excuse me, redirect, but I know the  
20 council may have some questions and I hate to have  
21 assistant chief have to stay over the noon hour, but we  
22 need to break for the noontime break pretty soon.

23 MS. REED: I have -- Your Honor, I have two,  
24 maybe three questions. But we can certainly break now  
25 and come back, if you think that the council is going to

1 have quite a few.

2 JUDGE NOBLE: Let me just poll the council  
3 about how many council members would have questions.

4 Let's break now and then come back. We are  
5 in recess until 1:15.

6 (Recess taken from 12:15 p.m. to 1:22 p.m.)

7 JUDGE NOBLE: Ready to go back on the  
8 record?

9 MS. REED: Thank you, Your Honor.

10 JUDGE NOBLE: You may proceed, redirect.

11 REDIRECT EXAMINATION

12 BY MS. REED:

13 Q. Chief Lester, on cross-examination, you were  
14 asked some questions about determining optimal staffing  
15 levels. Do you recall that?

16 A. I recall some of those questions, yes.

17 Q. And would you agree that there is no single  
18 consensus or best method for determining optimal  
19 staffing levels based on a formula?

20 A. From my perspective, you're probably correct on  
21 that, yes.

22 Q. And when you determined -- when you determined  
23 optimal staffing levels for the Vancouver Police  
24 Department, were you relying not only on a formula but  
25 also on your decades of experience with staffing at the

1 **Vancouver Police Department?**

2 A. Yes. It's not only just the formula that I  
3 presented in the earlier testimony. It's just looking  
4 at our daily staffing, weekly issues, 50 percent of our  
5 \$2 million overtime budget was on back overstaffing. So  
6 in my perspective, it's a problem and we're  
7 understaffed.

8 **Q. And that's something that you deal with every**  
9 **day on your job, isn't it?**

10 A. Yes.

11 **Q. Now, let's discuss mutual aid briefly. Is some**  
12 **mutual aid voluntary versus mandatory? In other words,**  
13 **if you ask some -- if you asked a certain agency to**  
14 **provide mutual aid, do they have to provide it or could**  
15 **they decline?**

16 A. I suppose they could decline. I've never  
17 experienced that. We all try to help each other out  
18 when we can. So maybe it's only one or two bodies,  
19 but -- or officers they can provide, but it's usually  
20 never declined that I have experienced.

21 **Q. What if there were a situation where, for**  
22 **example, the bridges across the Columbia River were**  
23 **closed due to an incident; do you think that that would**  
24 **interfere with your ability to obtain mutual aid from**  
25 **Oregon entities?**

1           A.     Yes, that would affect that.  Also I know that  
2     on a rare occasion when we needed crowd control  
3     management assistance from Portland, if they have events  
4     on that side of the river, then we're probably not going  
5     to get that assistance and we're looking at other  
6     resources for that.

7           **Q.     So would you agree that although mutual aid is**  
8     **something that you do rely on, you cannot be completely**  
9     **confident that it will be available when you need it?**

10          A.     That's correct.  We request it.  For the most  
11     part, we will get mutual aid, but at what level and how  
12     many -- or what staffing level that any agency could  
13     send would be dependent on the situation and what they  
14     have going on in their area of responsibility as well.

15                   MS. REED:  Okay.  Thank you.  That's all.

16                   JUDGE NOBLE:  Council questions for  
17     Assistant Chief Lester.  Mr. Shafer, is that you?

18                   MR. SHAFER:  Chief Lester, thank you very  
19     much for your testimony this morning.

20                   One question.  I'm trying to understand the  
21     context of this project or proposed project maybe in  
22     relation to other sites or facilities or projects within  
23     the greater Vancouver area.  Are there other sites or  
24     facilities that you think are comparable from the  
25     standpoint of readiness and emergency response, BPA Ross

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1 facility or facilities that Clark Columbia Utilities may  
2 have or Northwest Natural Gas, anything else out there  
3 that calls on the fire department to already have a  
4 level of readiness and response that may be comparable  
5 to the Vancouver Energy terminal?

6 THE WITNESS: It's hard to say. From the  
7 police perspective, there's always a security risk or  
8 maybe a situation, whether it be SEH or something  
9 similar, if there was an incident, that we may respond  
10 and assist. So it's hard for me to really compare, but  
11 I think --

12 MR. SHAFER: I'm just trying to understand.  
13 Is this of such a magnitude or say the material type  
14 that warrants, you know, a much more heightened degree  
15 of preparedness or response from the Vancouver Police  
16 Department?

17 THE WITNESS: Yeah, if I'm understanding you  
18 correctly, I would say that if it was an emergency-type  
19 situation, a spill, you know, an explosion or something  
20 like that, that's really going to be more of a fire and  
21 other agency's responsibility. We will provide staffing  
22 and still be part of that incident command. So I don't  
23 know that that would draw any more resources than in  
24 another area of the city that would have something  
25 similar to that of BPA or some of the other examples you

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1 gave.

2 MR. SHAFER: Okay. Thank you.

3 JUDGE NOBLE: Mr. Snodgrass?

4 MR. SNODGRASS: Good afternoon, Chief. Just  
5 a couple of questions on evacuations. I'm particularly  
6 interested in how an evacuation would be handled for a  
7 derailment and a fire, of how populations south of the  
8 tracks by the river would be evacuated. Well, just  
9 backup in general. When there's an evacuation, it looks  
10 like there's a protocol of calling on CRESA and  
11 authorizing it. Generally speaking, how soon after you  
12 or your department here has got an event would you  
13 expect that call to go out from CRESA?

14 THE WITNESS: Well, if there was an incident  
15 that occurred, a unified incident command would be set  
16 up. We would have officers in that command, probably a  
17 commander lieutenant from our department. If a reverse  
18 9-1-1 call would need to be made from CRESA, that would  
19 be depending on what agency's running unified command.  
20 I would probably say it's going to be more on the fire  
21 side of the incident of what you described. So it just  
22 kind of depends on who's in charge what the magnitude of  
23 the incident would be, but CRESA would do that at our  
24 request to start notifying the residents in that --  
25 whatever area's been identified as needing evacuation or

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1 at least to, you know, lock and shelter, whatever the  
2 directions may be.

3 MR. SNODGRASS: If there is an -- well,  
4 under any other circumstances, I assume in addition to  
5 the call going out from CRESA, the reverse 9-1-1, do you  
6 knock on doors or is there some on-site response as part  
7 of the evacuation?

8 THE WITNESS: We could. I mean, it could be  
9 going through a neighborhood on a PA system from a --  
10 one of our patrol cars. It could be getting out and  
11 having officers canvassing neighborhoods and knocking on  
12 doors, identifying management at apartment complexes and  
13 retirement centers and situations like that, and then  
14 trying to identify where are we going to funnel those  
15 folks out to gain transportation to get out of the area.

16 MR. SNODGRASS: If access is kept basically  
17 from the train -- the derailed train is blocking access  
18 out of the area, what would you do?

19 THE WITNESS: We'd have to look at our  
20 options. You know, if there's a waterway that we could  
21 get boats in, I'm sure we would get resources such as  
22 that. It just would really depend. If it's blocking --  
23 if there's no way in or out, I would be scratching my  
24 head, I guess, a little bit with that too. I don't know  
25 what the Air National Guard would have for choppers to

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1 come in and maybe evacuate folks out that way. It would  
2 just depend.

3 MR. SNODGRASS: Thank you.

4 JUDGE NOBLE: Mr. Stone?

5 MR. STONE: Good afternoon, Chief Lester.  
6 Earlier testimony, there was some mention of the  
7 possibility of a terrorist act at the terminal if it was  
8 built. I'm wondering if there was anything in  
9 particular about an act of terrorism that would  
10 automatically trigger a response from federal law  
11 enforcement agencies that Vancouver police could count  
12 on if that would happen?

13 THE WITNESS: I think probably any  
14 information through intel or other means that would  
15 raise that level or concern, I believe we could reach  
16 out to federal partners. I don't know what their  
17 protocols would be or what resources at the time. But  
18 we get terrorist alerts now through the FBI to be aware  
19 of, even though it's not generated solely in our area,  
20 but just for our folks to be aware of. So I think  
21 that's kind of the format it would fall under.

22 MR. STONE: Thank you.

23 JUDGE NOBLE: To my left, any questions?  
24 Assistant Chief -- are there any questions based upon  
25 those questions?

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1 MR. KISIELIUS: No, Your Honor.

2 MS. REED: No, Your Honor.

3 JUDGE NOBLE: Assistant Chief Lester, thank  
4 you for your testimony. You're excused as a witness.

5 THE WITNESS: All right. Thank you.

6 MS. BRIMMER: Your Honor, our next witness  
7 is in the building and we went to go find her. She just  
8 got here because we're moving quickly. It might be two  
9 or three minutes.

10 JUDGE NOBLE: We'll be off the record for  
11 the moment.

12 (Recess taken from 1:31 p.m. to 1:36 p.m.)

13 JUDGE NOBLE: All right. We're waiting for  
14 a witness and so we're working on some exhibits upon  
15 which there's been agreement between the parties. And  
16 it's my understanding that Exhibit 5551 is agreed.

17 MR. JOHNSON: Yes, Your Honor.

18 MS. BOYLES: And let me just insert there  
19 since we're there, 5550 is withdrawn.

20 JUDGE NOBLE: Let's try to do these one at a  
21 time so that we don't forget any. 5550 is withdrawn.  
22 5551 is admitted.

23 MS. BOYLES: 5554 is withdrawn.

24 JUDGE NOBLE: 5554 withdrawn.

25 MS. BOYLES: 5555 admitted.

1 MR. JOHNSON: Yes. No objection.

2 JUDGE NOBLE: It's admitted.

3 MS. BOYLES: 5557, objection has been  
4 withdrawn.

5 MR. JOHNSON: That's right.

6 JUDGE NOBLE: The objection's been  
7 withdrawn?

8 MR. JOHNSON: No objection.

9 JUDGE NOBLE: All right. 5557 is admitted.

10 MR. JOHNSON: There's a City of Vancouver  
11 Exhibit 3072, pages 76 to 123, and we're not objecting  
12 to that.

13 MS. REED: And, Your Honor, I believe that  
14 exhibit was previously withdrawn, but we went back and  
15 talked to them and agreed that an excerpt of it we could  
16 reach agreement on. So do you want me to have that  
17 renumbered Bates numbered or --

18 JUDGE NOBLE: No, it can have the same  
19 number, but you'll just replace it with the excerpt.

20 MS. REED: All right.

21 JUDGE NOBLE: Is that possible?

22 MS. REED: Yes. All right. Thank you, Your  
23 Honor.

24 JUDGE NOBLE: I won't admit it this time.  
25 I'll wait until you've been able to do that.

1 MS. REED: Okay.

2 JUDGE NOBLE: All right. Anything else?

3 MR. JOHNSON: I think that's it for right  
4 now, Your Honor.

5 JUDGE NOBLE: All right.

6 MR. JOHNSON: In terms of exhibits.

7 JUDGE NOBLE: All right. And what's the  
8 status on the witness?

9 MS. BRIMMER: I've got two people looking  
10 for her, and I'm texting her furiously.

11 JUDGE NOBLE: Is there anything else that we  
12 can do of the housekeeping matters?

13 MR. JOHNSON: We were able to resolve  
14 several issues over the lunch hour. So I'm not sure  
15 there's a lot more we can do right now, Your Honor.

16 MS. BOYLES: For two of our witnesses, who  
17 we are not having live testimony, that was Fred Millar  
18 and Dr. Frank James, you had requested some additional  
19 information about their credentials and foundation for  
20 some other testimony. We have prepared that in a  
21 written format and shared it with Mr. Johnson, and so I  
22 think we're in agreement and we will file that as soon  
23 as it's -- for -- to be the supplement to their direct  
24 testimony since they're not appearing live.

25 JUDGE NOBLE: So it's in the form of

1 testimony?

2 MS. BOYLES: It's in the form of -- it looks  
3 like the prefiled written direct testimony, yes.

4 JUDGE NOBLE: It's in declaration form?

5 MS. BOYLES: Yes, basically.

6 JUDGE NOBLE: We'll just add the supplement  
7 for Millar and James to the testimony.

8 MS. BOYLES: Yes. And I'll get my offices  
9 to file that tomorrow.

10 JUDGE NOBLE: Mr. Johnson, you were going to  
11 say something.

12 MR. JOHNSON: I was just going to respond  
13 that we had an opportunity to review it and aren't going  
14 to interpose any further objection to that additional  
15 testimony. However, you know, we maintain our position  
16 with regard to qualifications or lack thereof and would  
17 expect that council would weigh the evidence  
18 appropriately.

19 I have one more exhibit. This is the CV of  
20 Mr. Casey, and that was circulated among the parties  
21 this weekend. That's Exhibit 0371. We'd move for  
22 admission of that exhibit.

23 JUDGE NOBLE: Is there an objection to the  
24 admission of 0371?

25 MS. BOYLES: No, Your Honor.

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1 MS. REED: No.

2 JUDGE NOBLE: It's admitted.

3 I think the witness may have arrived.

4 MS. BOYLES: I think so. Thank you, Your  
5 Honor.

6 JUDGE NOBLE: Ms. Brimmer, will you call  
7 your next witness.

8 MS. BRIMMER: Yes, Your Honor. The  
9 opponents call Dr. Elinor Fanning.

10 JUDGE NOBLE: Ms. Fanning, would you raise  
11 your right hand.

12 (Witness sworn.)

13 JUDGE NOBLE: Thank you. Please be seated.  
14 You may proceed, Ms. Brimmer.

15 MS. BRIMMER: Thank you, Your Honor.

16 ELINOR FANNING,

17 having been first duly sworn,

18 testified as follows:

19 DIRECT EXAMINATION

20 BY MS. BRIMMER:

21 Q. Dr. Fanning, good afternoon.

22 A. Good afternoon.

23 Q. I would like you to begin by please stating your  
24 full name and spelling it for the court reporter. And  
25 what I would also like to note is that this is being

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1 recorded, so we want to make sure that you speak slowly  
2 enough that the court reporter can capture everything.

3 A. My name is Elinor Fanning, that's E-l-i-n-o-r,  
4 last name is F-a-n-n-i-n-g.

5 **Q. Ms. Fanning, what is your address and**  
6 **occupation, please?**

7 A. I'm a resident of Bainbridge Island, Washington,  
8 and I am a toxicologist.

9 **Q. And what's your educational background?**

10 A. I have a bachelor's degree in biology from  
11 Overland College and a master's degree in cellular and  
12 molecular biology from the University of California at  
13 Berkeley. I was awarded my doctoral degree from  
14 Berkeley as well in the School of Public Health  
15 Department of Environmental Health Science.

16 **Q. And if you could just give us a brief**  
17 **overview -- the council does have your CV, but if you**  
18 **could give a brief overview of your work experience,**  
19 **particularly related to the -- your role as a**  
20 **toxicologist.**

21 A. Sure. In the course of my work at Berkeley, I  
22 prepared a thesis on the health risk assessment of  
23 benzene, and after that time -- I sort of divided my  
24 time between work with the Office of Environmental  
25 Health Hazard Assessment, which is a branch of the

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1 California EPA, and the other part of my work was at  
2 UCLA in the School of Public Health there.

3 During the course of that work, I was a  
4 toxicologist in a group that was charged with assessing  
5 for the State of California the public health impacts of  
6 a change in the formula of gasoline. So we looked very  
7 broadly at overall impacts of changing the hydrocarbon  
8 balance of gasoline.

9 At UCLA, there I was associated with the  
10 Southern California Particle Research Center, which was  
11 a large interdisciplinary multicampus research effort on  
12 particulate matter air pollution funded by the US EPA.

13 **Q. Thank you. Dr. Fanning, you prepared prefilled**  
14 **written testimony in this matter, correct?**

15 A. Yes.

16 **Q. And you have reviewed that testimony prior to**  
17 **testifying here today?**

18 A. Yes.

19 **Q. And you adopt that testimony under oath here**  
20 **today?**

21 A. Yes. There were a couple of tiny little errors.  
22 Am I able to mention those? I'm not sure they're --

23 **Q. Absolutely. We want that to be correct. So why**  
24 **don't you go ahead and tell the council where those**  
25 **errors should be corrected. And in that note, what is**

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1 your testimony along with any exhibits, and if I recall  
2 correctly, you were thinking of paragraph 31 and  
3 paragraph 28?

4 A. Oh, good. Thank you.

5 **Q. Sure.**

6 A. So in paragraph 31, I don't know how that got  
7 past me, but on line 19, the port lies to the west of  
8 the community, not to the east. I think we're mostly  
9 aware of that.

10 **Q. Paragraph 28.**

11 A. And paragraph 28, I'm wondering if it's that  
12 one. There's a couple places where -- yeah, let's see.  
13 Yes, the N-O-x, NOx, in line 16 and 18, should be the  
14 specific oxide of nitrogen, nitrogen dioxide, NO2, just  
15 to be consistent with the publication that I'm citing.  
16 Thanks.

17 **Q. And your prefiled testimony also included**  
18 **reference to exhibits numbered 5530 to 5538. Do you**  
19 **incorporate those exhibits and references to them today?**

20 A. Yes, I do.

21 **Q. So I think it would be helpful, Dr. Fanning, if,**  
22 **as we get started, we define some terms, because there**  
23 **are a lot of terms that have been used in your testimony**  
24 **and others with respect to air pollutants, so I would**  
25 **like you to begin by describing what criteria pollutants**

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1 are, when you reference criteria pollutants.

2 A. Okay. This is a short version. The six  
3 criteria air pollutants are defined in the Federal Clean  
4 Air Act, and those are six pollutants that were  
5 identified at the time because they are -- they are or  
6 were nearly ubiquitous in nature and cause a variety of  
7 harms including human health harms. So those are ozone,  
8 nitrogen dioxide, sulfur dioxide, particulate matter in  
9 two sides fractions. Where am I?

10 **Q. I think lead --**

11 A. Lead for sure. Oh, carbon monoxide, of course,  
12 would be number six. Thank you.

13 **Q. And then the other term that gets used,**  
14 **hazardous air pollutants, sometimes known by the acronym**  
15 **HAP, H-A-P. What are those?**

16 A. So the HAPs are also -- this is also a federal  
17 definition. Hazardous air pollutant is also a Federal  
18 Clean Air Act definition, a list of nearly 200 chemicals  
19 that are hazardous to human health and may be emitted as  
20 air pollution. They differ in their -- the criteria in  
21 hazardous air pollutants are both harmful to health but  
22 are regulated differently.

23 **Q. Would it be correct to say that one of the**  
24 **characteristics of a hazardous air pollutant is that it**  
25 **is harmful in very small amounts?**

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1       A.     Many of them are.

2       **Q.     And then finally, I believe there is a reference**  
3 **in state law to TAPs, toxic air pollutants. Can you**  
4 **just describe what those are and how that relates to the**  
5 **federal definitions?**

6       A.     And that's defined in -- as you say, in state  
7 law. So the Washington Clean Air Act defines this set  
8 of toxic air pollutants that is similar and overlapping  
9 with the federal list but certainly not identical.  
10 They're more chemicals on it and there are some other  
11 differences.

12       **Q.     So I would like you to walk through briefly a**  
13 **summary of your written testimony. The council has your**  
14 **written testimony, but I think it would be helpful as we**  
15 **move forward today for them to have a summary. So**  
16 **first, what is your overall conclusion and opinion**  
17 **reached in your written testimony?**

18       A.     Overall, after reading the documents that were  
19 available to me to review, I conclude that the  
20 construction and operation of the Vancouver Energy  
21 terminal with the transportation of crude oil to and  
22 from that terminal that would be necessary for operation  
23 will emit air pollutants to the Washington State ambient  
24 air that are harmful for human health.

25       **Q.     And that would occur at levels that are harmful**

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1 as defined in the scientific literature?

2 A. Yes. In the scientific literature, it's clear  
3 that -- and we will get to this, that at very low  
4 exposure levels, we do still have health harms  
5 documented to occur from the pollutants that will be  
6 emitted from the facility.

7 **Q. And I believe in your written testimony you've**  
8 **identified diesel exhaust in particular. Could you**  
9 **elaborate just a bit on your concerns there?**

10 A. Yes. So we talked about criteria pollutants,  
11 hazardous air pollutants in federal law. Diesel  
12 exhaust, and diesel exhaust particulate especially, are  
13 a highly toxic air pollutant that has been the subject  
14 of lots and lots of scientific literature as well as  
15 regulatory activity. Diesel exhaust particulate is a  
16 toxic air pollutant under Washington law, and one of  
17 the -- while we don't have any federal -- well, we have  
18 very limited federal guidance yet about a health  
19 benchmark level for diesel particulate, Washington has  
20 largely adopted the California standard for diesel -- or  
21 the California unit risk factor for cancer risk for  
22 diesel exhaust particulate.

23 The reason that diesel has ended up as the top  
24 priority health pollutant for our Washington Department  
25 of Ecology and is identified also by the Washington

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1 Department of Health as a top public health concern is  
2 that these particles are especially small. They are  
3 emitted in nanometer size, very, very tiny. They can be  
4 inhaled very deep into the lungs, and they tend to be --  
5 to possess highly toxic properties. So it's very  
6 important to know, as we talk, that not all particulate  
7 matter is the same.

8 **Q. Thank you. Now, let's move to just generally**  
9 **identifying the sources and types of hazardous air**  
10 **pollutants from the facility. You've talked some about**  
11 **diesel particulate that I think you wanted to call out,**  
12 **but let's just talk about I think a couple of different**  
13 **sources and the types of pollutants that are the subject**  
14 **of your concern.**

15 A. Okay. I think first we -- I talked in my  
16 prefiled about evaporative emissions from crude oil, so  
17 the oil commodity itself is a complex mixture of  
18 hydrocarbons, many of which are going to be volatile at  
19 ambient outdoor temperature and pressure. So when that  
20 oil is exposed to outdoor air, some of these components  
21 will evaporate. And that will happen in the course of  
22 transport, in the course of handling, in the course of  
23 pumping from ship to shore. I think we've heard about  
24 efforts to control those emissions that the facility has  
25 taken into account in their design.

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1           However, I think all the testimony and  
2 documentation that I've seen does agree that there will  
3 be some level of evaporative emissions.

4           Now, these are important for two different  
5 reasons. We talk about VOCs. You've heard the term  
6 volatile organic components probably earlier in the  
7 proceedings, and that is a regulatory term that refers  
8 to a group of organic compounds that can participate in  
9 atmospheric chemistry. What does that mean? That means  
10 they react after they're emitted and can produce other  
11 compounds. The one of top concern is ozone. So we look  
12 at evaporation, we look at VOCs, largely because it's  
13 driven by ozone formation concerns.

14           But I will say that some of those VOCs possess  
15 intrinsic toxicity of their own. So they are also --  
16 they also show up on that hazardous air pollutant list.  
17 Examples that are key that I think are in my prefiled  
18 would include benzene, which is toxic to bone marrow and  
19 produces anemias and leukemias in people, and hexane,  
20 which is a neurotoxin and produces peripheral  
21 neuropathies.

22           **Q.    So that -- thank you. That's evaporative**  
23 **emissions.**

24           A.    Yeah.

25           **Q.    And I think you also reference combustion as a**

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1 source?

2 A. Yeah. So in the course not only of transporting  
3 oil to and from the terminal, but also some of the  
4 on-site -- the boiler and the -- boilers and the vapor  
5 combustors, there will be emissions from combustion  
6 processes.

7 Now, combustion, in general we're going to be  
8 concerned about all those criteria pollutants excepting  
9 lead for this case, but carbon monoxide, ozone formation  
10 particulate matter, sulfur dioxide and nitrogen dioxide  
11 are all present in combustion emissions, as well as a  
12 number of toxic air pollutants as well. For those I  
13 might say when we're -- now if we're looking at  
14 combustion, you might talk about some of the aldehydes,  
15 formaldehyde, acid aldehyde and a compound called  
16 acrolein. These are combustion breakdown products that  
17 are highly irritating to the respiratory system.

18 **Q. And would you include in this internal**  
19 **combustion, which I think is the diesel exhaust that you**  
20 **referenced earlier?**

21 A. Yeah, sure. So, you know, obviously of high  
22 concern with combustion emissions is going to be diesel  
23 exhaust in its particulate in the -- for the reasons  
24 that we talked about earlier.

25 **Q. And, Dr. Fanning, I just want to be clear, do**

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1 you consider all of the pollutants that you've discussed  
2 here by way of example as toxic or hazardous to human  
3 health?

4 A. Well, yes. That's primarily how they land in  
5 these regulatory categories, yes. Perhaps with the  
6 exception of some of the VOCs, which are not directly  
7 toxic in and of themselves.

8 **Q. I would like to turn to the more general**  
9 **discussion, I think you broke health effects or**  
10 **potential health impacts from these things at the**  
11 **terminal into I think three categories. Does that sound**  
12 **correct?**

13 A. Yeah, that -- yeah.

14 **Q. And I would like you to elaborate on how you**  
15 **focused on health effects in your testimony and what**  
16 **those three end points are.**

17 A. All right. So I think -- let's start with the  
18 respiratory -- with sort of the overall category of  
19 respiratory health effects. A number of the criteria  
20 pollutants, as well as those aldehydes and so on that I  
21 mentioned earlier, are -- have respiratory irritation  
22 properties and other toxicities to the respiratory  
23 system. This is, of course, the first tissues that  
24 those chemicals contact when they are inhaled into the  
25 body. So our respiratory system is a very important

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1 target tissue for these air pollutants resulting in  
2 asthma attacks, bronchitis, cough, wheeze and these  
3 kinds of -- these kind of outcomes. There's fairly  
4 clear literature -- fairly deep literature documenting  
5 increases in air pollution being associated with  
6 increases in hospital admissions for these kinds of  
7 respiratory causes, like an asthma attack and so on.

8 Let's see. I feel there's more that I wanted to  
9 say about respiratory, but it's not on the top of my  
10 head right now.

11 **Q. That's okay. Let me see if we can walk through**  
12 **that. I want to actually back you up just a tish on**  
13 **diesel exhaust. I think you were -- you were talking**  
14 **about that in respiratory effects and how the small**  
15 **particles get deep into the lungs. Can you address the**  
16 **issue with respect to the way we regulate them, by mass**  
17 **versus what we're discovering about the harmful effects**  
18 **and whether or not they are covered and why ecology is**  
19 **paying attention.**

20 A. Right. So the issue here is that the way that  
21 particulate matter is regulated is by a weight --  
22 essentially by weight, by mass, so a weight in a  
23 particular volume of air, micrograms per meter cubed of  
24 air. What that kind of assumes is that any equal weight  
25 of particles behaves equally. And as scientists we know

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1 that's simply not the case. Particulate matter is very  
2 complicated, can have very different composition  
3 depending where it came from, where you measured it. So  
4 not only does it vary in size, but very much in chemical  
5 composition in toxicity.

6 So diesel particles, being small and possessing  
7 an especially toxic chemical breakdown, a certain given  
8 mass of those may be quite a bit more consequential  
9 than, say, dust that's blown off the fields or other  
10 types of particulate matter that might have a less  
11 complex chemical composition.

12 **Q. Thank you.**

13 A. Oh, I know, respiratory health effects. There  
14 was something I -- may I?

15 **Q. Go ahead, please.**

16 A. I was just going to address that this end point  
17 is particularly important for children's health. And I  
18 wanted to get that out. Because kids have a higher  
19 breathing rate per body size than adults, so they're  
20 taking in more air pollutants. They're also more likely  
21 to have -- to have their asthma triggered in a situation  
22 where you have asthma triggering levels of air  
23 pollution. So really elderly, people with COPD and kids  
24 are particularly susceptible to the respiratory effects  
25 of air pollution.

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1           **Q.    And that's -- and those are studies looking at**  
2 **children's exposures?**

3           A.    Yeah.  There's a great group out of USC who have  
4 conducted a year's long study called the Children's  
5 Health Study in Southern California, and what they've  
6 done is looked at basic background air pollution in  
7 different neighborhoods.  This is not any particular  
8 super-high exposure.  These are just whatever kids have  
9 in their neighborhoods outdoors, and they've been able  
10 to show, by following groups of kids over the years,  
11 that at the kinds of outdoor levels that we are exposed  
12 to, even below the air quality standards, they have  
13 shown a very important effect which is a reduced lung  
14 development in kids.  In other words, if you grow up  
15 with a little more pollution, that development of your  
16 lung capacity is that much reduced.

17           **Q.    And is there a direct relationship, then, to**  
18 **adding pollution on top of that?**

19           A.    Well, yes.  Now, those studies we haven't looked  
20 as carefully at what toxicologists call the dose  
21 response curve, that is, mathematical relationship  
22 between increasing dose and increasing health problems.  
23 But for a number of the respiratory end points, it's  
24 very clear that that dose response relationship goes  
25 down to very low levels and does not observe what in

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1 toxicological language would be a threshold, that is, a  
2 dose below which you're fine, you see zero effect and  
3 above which effects start. What we see is a linear  
4 effect even at low doses.

5 **Q. Even at low doses. And does it also hold true**  
6 **that then the respiratory effects go up as the dose goes**  
7 **up?**

8 A. Yeah. Yeah.

9 **Q. I think another health end point that your**  
10 **testimony discusses is increased daily mortality. Could**  
11 **you please offer a summary in explanation of that?**

12 A. Yeah. And this one I know -- this can be a  
13 little difficult to describe, and it sounds a little  
14 overdramatic, daily mortality, but this is actually a  
15 very -- a very robust health end point especially for  
16 particulate matter. This is the subject of an  
17 incredibly rich body of literature that has now been  
18 adopted by multiple authoritative bodies. So let me try  
19 to describe.

20 This body of literature really started by trying  
21 to look at two different kinds of things over time.  
22 First, following levels of air pollutant rise and fall  
23 on a daily basis and then overlaying on that  
24 statistically how -- some health end point, and, in this  
25 case, mortality from cardiovascular causes. And it's

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1 been -- this has been studied and studied and studied,  
2 and it's very clear that at even at low increases in  
3 human exposure to particulate matter, we can see a  
4 statistically robust increase in mortality a couple of  
5 days later from cardiovascular causes.

6 Now, this may be a small increment, right. So  
7 we're talking about a -- okay. Short-term and long-term  
8 different -- daily, about a 3 percent increase for every  
9 10 micrograms per meter cubed. So the fact has also  
10 been -- now that's been extended to long-term exposure.  
11 In other words, the study designs are going to be a  
12 little different but essentially it's very clear that a  
13 10 microgram per meter cube increase in particulate  
14 matter is associated with approximately a 10 percent  
15 increase in daily mortality from cardiovascular  
16 causes -- in mortality from cardiovascular causes, yes.

17 **Q. And I think you reference in your testimony that**  
18 **these studies are acknowledged and used or adopted by**  
19 **the Washington State Department of Health in their**  
20 **2014 --**

21 A. Well, I won't say "used," but certainly  
22 Department of Ecology, Department of Health, if  
23 you're -- if you -- you know, have plenty of white  
24 papers and documentation on -- in their air pollution  
25 programs that have -- that acknowledge the mortality

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1 effect and probably describe in language similar to what  
2 I'm using today. I think in the exhibits I gave,  
3 there's a very -- a very solid paper that was  
4 commissioned by the American Heart Association. That  
5 was the Brook 2010 reference I gave you, which is  
6 this -- the American Heart Association convened a very  
7 illustrious group of scientists to look into this issue  
8 and prepare a position statement for the heart  
9 association.

10 Really the local expert on that would be Joel  
11 Kaufman at the University of Washington, who was on that  
12 panel and is just a very solid expert on this particular  
13 topic of particulate matter and mortality.

14 **Q. In turning to the third health effect, you**  
15 **identified cancer.**

16 A. Yeah. So the International Agency for Research  
17 on Cancer has identified now global statements that air  
18 pollution -- outdoor air pollution is a known lung  
19 carcinogen. We can -- there are lots of studies on  
20 particulate matter. Of course, diesel exhaust  
21 particulate is a lung carcinogen. So it's very clear  
22 that we have cancer-causing chemicals in these  
23 combustion emissions.

24 There are also carcinogens that are not  
25 necessarily related to combustion. I mentioned earlier

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1 benzene, for example, which can evaporate from fuels  
2 that can produce leukemia, which is a blood cancer. So  
3 really in this situation, we have more than one compound  
4 that can cause cancer. And it's very important to note  
5 that the scientific way of thinking about cancer -- this  
6 goes back to our dose response conversation, in general  
7 it is assumed that a cancer-causing chemical will  
8 increase the risk of cancer at some small amount  
9 regardless how small the dose. In other words,  
10 carcinogens are assumed to not have a threshold. There  
11 is no specific safe level. So we regulate them based  
12 on, well, what is a reasonable amount of extra risk that  
13 we as a society think is acceptable in a given  
14 situation. That's how -- that's how carcinogens are  
15 regulated.

16 **Q. And is there a special consideration here for**  
17 **children as well?**

18 A. Well, yeah. So, again, coming back to this  
19 notion that children have a different biology than  
20 adults, I mentioned earlier their breathing rate per  
21 body weight is higher, but think about what's going on  
22 in kids. They're growing. Their stem cells are  
23 dividing. Now, the origin of many, many cancers is  
24 those stem cells. So when the stem cells are busy in  
25 dividing, they're more vulnerable to genetic damage, to

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1 chemicals that can get in, cause genetic damage and go  
2 on later in life along with cellular changes to produce  
3 cancers.

4 So what happens is, if we say we have some  
5 exposure that we're going to have person A and person B  
6 have this exposure for 20 years, same 20 years, same  
7 concentration, but one person's going to start their  
8 exposure at age 5 and the other's going to be like me,  
9 somewhere in her 50s, and what we now know is that that  
10 person who has early life exposure to the carcinogens is  
11 going to have a higher risk. This is something  
12 regulation is still struggling with, but it's out there  
13 and very solid in the science. So, yeah, I do consider  
14 carcinogen exposure more serious in the case of exposing  
15 young folks.

16 **Q. And I think you referenced -- you used the**  
17 **phrase "outdoor air pollution." And when you use that**  
18 **phrase, you're talking about some of the very things**  
19 **that will come from terminal construction and**  
20 **operations, right?**

21 A. Absolutely. I mean, you have -- there are no --  
22 there are no walls for air pollution. It's going to --  
23 it's going to follow predominant air flow movements,  
24 depending on daily meteorology. So outdoor air  
25 pollution generally refers to a mixture that comes from

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1 a number of sources at the same time, all of which may  
2 have some additive impact on a particular community.

3 **Q. And when you were looking at this situation and**  
4 **preparing your testimony, were you looking at normal**  
5 **operations at the terminal; there wasn't a worst-case or**  
6 **a disaster scenario that you were looking at?**

7 A. Well, no. I figured that probably there would  
8 be enough time spent on the disaster kind of situation  
9 and fires and so on. Clearly, those scenarios are going  
10 to create massive amounts of air pollution in a very  
11 short -- over a very short time interval. So, yes, what  
12 we might call unplanned combustion of crude oil creates  
13 a severe air pollution impact for the people in the  
14 vicinity.

15 But I just wanted -- what I wanted to do here,  
16 given the sort of short time that I had to take a look,  
17 was just try to take a broad overview looking at across  
18 different areas of the state that could be impacted,  
19 across different kinds of scenarios and just say, look,  
20 what overall could be the public health impacts related  
21 to air pollution that we should be considering.

22 **Q. You also expressed concerns regarding available**  
23 **information and what is known. Do you recall that in**  
24 **your testimony?**

25 A. Yeah. Let's see.

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1           **Q. Can you just summarize your concerns with**  
2 **respect to the information that is available in the**  
3 **application?**

4           A. Okay. There are a few things. I'm not -- let  
5 me think how best to go through this. So first of all,  
6 I do think that the transportation-derived pollution is  
7 important. And so to me the information I had to look  
8 at, we haven't adequately looked at areas of the state  
9 that may be impacted by the transportation corridor for  
10 moving oil. So I don't know, for example, how much  
11 increased shipping traffic in Longview is going to  
12 affect Longview air -- there are a large number of  
13 questions out there that maybe are not pertinent, but  
14 let's take a look and let's find out where the problems  
15 sit. So one thing is sort of area.

16           I would say in terms of how we've looked at  
17 toxic air pollutants, what I saw is the basic -- you  
18 know, the facility evaluation for the air permit took a  
19 look at emissions rates and so on. But we haven't yet  
20 seen a more global analysis of toxic air pollutant  
21 issues when all the sources are factored in together.  
22 So that's one.

23           And, of course, diesel -- I would like to see a  
24 more careful assessment of diesel particulate. There  
25 were a couple of little things just in the analysis that

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1 was done that I had to look at that I might quibble  
2 with, not in a -- not in the sense of saying things were  
3 done incorrectly, but just in the sense of saying there  
4 are some areas of the emissions estimates and the  
5 modeling of concentration estimates that weren't clear  
6 to me and I think still needs some resolution and some  
7 clarification.

8 **Q. I think you pointed out some differences with**  
9 **respect to reported fine particulate after trains and**  
10 **ships were added in?**

11 A. Oh, right. This is going to be tricky because I  
12 want to remember a table number. I believe -- I believe  
13 it's Table 3.2-5, but I could be wrong. But this is a  
14 table in the air permit application where the  
15 consultants who prepared that have given us what they  
16 consider to be the project-related increases in each of  
17 the criteria pollutants and then they're going to  
18 compare -- they're going to add those to an estimated  
19 sort of modeled background level and compare that to the  
20 air quality standards.

21 So I think the number for 24-hour particulate  
22 matter in that particular table was about -- it's 6.5,  
23 6.59, something like that. Then when the same  
24 consultant produced a report that included now the  
25 mobile sources -- so that's just for the stationary

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1 sources. That is just for the facility, the boilers,  
2 the other equipment that can emit PM. Then when they  
3 produced the report that is Appendix F to DIS, the  
4 particulate --

5 MR. JOHNSON: Objection --

6 THE WITNESS: Sorry?

7 MR. JOHNSON: I'm sorry. I'm going to  
8 object because now we're wading into the comment -- the  
9 commentary and critique of the DEIS, and now that we're  
10 in the realm of talking about mobile source modeling,  
11 which is not a component of permitting, it's solely  
12 related to the DEIS and it's the subject of DEIS  
13 commentary, and so I object to this line of testimony.

14 MS. BRIMMER: Your Honor, first, this is an  
15 appendix to the DEIS. It is a fact document prepared by  
16 a consultant that this witness looked at and relied upon  
17 in formulating opinions about pollutants that she  
18 expected to see from the facility and what she was  
19 testifying to is it's different than another report and  
20 we were on the subject of what are the kinds of things  
21 that are important to know about air pollutants from  
22 this facility.

23 Second, I would point out that this is not a  
24 permitting proceeding. We do not have a permit in front  
25 of us right now. This is a proceeding where this

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1 council is tasked with viewing a broad array of impacts,  
2 not just those that may or may not be regulated by a  
3 Clean Air Act permit, but rather impacts to the  
4 environment and the public as a whole from this facility  
5 and the need to weigh that against the need for energy.  
6 And this witness is testifying to that as a whole.  
7 Mobile sources are, in fact, relevant and it is proper  
8 for her to rely on facts that are appendices to the DEIS  
9 as well as to the air permit application.

10 JUDGE NOBLE: All right. I'm going to  
11 sustain the objection insofar as this witness is  
12 critiquing the draft EIS, including the appendices to  
13 it. But the information that she has, she can testify  
14 about and give her own opinions. So what I'm going to  
15 ask you to do is to rephrase the question in those  
16 terms.

17 MS. BRIMMER: Thank you.

18 BY MS. BRIMMER:

19 **Q. Dr. Fanning, in light of that, I'm not asking**  
20 **you whether -- this is not a critique of the DEIS. Is**  
21 **this just information that you looked at in formulating**  
22 **your overall opinions?**

23 A. I think what I -- I won't give table references,  
24 since that's not appropriate in this setting, but what  
25 I'd like to say, in general, is that there are some

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1 inconsistencies in the various versions of the air  
2 permitting application or supporting reports that I was  
3 able to see. And I am confident that the consultants  
4 can work those inconsistencies out, but if we have --  
5 for example, in the most recent version of the air  
6 permit application, there are some changes in the  
7 numbers from the prior air permit application and I  
8 don't see those numbers clearly explained.

9 So what I'm trying to get at is, it would be  
10 useful, I presume it's EFSEC staff, to go ahead and sit  
11 with the consultants who have come up with these numbers  
12 and really go through carefully. I -- in my opinion,  
13 the documentation is not yet adequate and clear.

14 JUDGE NOBLE: Dr. Fanning, you were not here  
15 for the ruling that was made, and the ruling was that  
16 this is not a proceeding that was to critique the draft  
17 EIS. And so your testimony needs to be your own opinion  
18 and not a critique of what has been written in the draft  
19 EIS. Is that a distinction that's clear?

20 THE WITNESS: Yes, Your Honor. In the piece  
21 that I just said, I tried to limit my comments to the  
22 air permit applications. Those are -- is that valid?

23 JUDGE NOBLE: Yes, that was a part of the  
24 ruling.

25 THE WITNESS: Okay. Okay. Thank you for

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1 explaining.

2 JUDGE NOBLE: Were you done with your  
3 answer?

4 THE WITNESS: I think so.

5 JUDGE NOBLE: Okay.

6 MS. BRIMMER: Thank you.

7 BY MS. BRIMMER:

8 Q. If you, in the kind of work that you have done  
9 in the past, your toxicological work, were examining the  
10 air effects of this facility, what would you want to  
11 know that you haven't already discussed?

12 A. Yeah, I think we did go through some of this.  
13 So I would like to see a more complete health risk  
14 assessment for the most highly impacted community that  
15 takes into account all potential exposures and that  
16 would include all the toxic air contaminants from all  
17 sources that are associated with operating the facility.

18 And I would like to see, as I said, an  
19 assessment along the routes of transport in the state.  
20 I also think that this business of down -- further  
21 downwind, off-site movement of VOCs, given that I -- I  
22 understand there's some debate right now about the  
23 overall volume of VOCs, it could be that ozone is a  
24 concern and we haven't seen any ozone modeling yet. So  
25 that's something that I would like to at least see

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1 someone look into and determine if that's an issue.

2 **Q. Can I ask, would the -- so the transit things**  
3 **that you referenced, would that also include the**  
4 **outbound trains?**

5 A. Yes. So when there was an assessment of -- that  
6 included train corridors, I think that the northbound  
7 tracks were not included, and those tracks sit, I  
8 believe, if I'm remembering my maps right, within 300,  
9 500 meters of residential homes.

10 **Q. Have you seen any of this information in the**  
11 **permit application materials that you have reviewed?**

12 A. Well, the permit application materials address  
13 narrowly the issues that are required for that permit  
14 application. So I think there are some pieces there. I  
15 don't think that that permit application gives us an  
16 overall picture of what the health impacts on Washington  
17 State residents are of constructing and operating this  
18 kind of large-scale oil transfer terminal.

19 **Q. I would like to turn now to some rebuttal of**  
20 **some of the witnesses that we have heard previously.**  
21 **Since the filing of your written testimony, have you**  
22 **reviewed other information or testimony related to this**  
23 **case?**

24 A. Let's see. Well, I did take a quick look at  
25 the -- at the new air permit application that came out a

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1 month or so -- two months ago. So that's -- that's one  
2 piece, sort of a cursory look. I haven't had time to  
3 review it in detail.

4 I looked at -- I did read testimony from  
5 Mr. Eric Hansen, principal at Environ, I believe I have  
6 his name right, and I looked at testimony from  
7 Dr. Ranajit Sahu as well. So I think that's it.

8 **Q. And you said that you've taken a quick look at**  
9 **the new permit application, correct?**

10 A. Yeah.

11 **Q. And you noted -- I think you had mentioned you**  
12 **noted some changes to VOC emissions?**

13 A. Yeah, I think there are some changes, again,  
14 that VOC levels have changed. There was something about  
15 annual emission -- annual concentrations of particulate  
16 matter that seem to me to be different, yet the  
17 short-term concentration estimates had not changed. So  
18 I felt there were kind of new numbers that came out that  
19 I would want to sit and go through, but more  
20 appropriately perhaps the consultants involved would  
21 need to sit and go through carefully the back story for  
22 each of those numbers.

23 **Q. Well, from your review so far, noting that you**  
24 **would like your review to be more complete, does**  
25 **anything in the newest permit application change your**

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1 written testimony or your testimony here today?

2 A. I don't think so, no.

3 **Q. Do you consider your testimony consistent with**  
4 **Dr. Sahu's testimony?**

5 A. Well, Dr. Sahu's expertise is in a different  
6 area. We reviewed different aspects, but I -- I don't  
7 see anything inconsistent between our work, no.

8 **Q. And have you had a chance to review Mr. Hansen's**  
9 **testimony before the council?**

10 A. So I read his prefiled, and I did briefly -- I  
11 had some computer issues trying to watch the  
12 proceedings. So I was able to -- I was able to make out  
13 some of it, yes.

14 **Q. And was there anything in Mr. Hansen's testimony**  
15 **before the council that causes you to change your**  
16 **testimony?**

17 A. Now I'm in the uncomfortable position of trying  
18 to recall which notions from Mr. Hansen I read and which  
19 I might have heard. So let me do my best.

20 **Q. Well, let me -- let's -- instead of forcing you**  
21 **to rack your brain, let me ask you some specifics.**  
22 **Would you agree with Mr. Hansen that Tesoro has been**  
23 **extra -- or there's some additional conservatism to its**  
24 **approach to the air pollutants because of the way**  
25 **Washington regulates or considers the air toxins? And**

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1 that I think was in his written prefiled testimony.

2 A. Okay. I think what you're referring to -- so  
3 this comes back to this notion of how we regulate air  
4 pollutants and put them in different categories, and I  
5 believe what Mr. Hansen's point was is that nitrogen  
6 dioxide and sulfur dioxide are regulated as criteria air  
7 pollutants with all the regulations that go with that.

8 Now, in Washington, those two criteria  
9 pollutants are also listed as toxic air pollutants. So  
10 they come under regulation in that way too. But I don't  
11 consider the Washington law to be sort of double  
12 counting or extra conservative in that way. The way we  
13 look at criteria pollutants and the way we look at toxic  
14 pollutants, it really is fine and appropriate, I think.  
15 I don't see any extra protective notions there in the  
16 Washington law, no.

17 **Q. Mr. Hansen's testimony also addresses several**  
18 **areas. Starting with the atmospheric production of**  
19 **additional pollutants, do you agree with Mr. Hansen in**  
20 **all respects on that topic?**

21 A. Well, he makes -- he makes a fine point, which  
22 is that they carried out modeling to look for air  
23 concentrations in the vicinity of the terminal. Okay.  
24 And so for his purposes, events that are happening  
25 farther downwind from the terminal may not be relevant.

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1 And I think he said, you know, look, atmospheric  
2 chemistry might be relevant, you know, 50 kilometers  
3 away, but that's not what we're looking at.

4 And I guess because I came to this not with a  
5 specific charge -- like the consulting company had a  
6 specific charge to write an air permit; I was just  
7 looking generally at our issues -- for me, 50 kilometers  
8 downwind, what's that, Battle Ground or Washougal or  
9 Longview? It's still relevant. So if we have enough  
10 VOCs to cause an ozone problem and that ozone problem is  
11 far downwind, I'm still interested. I think -- and I'm  
12 not saying Mr. Hansen wouldn't be. It's just that's  
13 something that, you know, currently is not addressed.

14 **Q. Mr. Hansen also addresses modeling of diesel**  
15 **particulates and finding of some exceedances of I think**  
16 **it's the ASIL, and I want you to explain that acronym.**  
17 **Do you agree on that point with Mr. Hansen?**

18 A. So many acronyms. So ASIL stands for acceptable  
19 source impact level. This is a Washington State term  
20 that -- where for toxic air contaminants, a particular  
21 amount of a pollutant that would be associated with a  
22 project, there's sort of an acceptable level of impact  
23 and then a level above which further regulatory steps  
24 come into play.

25 Now, the diesel exhaust number is -- is a thorny

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1 point. So that ASIL is based on a cancer risk for  
2 diesel exhaust that was established in California back  
3 in the '90s. And as I said earlier, we don't have a  
4 cancer risk number from Federal EPA to give any guidance  
5 to the states, so most states have adopted in this case  
6 California's number.

7 Now, if I -- there was one little point in  
8 Hansen's written testimony that I think -- that I would  
9 actually directly dispute, and that was that he  
10 referred -- he actually said that that number may be  
11 based on bad science. I may have the language wrong. I  
12 think that's right. I think he said bad science. No,  
13 not based on sound science, I think is the way he put  
14 it. But -- and this isn't only because I worked for the  
15 agency that developed that number. I was not employed  
16 at the time that number was developed. I'll make that  
17 clear. But the office of Environmental Health Hazard  
18 Assessment in California put a fleet of toxicologists,  
19 epidemiologists, air pollution experts on developing  
20 enormous documentation for diesel particulate in order  
21 that the state of California could conduct a review of  
22 this air pollutant, this important air pollutant, and  
23 come up with a cancer risk number that could be used for  
24 regulatory purposes.

25 That review -- and I do remember the review and

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1 attended some of the public hearings; this peer review  
2 was conducted by a panel of experts in the state, mostly  
3 university professors from the California -- University  
4 of California system. And that panel conducted a  
5 lengthy, lengthy review, sent the agency back to the  
6 drafting board several times. There was -- it was a  
7 long, drawn-out process, lots of public testimony,  
8 opportunities for public input.

9 I guess what I'd say is they did the very best  
10 based on the 1990s science. And it may be that when US  
11 EPA gets around to doing their diesel risk assessment,  
12 it's going to come out different now that we have  
13 updated epidemiology. But right now, all we've got to  
14 go on is that California number, and that 1990s --  
15 mid-1990s review. So I guess -- I would say it was  
16 based on the soundest science available at the time.

17 **Q. And I think that Dr. Hansen also -- excuse me,**  
18 **Mr. Hansen noted something about finding high**  
19 **concentrations of diesel particulate near a lot of**  
20 **different transportation sources was an argument for not**  
21 **using the ASIL. Would you agree with that?**

22 A. You know, I'm not positive what his intent was  
23 in that statement. I think he makes a good -- he makes  
24 a -- what -- a point I would agree with in saying that  
25 ASILs are designed for a certain purpose; that is,

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1 they're designed to look at stationary sources in  
2 Washington and, you know, they're in a certain part of  
3 the code. And so his point was, when we take that  
4 regulatory number and then try to apply it to a mixed  
5 exposure situation where we have trains coming in, we've  
6 got boilers, it starts to be -- it starts to step  
7 outside of the regulatory purpose of the number. So I  
8 think he makes a very valid point there.

9 On the other hand, if the ASIL is the only tool  
10 we've got, maybe we need to do at least a screening  
11 assessment with it, and I might -- I might be fine with  
12 that. And if it shows that near transportation sources,  
13 emissions are over accepted source levels, perhaps  
14 they're too high.

15 **Q. The source levels are too high?**

16 A. Perhaps.

17 **Q. So what is the health effect that is shown that**  
18 **you and Mr. Hansen are referencing here with respect to**  
19 **the ASIL? What was shown by that?**

20 A. Oh, there's no specific health effect. These  
21 are all based on diesel exhaust particulate ability to  
22 cause lung cancer. So that's where that standard number  
23 comes from. And the way that we use -- that it's used  
24 has to do with comparing -- with screening emission  
25 levels.

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1 Q. I think --

2 A. So, you know...

3 Q. I think what's often referred to as, is there a  
4 one in 10,000 chance or a one in a million chance. Is  
5 that one of the ways this gets used?

6 A. Okay. So that's a little bit different. That I  
7 understand was modeling done by the consultants to the  
8 council where they did go and look at some of the cancer  
9 risks that could be attributed to diesel exhaust given  
10 the parameters that they had to work with. And if I  
11 remember right, those numbers came out in the local  
12 community to be something on the order of -- I'm  
13 remembering 30 to 45 in a million. I would have to  
14 actually look back at the document.

15 But, yeah, that -- we're probably seeing levels  
16 of carcinogens that matter in these communities, but I  
17 just think the assessment needs to be done more  
18 thoroughly and we need to add whatever carcinogens are  
19 known, not just the diesel particulate, but the other  
20 ones, the benzene, anything else that is on that toxic  
21 air pollutant list that causes cancer and is emitted and  
22 some sort of additive cancer assessment could be done  
23 for the nearest communities. And that hasn't -- that  
24 type of health risk assessment has not been looked at.

25 MS. BRIMMER: I have nothing further, Your

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1 Honor.

2 JUDGE NOBLE: Cross-examination.

3 CROSS-EXAMINATION

4 BY MR. JOHNSON:

5 Q. Good afternoon, Dr. Fanning. I'm Dale Johnson.  
6 I'm one of the attorneys for the applicant for the  
7 terminal project.

8 A. Good afternoon.

9 Q. Good afternoon. First of all, are you familiar  
10 with the EFSEC regulations setting forth the standards  
11 for issuance of a cite certification --

12 JUDGE NOBLE: Excuse me, Mr. Johnson, I am  
13 really sorry to interrupt your questioning, but I think  
14 we need to take a break.

15 MR. JOHNSON: Okay.

16 JUDGE NOBLE: I apologize for interrupting  
17 you.

18 MR. JOHNSON: No, that's fine.

19 JUDGE NOBLE: The court reporter could use a  
20 break. So we'll return in 15 minutes, which would be  
21 five minutes of 3.

22 (Recess taken from 2:40 p.m. to 2:56 p.m.)

23 JUDGE NOBLE: We need to go back on the  
24 record. Mr. Johnson.

25 MR. JOHNSON: Yes, Your Honor.

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1 JUDGE NOBLE: We're ready for your  
2 cross-examination.

3 BY MR. JOHNSON:

4 Q. All right. Dr. Fanning, sorry about that.

5 A. Yes.

6 Q. So before the break, I was beginning to  
7 answer -- ask a question of you regarding whether you  
8 are familiar with the EFSEC regulations governing  
9 issuance of a site certification for a proposed energy  
10 facility as it relates to air. Are you familiar with  
11 those regulations?

12 MS. BRIMMER: Your Honor, I just want to  
13 register an objection which may just go to the form of  
14 the question. I want to be clear that he is not asking  
15 for any kind of legal interpretation or legal conclusion  
16 relative to the regulations.

17 MR. JOHNSON: I'm just asking whether or not  
18 she's familiar with the EFSEC regulation. That's all I  
19 wanted to know.

20 JUDGE NOBLE: Well, I'll allow the answer.  
21 I think she said yes.

22 A. My answer is actually that I have a cursory  
23 familiarity. I consider myself primarily a  
24 toxicologist. I look at health effects, and the details  
25 of the site certification process are not something that

JOHNSON / FANNING

1 I'm going to have a deep knowledge of.

2 BY MR. JOHNSON:

3 **Q. Okay. Fair enough. But you are familiar with**  
4 **the Federal Clean Air Act; is that right?**

5 A. Again, I have a familiarity. I do not consider  
6 myself an expert on the regulations -- on the laws and  
7 regulations, no.

8 **Q. Okay. How about the Washington Clean Air Act?**

9 A. Same. I have -- you know, I have a familiarity  
10 with the regulations as they pertain to how we use  
11 health effects information in making decisions,  
12 regulatory decisions.

13 **Q. Okay. And you referred to a pending permit**  
14 **application. You are familiar with that, aren't you?**

15 A. Absolutely. Yeah, I certainly read the  
16 document.

17 **Q. And are you aware that that permit application**  
18 **is under and will be reviewed by the Department of**  
19 **Ecology?**

20 A. Uh-huh.

21 **Q. Okay. And are you aware that EFSEC has a**  
22 **responsibility for reviewing that permit application as**  
23 **well?**

24 A. Yes.

25 **Q. Okay. Are you familiar with Federal EPA**

**JOHNSON / FANNING**

1 standards relating to health-based threshold criteria  
2 for TAPs emissions?

3 A. Do I know them all? No. Am I familiar with the  
4 fact that EPA does set health-based criteria for toxic  
5 air pollutants, yes.

6 **Q. Okay. And how about state-based criteria?**

7 A. I -- we discussed some of the ASILs earlier.

8 **Q. Okay. And isn't it true that the -- there is no**  
9 **evidence that -- based on the modeling of proposed**  
10 **maximum emission rates for this facility, that there**  
11 **will be any exceedance of a health-based threshold**  
12 **established by the EPA?**

13 A. I do not think that is clear at this time for  
14 reasons that I touched on earlier with regard to  
15 documentation of exactly what the input values were to  
16 the dispersion modeling that was done, and in the  
17 various versions that we've seen, why the values have  
18 changed from time to time. So from my examination, I do  
19 not consider it clear at this time.

20 **Q. Okay. So let's start with the federal**  
21 **regulations. And what specific hazardous air pollution**  
22 **or criteria pollutant are you concerned about based on**  
23 **your review of the air permit application?**

24 A. One of them would be the fine particulate  
25 matter.

JOHNSON / FANNING

1       **Q.    Fine particulate matter, that's 2.5?**

2       A.    Yes.

3       **Q.    Okay.  And how is that different than DPM?**

4       A.    Diesel particulate matter would be included; in  
5 other words, in a measurement of PM 2.5, you're going to  
6 collect any diesel particles that are present.  However,  
7 as I described, the science is pretty clear that the  
8 standards for PM 2.5 mass-based standards may not  
9 capture well the actual health risks of diesel  
10 particulate, and this is an ongoing conversation.

11       **Q.    So there is no federal DPM standards; isn't that**  
12 **what you said?**

13       A.    There is a -- there is a non-cancer reference  
14 exposure level, I believe.

15       **Q.    Is there an ambient air quality standard?**

16       A.    No.  It is not a criteria pollutant in the  
17 definition of Clean Air Act criteria pollutants.  So  
18 there is not a national ambient air quality standard.  
19 Those are set for the criteria pollutants that were  
20 defined back when the Clean Air Act was written.

21       **Q.    Okay.  And you testified a bit about the ASIL in**  
22 **Washington, the acceptable source impact level.  And I**  
23 **just wanted to clarify that those are not applicable to**  
24 **mobile sources, correct?**

25       A.    My understanding of their definition and use is

JOHNSON / FANNING

1 that the original intent was not to use them in analyses  
2 of roadway mobile source emissions.

3 **Q. Okay.**

4 A. So I would agree with that.

5 **Q. All right. And is your concern about DPM a**  
6 **concern about solely stationary source emissions from**  
7 **the project, or is it a combination of DPM sources, that**  
8 **is, existing sources outside the project boundaries that**  
9 **could have adverse health effects?**

10 A. To my mind, both, because the transport of crude  
11 oil to and from this facility relies on diesel power to  
12 move the large volumes of crude oil that we're talking  
13 about.

14 **Q. Okay. And so that will be a mobile source**  
15 **emission; is that right?**

16 A. Yes, trains and ships transporting oil would be  
17 mobile sources.

18 **Q. Okay. And mobile sources are not required to be**  
19 **considered when obtaining a permit for a facility; is**  
20 **that right?**

21 A. Again, the air permitting is not my expertise.  
22 I tried to look at this problem with a broader view to  
23 what are the overall public health impacts associated  
24 with air pollution due to construction and operation of  
25 the terminal.

JOHNSON / FANNING

1           **Q.     So you don't know if, as part of obtaining an**  
2 **air permit, you have to -- the applicant has to assess**  
3 **mobile sources or not?**

4           A.     What I read in the application argues no.  So I  
5 am not an expert in the regulations.  I'm, again, trying  
6 to look broadly at public health and not particularly at  
7 a permitting process.

8           **Q.     Okay.**

9                     MR. JOHNSON:  Ms. Mastro, could you please  
10 pull up Exhibit 047 -- 0470, please.  That's -- I'm  
11 sorry.  Exhibit 1, that's the application, page 470.

12 BY MR. JOHNSON:

13           **Q.     And while she's doing that, I have a question**  
14 **for you.  In terms of receptors at this particular**  
15 **location, is there a -- could you remind us what the**  
16 **particular geographic area of concern is, if there is**  
17 **one?**

18           A.     I think there are a number.  I would say  
19 geographic areas of concern include the transport -- the  
20 ship and train transport routes.  I would say  
21 potentially the train yards.  I think there are -- I  
22 think there are a number of geographic areas for which  
23 impacts need to be assessed, or at least taken some  
24 cursory level of analysis.  I think that the immediately  
25 adjacent neighborhood probably is of greatest concern.

JOHNSON / FANNING

1 Q. And what neighborhood is that?

2 A. From the census track data I looked at, that's  
3 the Fruit Valley neighborhood.

4 Q. Okay.

5 A. But there are other -- there are other  
6 neighborhoods in the vicinity. I don't know a lot about  
7 them.

8 Q. All right. And you made a correction to your  
9 prefiled testimony about the location of the Fruit  
10 Valley neighborhood in proximity to the project site; is  
11 that right?

12 A. Yeah. I think we've got our wests and easts  
13 straight now. Thank you.

14 Q. And I think you clarified, the Fruit Valley  
15 neighborhood is generally oriented to the east of the  
16 project site; is that right?

17 A. I believe so.

18 Q. Okay. And you testified earlier that pollutants  
19 follow predominant air flow movements. Is that another  
20 way of saying they kind of follow the wind?

21 A. Yeah.

22 Q. Okay. All right. There's an exhibit that's up  
23 on the screen, and I realize with the colors it may be  
24 hard to see. Do you see that exhibit? And there are --  
25 there are -- maybe the one behind you is closer. I

**JOHNSON / FANNING**

1 don't know which one works better for you.

2 MR. JOHNSON: Thank you for pulling that up.

3 BY MR. JOHNSON:

4 Q. Do you see that exhibit?

5 A. Sure. I recognize that as the wind grows based  
6 on meteorology of the terminal air.

7 Q. Okay. And do you know where that was taken  
8 from, that data was taken from?

9 A. I forget right now the source of the met data.  
10 I read it, and I'm just forgetting.

11 Q. Okay. But you do recognize this exhibit?

12 A. Yeah.

13 Q. Okay. And so can you just describe what you  
14 understand it to represent, the yellow and the red there  
15 on the rows?

16 A. Yeah, the predominant air flow from the terminal  
17 is largely oriented with the Columbia River, as you  
18 might expect, it's largely up and down river.

19 Q. Okay. And so up and down river being, what,  
20 northwest --

21 A. Northwest --

22 Q. -- southeast?

23 A. -- and sort of east-southeast.

24 MR. JOHNSON: Could you, Ms. Mastro, now put  
25 up Exhibit 1012, please, 1012. That's not "page."

JOHNSON / FANNING

1 BY MR. JOHNSON:

2 Q. If you just give it a minute, it will come up  
3 here. While we're looking for that, let me just ask you  
4 some other questions about this diesel particulate  
5 matter question.

6 Would you agree that vehicles like trucks and  
7 cars are a significant source of DPM?

8 A. Absolutely.

9 Q. Okay. Would you agree that trains, specifically  
10 locomotives, are a source of DPM?

11 A. Yes.

12 Q. Okay. How about marine vessels?

13 A. Yes.

14 Q. Okay. As soon as we get this exhibit up, I can  
15 ask you a few questions about that. All right. Here we  
16 go. Can you see this exhibit? This is an aerial  
17 photograph.

18 A. I think I'm -- based on my eyesight, I may --  
19 oh, I see, I can see it here. That's better.

20 Q. All right. And I assume you've made a site  
21 visit to the project location; is that right?

22 A. I have not been able to make a site visit. I  
23 have studied, as much as I could, aerial and satellite  
24 images.

25 Q. Okay. There's a laser pointer on the desk there

**JOHNSON / FANNING**

1 in front of you, and I'm going to ask you a few  
2 questions and have you -- just make sure we're oriented  
3 to the same geography here.

4 First of all, could you just point out your  
5 understanding of where the facility -- the Vancouver  
6 Energy terminal will be located.

7 A. This is a little rough. So I think this is the  
8 train unload area and I think this is the tank farm.

9 JUDGE NOBLE: Dr. Fanning, could you use  
10 your pointer on the one -- the photograph behind you so  
11 that all the council can see?

12 THE WITNESS: Yes, Your Honor.

13 A. All right. I do believe that this is the train  
14 loop on which the inbound trains come. This is the  
15 unload area. And I think this is where the tank farm  
16 sits.

17 BY MR. JOHNSON:

18 Q. Okay. I'm sorry, I didn't mean to cut you off.

19 A. I'm finished.

20 Q. And then where would the Fruit Valley  
21 neighborhood be in relation to that?

22 A. And I -- this area.

23 Q. Okay. And I should have asked you, is this --  
24 is your understanding of the orientation of this that  
25 this is generally oriented north to south, that is,

**JOHNSON / FANNING**

1 north at the top, south on the bottom, west to the left  
2 as we're looking at it and east to the right?

3 A. I think so.

4 Q. Okay. And how about the main rail line? Do you  
5 know where that's located?

6 A. This is coming in from the Columbia Gorge and  
7 then there is a kind of an exchange area. There's a  
8 spur that goes to the terminal, unload, exit spur and  
9 then the northbound trains are not quite northbound,  
10 they're kind of northwestbound along this trajectory, to  
11 my understanding.

12 Q. Okay. And the main rail yard, do you know where  
13 that is?

14 A. No.

15 Q. Okay. All right. Fair enough. How about the  
16 Columbia River where the vessel traffic would be?

17 A. Roll on Columbia.

18 Q. All right. And it -- the prior exhibit we  
19 looked at was wind rows that reflected a prevailing wind  
20 direction. Could you just point out to us, if you can,  
21 how -- what the wind direction would be, generally --  
22 the predominant wind direction would be at this  
23 location?

24 A. There is a major vector up river and -- I mean,  
25 down river and a major vector up river.

JOHNSON / FANNING

1 Q. Well, I think --

2 A. More or less.

3 Q. We can go back if you want. I thought that we  
4 agreed that it was primarily --

5 A. East-southeast. So, you know -- sorry if my  
6 hand's jiggly.

7 Q. That's okay. So east-southeast?

8 A. Uh-huh.

9 Q. All right. And an east-southeast vector would  
10 take pollutants away from the general facility site away  
11 from the Fruit Valley neighborhood; isn't that right?

12 A. I believe there are some homes in this area here  
13 and, of course, wind doesn't blow only on that level,  
14 and there are also times where the air is relatively  
15 still and you can have a sort of gathering plume around  
16 the facility.

17 Q. Okay. But the wind -- but the compass rose  
18 reflects a predominant wind direction, does it not?

19 A. I would include probably these homes in the --  
20 more or less in the predominant wind, certainly include  
21 these guys, given the tank farm sitting right here with  
22 the VOC emissions.

23 Q. So you're talking about the stationary source  
24 emissions, then, not the mobile source emissions that  
25 would be from the locomotives and unloading facility?

**JOHNSON / FANNING**

1           A.     In this case you -- you're right. Thank you.  
2 From these train tracks, there are impacts -- impacts  
3 against the east-southeast; from these tracks directly  
4 northwest.

5           Q.     Okay. Do you know how many trains travel down  
6 that main rail line every day without regard for this  
7 new facility?

8           A.     Had that number in my head and it's gone as of  
9 this moment. I'm sorry, I can't recall.

10          Q.     Is it a lot?

11          A.     It's a lot.

12          Q.     Okay. And do those locomotives emit diesel  
13 particulate matter?

14          A.     Sure they do.

15          Q.     Okay. How about I-5 again? Are there a lot of  
16 cars that travel up and down -- or not a car. I guess  
17 we're talking about diesel engine vehicles, right?

18          A.     Yes.

19          Q.     Okay. So I-5 is to the east; is that right?

20          A.     That's right.

21          Q.     Okay. And do you know how many vehicles travel  
22 up and down that stretch of I-5 every day?

23          A.     I don't.

24          Q.     If I told you it was 126,000 vehicles per day,  
25 would that be a surprise to you?

**JOHNSON / FANNING**

1 A. Of which category are you talking about?

2 Q. Of all vehicles.

3 A. All vehicles.

4 Q. Okay. And there would be some of those that  
5 would be diesel-powered vehicles; is that correct?

6 A. Yeah.

7 Q. And they're an existing source of diesel DPM?

8 A. Yes.

9 Q. Okay. All right. And, again, with regard to  
10 the stationary source emissions that have been -- that  
11 are reflected in the permit application, assuming those  
12 numbers are correct, okay? You're an expert so I can  
13 ask you to assume something. Assuming those numbers are  
14 correct, those maximum emission rates are correct, there  
15 is no exceedance of a health-based threshold for DPM  
16 from the facility, is there?

17 A. I'm thinking here. Given the -- if all the  
18 emissions are correct for PM 2.5, which is what was  
19 calculated, then the stationary sources alone would not  
20 cause an exceedance of the PM standard.

21 Q. Do you have any --

22 A. We don't have a diesel standard.

23 Q. I'm sorry.

24 A. That's all right.

25 Q. We don't have a diesel standard. Is that what

**JOHNSON / FANNING**

1 you just said?

2 A. You don't have a set standard in which the air  
3 permit application -- the air permit application does  
4 not assess diesel exhaust.

5 Q. And do you have a copy of your prefiled  
6 testimony?

7 A. Uh-huh.

8 Q. Could you turn to page 16. Are you there?

9 A. Yeah.

10 Q. Okay. Can you look at line 19, please. And I'm  
11 specifically referring to the sentence that begins,  
12 "There are adverse health effects that occur at any  
13 level of air pollution exposure; there is no threshold  
14 below which effects will not occur."

15 You see that?

16 A. I do.

17 Q. Okay. So how is the applicant to address  
18 impacts for which there's no threshold?

19 A. I don't know.

20 MR. JOHNSON: Nothing further.

21 JUDGE NOBLE: Redirect?

22 MR. BARTZ: Your Honor, might I ask a  
23 question?

24 JUDGE NOBLE: Oh, I'm sorry. Mr. Bartz.

25 MR. BARTZ: That's all right.

BARTZ / FANNING

CROSS-EXAMINATION

1  
2 BY MR. BARTZ:

3 Q. Good afternoon, Dr. Fanning. My name is David  
4 Bartz and I represent the Port of Vancouver.

5 A. Good afternoon.

6 Q. Just one area of questions or one question. Are  
7 you familiar with the concept of new technology diesel  
8 exhaust?

9 A. Yes.

10 Q. I generally understand that to be both improved  
11 fuels and improved operations of diesel engines so that  
12 they reduce their emissions. Is that a fair summary?

13 A. That's fair.

14 Q. Is it also fair to say that recent -- or not  
15 recent. Testing of those operations, both the lower  
16 sulfur fuel, as well as those modern engines, that  
17 revealed reduced emissions from diesel exhaust?

18 A. Yes. The emissions have changed.

19 Q. Are you aware of the potential for improvement  
20 with locomotive engines or marine engines or diesel  
21 trucks because of that use of variations of that new  
22 technology diesel exhaust systems?

23 A. Yes. I do believe that our air contaminate  
24 control programs are progressing and we are cleaning up  
25 diesel to the extent -- to an extent that will and is

BRIMMER / FANNING

1 bringing down air pollution, yes.

2 MR. BARTZ: Thank you. No further questions  
3 at this time.

4 JUDGE NOBLE: Redirect, Ms. Brimmer.

5 REDIRECT EXAMINATION

6 BY MS. BRIMMER:

7 Q. Ms. Fanning, I just want to be clear about some  
8 of the terms just so that we're all on the same page.  
9 Counsel used the acronym periodically DPM. That's  
10 diesel particulate matter, correct?

11 A. Yes.

12 Q. Does the fact that a regulated pollutant  
13 threshold is not exceeded mean there's no negative  
14 health effect?

15 A. Well, no. I think we spent quite a bit of time  
16 on that before the break, the notion that public health  
17 impacts of air pollution are very clearly documented to  
18 occur at levels below our national air quality standards  
19 and there's just a matter of time and so on before we  
20 can figure out how to address these issues. But there  
21 are, most certainly, these no-threshold types of health  
22 effects, yes, and I've tried to highlight which those  
23 are.

24 Q. For example, this facility is going to involve a  
25 lot of mobile source emissions, right?

**BRIMMER / FANNING**

1       A.     Well, yes.  You can't transfer oil if you  
2 haven't moved it to -- you have to move it to and from  
3 the facility in order to operate your facility.

4       **Q.     And those mobile sources, as I think was**  
5 **established in cross-exam, aren't regulated by the air**  
6 **permit in this case, right?**

7       A.     Well, again, I like to leave the permitting to  
8 the permitting folks, but that's my understanding.

9       **Q.     But those mobile sources are still going to**  
10 **affect public health?**

11       A.     Oh, absolutely.  I think, you know, our  
12 Department of Health has declared transportation-derived  
13 pollution as a top priority, and transportation-derived  
14 pollution is very important in our state and others.

15       **Q.     And similarly, I think counsel asked you on**  
16 **cross-examination -- or confirmed, there's no standard**  
17 **for diesel particulate matter at this point in time?**

18       A.     We don't -- we certainly don't have a national  
19 ambient air quality standard for diesel or the surrogate  
20 that many scientists have asked for is a standard for  
21 ultrafine particles, so that we would be looking at a  
22 mass of those very small particles that I discussed.  
23 And we don't have that ultrafine particle standard yet.

24       **Q.     And, again, that doesn't mean there aren't**  
25 **health effects and sometimes very serious health effects**

**BRIMMER / FANNING**

1 from diesel particulate matter?

2 A. Right. And those are well-accepted. What we do  
3 know quite clearly is the cancer risks from diesel  
4 exhaust, and we do have a regulatory number from  
5 California that has been adopted by many states there.  
6 So, you know, again, I'm not a hundred percent clear how  
7 Washington has chosen to use that number. The  
8 regulations are not my -- not exactly my expertise.

9 **Q. There's also been some talk about other sources**  
10 **of diesel particulate, for example, I-5 came up in the**  
11 **cross-examination, correct?**

12 A. Yes.

13 **Q. And you don't disagree that there are a lot of**  
14 **sources, particularly for some of these neighborhoods,**  
15 **right?**

16 A. Oh, I don't disagree. I think that's precisely  
17 the problem.

18 **Q. But this is an additional source, the terminal**  
19 **and the mobile and stationary source pollutants that**  
20 **come with it, correct?**

21 A. Correct.

22 **Q. And that four trains per day, for example, will**  
23 **be an additional source of diesel particulates?**

24 A. Right. So when you add on to an already  
25 burdened air basin, going the wrong direction.

BRIMMER / FANNING

1 Q. And it's -- was your testimony that the research  
2 shows that with more pollution, you get increased  
3 negative respiratory, daily mortality and cancer risks,  
4 right?

5 A. Correct, all three.

6 Q. On cross-exam, I think we also talked a little  
7 bit about the impacted areas and I think you talked  
8 about the Fruit Valley neighborhood and some other  
9 neighborhoods you didn't know the name of. Did you also  
10 consider the Jail Work Center in your review of this?

11 A. Yes. So my understanding is that this is a  
12 Clark County facility that is sited -- our maps aren't  
13 up, but, you know, right in the -- in between kind of  
14 where the rail unload and that tank farm were. And I  
15 think that there's no question but that the inmates and  
16 the workers at that facility are likely to experience  
17 very high concentrations of probably -- my main concern  
18 would be respiratory irritation and respiratory  
19 toxicants during the construction phases.

20 I think staff -- inmates, my understanding is,  
21 turn -- maybe don't serve long term there, so the acute  
22 short-term health effects are what are of concern there.  
23 In other words, if you have somebody with asthma and  
24 they're there for those 18 days or -- that's a concern.  
25 Staff are there longer term and they may be subject to

BRIMMER / FANNING

1 higher levels of chronic exposure and chronic health  
2 harms.

3 Q. Dr. Fanning, last question, then, and really  
4 harkening back to one of my previous. We talked about  
5 the additive effects that are going to come from the  
6 terminal. Is that a straight line? In other words, is  
7 it one for one as you move up the scale?

8 A. Well, the shape of a dose response curve is  
9 always something that is highly debated. So I won't say  
10 there's a straight line. What I'll say is I think for  
11 the health effects that we've discussed today, additive  
12 incremental increases in pollution lead to added  
13 incremental increases in those health outcomes.

14 And I think on that I would like to make one  
15 more little comment that I forgot, which is sometimes --  
16 and I think the respiratory effects are a good example  
17 here -- we have multiple pollutants we've got that  
18 affect the respiratory tissue: ozone, nitrogen dioxide,  
19 formaldehyde, diesel particulate and for -- in many  
20 toxicologic cases, there's a greater-than-additive  
21 effect when you have multiple pollutants doing the same  
22 thing. Your bronchi don't really know which pollutant.  
23 So you can get greater-than-that effects. This is  
24 something that regulators -- we struggle with in an  
25 agency way, how to address that.

## FANNING

1 MS. BRIMMER: Thank you. Nothing further,  
2 Your Honor.

3 JUDGE NOBLE: Council questions, to my left?  
4 Mr. Stephenson?

5 MR. STEPHENSON: No.

6 MR. ROSSMAN: I may. I need a minute to  
7 think.

8 JUDGE NOBLE: To my right?

9 Mr. Shafer?

10 MR. SHAFER: Dr. Fanning, thank you very  
11 much for your testimony today.

12 I have one question, and I know there's been  
13 a lot of questioning on this, but I'm just trying to  
14 better understand. Is it possible to quantify the  
15 percentage increase -- let's say with the diesel  
16 particulates, the percentage increase as a result of the  
17 project in relation to the overall aggregate, meaning,  
18 as was referenced and I'm having the same thoughts,  
19 there's quite a heavy volume of particulate release  
20 already, trains, trucks, factories, utilities, vehicles,  
21 and I don't excuse or rationalize any of that, but I'm  
22 just trying to sort in my mind a little bit better here  
23 what the baseline is from, you know, the aggregate there  
24 in the community and what this specific project may give  
25 as a percentage increase.

## FANNING

1           Is it possible to quantify that? Is it in  
2 the realm of .1 percent? Is that low? Is it 1 percent?  
3 Is it as much as 10 percent? Do we have any idea on  
4 that?

5           THE WITNESS: I think that's an excellent  
6 question. To my knowledge, the background impact of  
7 diesel exhaust hasn't yet been quantified. So we don't  
8 know yet how much is drifting over from I-5; how much is  
9 coming from the ships. This is what I meant when I said  
10 I think it would be useful for somebody -- I'm sorry,  
11 but this is just me on a little contract. I think we  
12 need the consultants to take on a more thorough look at  
13 what are the current levels of diesel exposure in this  
14 community and what are the additives that we're talking  
15 about and let's get the best handle on that we can. But  
16 no, I can't give you a useful number today.

17           MR. SHAFER: Okay. Thank you.

18           THE WITNESS: Sorry.

19           JUDGE NOBLE: Mr. Lynch?

20           MR. LYNCH: Good afternoon, Doctor. I have  
21 a couple of questions for you. First of all, I would  
22 like to know a little bit more about the behavior of the  
23 small particulate matter. This small particulate matter  
24 settles out after a certain distance; is that correct?

25           THE WITNESS: Actually, the very smallest

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1 ultrafines are going to have low deposition. What  
2 happens to those -- so in your hot diesel exhaust, there  
3 are -- there are gases, there are very, very small  
4 nanometer-sized particles down to our level of ability  
5 to measure particles, and as that exhaust cools, there  
6 are going to be physical changes. So some of those very  
7 small particles coagulate together and make larger  
8 particles. That's one of the first things that happen.

9           Some gases are going to condense onto those  
10 particles and add hydrocarbon, organic carbon, kind of  
11 outer coatings to those particles. There's a very  
12 complicated set of changes that depends on the exact  
13 composition of the plume and the other pollutants that  
14 are in the area that can contribute to oxidization of  
15 some of those compounds. Yes, at some particle sizes,  
16 distances and meteorologic conditions, such as rain, we  
17 do see particle deposition.

18           MR. LYNCH: One of the things I'm wondering  
19 about is -- let's just assume for argument's sake that  
20 some of these particles settle out in that Fruit Valley  
21 area. If somebody starts to mow their grass, does that  
22 make these particles become airborne again? I'm just  
23 trying to figure out is it -- I mean, you just worry  
24 about particulate matter that's coming out any given  
25 day, or is this something that accumulates in the

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1 neighborhood? Can you help me with that?

2 THE WITNESS: Yeah. Re-entrained dusts sort  
3 of -- so re-entrainment of particle matter that's on the  
4 ground via wind and this kind of turbulence is a  
5 phenomenon that occurs. I mean, we generally think  
6 about that more in a highway setting where you have such  
7 profound turbulence from wheels and so on. So that's  
8 where a lot of re-entrainment of dust or -- you know,  
9 one kind of particulate we didn't really talk about is  
10 all that brake wear. So you can get a lot -- this is  
11 where you get metals and so on. So re-entrainment is a  
12 thing. I'm not sure how I would answer about in that  
13 specific neighborhood, you know, falling onto -- I don't  
14 know how green it is, how much it's, you know, sidewalky  
15 and pavement, but certainly re-entrainment off pavement  
16 is easy to imagine.

17 MR. LYNCH: And you said earlier, I believe  
18 you were talking about looking at the entire amount of  
19 pollution-generating sources from the facility, both  
20 mobile and fixed, but I just want to make sure, were you  
21 also including other businesses at the port site that  
22 might be emitting some other pollutants?

23 THE WITNESS: Well, a true health risk  
24 assessment for a community -- so there are different  
25 ways to look, right. We can look at what are accessing

## FANNING

1 the risks of a particular source or we can say, what's  
2 going on in a particular community? If we're looking at  
3 a community, we want to know what are the contributions  
4 of pretty much everything affecting their airshed. So  
5 these guys -- we're also talking about the greater  
6 Portland-Vancouver airshed, which is why in some of my  
7 written testimony, I brought up the issue of secondarily  
8 produced formaldehyde. Most of the formaldehyde in  
9 Portland is from secondary atmospheric formation.

10 So, yes, other port businesses would have an  
11 impact if we're looking -- trying to do a risk  
12 assessment for that community, and then, you know, tease  
13 out that additive amount for a particular subset of  
14 those sources. Does that help? I'm sorry if that's a  
15 bit rambling.

16 MR. LYNCH: No, that's helpful. Thank you.

17 THE WITNESS: Thank you.

18 MR. LYNCH: And if this council were go to  
19 go ahead and recommend this proposal to go forward and  
20 the governor agreed with that, is there any type of  
21 monitoring equipment that you would recommend be  
22 installed that would help ensure that certain pollutants  
23 weren't exceeding certain levels?

24 THE WITNESS: Well, it's difficult to answer  
25 because my -- my opinion is, once you've gone forward,

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1 you could monitor but I'm not sure you're going to go  
2 back.

3           However, there are certainly ways to  
4 monitor. I think ecology has -- you know, you'd go  
5 right to the Department of Ecology and they would --  
6 they can set up a site-specific community-based  
7 monitoring program, which is different from the way -- I  
8 mean, this is very different from the way that we do  
9 kind of a regional assessment of air pollutants which --  
10 and a kind of community approach would be relevant, I  
11 think.

12           MR. LYNCH: Okay. Thank you.

13           JUDGE NOBLE: Any other questions? From my  
14 right? To my left? Mr. Rossman?

15           MR. ROSSMAN: Yes, thank you. I want to ask  
16 you about an attachment to your prefilled testimony that  
17 is from the groundwater protection agency related to  
18 environmental justice.

19           THE WITNESS: Oh, yeah.

20           MR. ROSSMAN: And I just want to make sure  
21 I'm reading this right, that this is based on a report  
22 for the Fruit Valley neighborhood and shows that the  
23 Fruit Valley neighborhood is in the 88th percentile in  
24 the state on the environmental justice index for PM 2.5.  
25 Do you see that? That's on page 1 and this is

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1 exhibit --

2 THE WITNESS: Yes, I do.

3 MR. ROSSMAN: This is Exhibit 5536. So can  
4 you help me interpret that. Does that mean that this is  
5 the 88th best neighborhood or the 88th worst?

6 THE WITNESS: Yeah. So first of all, let me  
7 put this type of report in context, if I may. This is a  
8 tool that EPA provides. And I would not substitute the  
9 pollutant information on here for -- you know, for  
10 example, this kind of community measurement that we were  
11 talking about earlier, actually going on site and  
12 finding out what's there.

13 This is a product of a program at US EPA  
14 called the National Air Toxics Assessment. And this is  
15 a modeling exercise that they do nationwide. So they  
16 basically try to account for all emissions of criteria  
17 pollutants and then kind of put them into large-scale  
18 dispersion models and try to get census tract base  
19 numbers for the top -- there's some short list of  
20 chemicals that are looked at.

21 So it's designed more for policy guidance.  
22 In fact, EPA is very, very careful to say, don't use  
23 this to say what's exactly happening in your  
24 neighborhood. We do not validate the tool for that. So  
25 I just think that's very important to keep in mind that

## FANNING

1 these -- the actual exposure numbers are -- I would  
2 probably ask Department of Ecology.

3 But what that means is that they -- that  
4 this -- according to this modeling exercise, the 88th  
5 percentile, the 88th -- there are -- 88 percent of state  
6 census tracts would have a lower concentration, 12  
7 percent would have higher. So this is in that high  
8 fraction.

9 MR. ROSSMAN: Got it. And turning to the  
10 last page here, I'm recognizing what you're saying in  
11 terms of the data here should be taken with a shaker of  
12 salt, but there's a data point given for micrograms per  
13 meter cubed of 8.64 in this neighborhood, and it gives  
14 that as the 69th percentile. And I guess I'm wondering  
15 what is the difference between -- why is it the 69th  
16 percentile in terms of the raw data but the 88th  
17 percentile in terms of the environmental justice index?  
18 And I think that's because this neighborhood is  
19 disproportionately minority or communities of concern for  
20 the environmental justice index, but I'm not sure about  
21 that, and I'm wondering if you could comment on that.

22 THE WITNESS: You know, sir, I am not sure,  
23 I'm going to just say.

24 MR. ROSSMAN: Okay. Fair enough. Now, in  
25 the testimony of Mr. Hansen, I believe that he

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1 referenced some modeling that suggested -- it looks to  
2 me like .05 to .15 micrograms per cubic meter were the  
3 expected increase in -- I'm not sure if it was DPM or  
4 PM 2.5. Did you catch that in the portions of his live  
5 testimony that you saw?

6 THE WITNESS: No. But what I remember  
7 from -- I think PM 2.5 project attributable  
8 concentrations at the maximum -- at the maximally  
9 impacted receptor were more on the order of 5 to  
10 10 micrograms per meter cubed.

11 MR. ROSSMAN: I think that's right, but this  
12 is specifically the estimate for the Fruit Valley  
13 neighborhood.

14 THE WITNESS: Well, I think -- I think he  
15 may have been referring to NATA -- sorry, to the  
16 National Air Toxic Assessment model data, but I don't  
17 remember -- I don't remember that testimony.

18 MR. ROSSMAN: Okay.

19 THE WITNESS: I'm sorry, I can't --

20 MR. ROSSMAN: Well, just -- assuming that  
21 that was right, that he's projecting a .05 to  
22 .15 micrograms, I assume, per meter cubed increase in  
23 that neighborhood, what would be the appropriate way to  
24 relate that back to the studies that you were showing  
25 that suggested, I think, a 3 percent per 10 micrograms

## FANNING

1 per meter cubed? Can we just do the linear math there  
2 and divide .15 into 10 and multiply that by the percent  
3 increase in mortality?

4 THE WITNESS: Okay. So those mortality  
5 numbers that I quoted are for PM 2.5 actually. So, yes,  
6 you can look at the incremental addition from a source.  
7 So once the modeled -- once the consultants clear up how  
8 much PM 2.5 we really are expecting to increase in this  
9 particular neighborhood, then we can go to the  
10 scientific literature that says 3 percent increase in  
11 daily mortality and 10 percent increase in long-term  
12 mortality per 10 micrograms per meter cubed increase,  
13 yeah.

14 MR. ROSSMAN: So assuming we were to get  
15 that number nailed down and then we were to multiply it  
16 by factors for the number of people in the neighborhood,  
17 et cetera, one could -- would one analytically be able  
18 to come up with an estimated -- and this is just in  
19 terms of mortality numbers -- impact on that community  
20 in terms of increased deaths per year or number of years  
21 until one would expect an increased death from --

22 THE WITNESS: Yeah, I think you can.

23 MR. ROSSMAN: That's an appropriate approach  
24 analytically?

25 THE WITNESS: Sitting here, I think so.

## FANNING

1 MR. ROSSMAN: All right. Thank you very  
2 kindly.

3 JUDGE NOBLE: Mr. Stephenson?

4 MR. STEPHENSON: Thank you. I wanted to  
5 follow up on Chair Lynch's question about monitoring  
6 because I think there's some clarity that might be  
7 needed. Are you generally aware of the ecology  
8 monitoring network and the types of monitors we use?

9 THE WITNESS: Some of it. I know there are  
10 different aspects of that network used for different  
11 purposes, for sure.

12 MR. STEPHENSON: And the types of monitors?

13 THE WITNESS: Not all of -- not all. I  
14 can't -- I can't debate the technical details of the  
15 monitors, no.

16 MR. STEPHENSON: Stop me if I'm going --  
17 overreaching, Judge. But we have one monitor, a federal  
18 reference monitor that is a filter-based. Do you think  
19 that's a good monitor for testing for diesel emission  
20 particulates?

21 THE WITNESS: Seems to me that in the  
22 research context, the federal reference method was not  
23 always considered a good method for ultrafines and for  
24 diesel, and -- but I don't consider myself an expert on  
25 the -- kind of the measurement side. I've worked with

## FANNING

1 measurement people, but I really like to stick to my  
2 territory on health effects when possible. But I  
3 would -- I would believe that your department would come  
4 up with the best way to model -- to monitor, rather.

5 MR. STEPHENSON: Thank you.

6 JUDGE NOBLE: Any other questions to my  
7 left? To my right?

8 Mr. Snodgrass?

9 MR. SNODGRASS: Just, I guess, one question  
10 following up on Councilmember Rossman's inquiry. The  
11 3 percent per 10 micrograms, you expressed that in terms  
12 of fatalities and you had also earlier in your testimony  
13 talked about impacts to children presumably not  
14 associated with fatalities. Is there anything -- is  
15 there any way to look at impacts from children based on  
16 the 3 percent?

17 THE WITNESS: Well, yeah. So -- and first  
18 of all, 3 percent is the best estimate. There is, of  
19 course, quite a range. I mean, studies go anywhere from  
20 sort of, you know, 1 to 76. So we would want to spend  
21 some time selecting actually that number.

22 Now, of course, there are health effects  
23 that probably occur at a higher rate that are less  
24 severe. So one of the reasons I pulled that one out is  
25 consequential and we want to think about it.

## FANNING

1           Now, one of the health effects that's very  
2 commonly studied are hospital admissions or ER visits.  
3 This is something -- so ER visits by -- for respiratory  
4 causes, people with COPD or kids with asthma, end up --  
5 end up with hospital visits during air pollution  
6 episodes. Quantification of that is probably -- I don't  
7 know that you can do it for a community because the  
8 studies are looking at -- you know, they're based on a  
9 very specific population. So maybe that was a  
10 population of New Jersey urban kids exposed to cockroach  
11 dust. So you see where I'm going with this? I'm not  
12 sure how to quantify that specifically.

13           But what we can do is look at the -- try to  
14 find available data on acute health -- acute respiratory  
15 effect thresholds -- some of these -- some of these  
16 numbers are computed as thresholds so there will be a  
17 health benchmark. And there is an additive approach  
18 that's -- that's called a -- where you take the hazard  
19 index for each respiratory chemical and kind of add it  
20 together and try to come up with an additive risk  
21 overall. And there may be some approaches that could be  
22 taken here along those lines.

23           MR. SNODGRASS: Thank you.

24           JUDGE NOBLE: Any further council questions  
25 at all?

BRIMMER / FANNING

1 Questions based on council questions?

2 MR. JOHNSON: No questions, Your Honor.

3 REDIRECT EXAMINATION

4 BY MS. BRIMMER:

5 Q. Dr. Fanning, just one follow-up on the question  
6 from Councilmember Snodgrass. I guess I want to ask  
7 just in -- more general. I think we were focused on the  
8 3 percent figure. But is there a way that an assessment  
9 could be made of a similar attendant increase for  
10 impacts to children in the community from this facility,  
11 or is that sort of beyond our scientific capability  
12 right now?

13 A. Well, I think there are some things that can and  
14 should be done by just taking a standard kind of health  
15 risk assessment approach, and you start by looking at  
16 what are the exposures in the community, what are the  
17 health effects that are impacted and how can -- what is  
18 the best approach for trying to guesstimate those risks.  
19 And there are some standard guidelines for how to  
20 approach this type of work, and it may be that this is a  
21 situation where it's appropriate to do so.

22 Q. And the fact that we may not have the tools to  
23 precisely quantify that there will be a 1 percent  
24 increase does not -- should not be taken to mean there's  
25 no effect; is that correct?

**BRIMMER / FANNING**

1           A.     True.  I mean, we can never predict perfectly,  
2 right.  All these regulatory approaches are based on  
3 estimates.  That's what we're stuck with.  There is no  
4 terminal to measure at this point.  So we can't -- we  
5 can't -- we can't have a concrete approach.  We can  
6 guess.

7                   MS. BRIMMER:  Dr. Fanning, thank you very  
8 much.

9                   JUDGE NOBLE:  Dr. Fanning, thank you very  
10 much for your testimony today.  You're excused as a  
11 witness.  We have reached ten minutes till 4.  Are there  
12 any other witnesses for today from the opponents?

13                   MS. BOYLES:  Your Honor, we have run out of  
14 witnesses for today.  I have been e-mailing frantically,  
15 but there's no one else that we can call today.

16                   JUDGE NOBLE:  All right.  So it's time,  
17 then, to talk about tomorrow.

18                   MS. BOYLES:  Yes, Your Honor.  One second,  
19 please.  For tomorrow, we have Mr. Scott Johnson, who is  
20 the City of Vancouver witness.  He has prefiled  
21 testimony and he is testifying about emergency  
22 notification and response issues.

23                   MR. POTTER:  Emergency management issues.

24                   MS. BOYLES:  Emergency management issues.  
25 We have Mr. Ian Goodman, who is a Columbia Riverkeeper

1 witness. He has prefiled testimony. He will testify  
2 about oil economics and a critique of the need for the  
3 project. He will also -- to have some rebuttal  
4 testimony for the testimony of Mr. Roach, Mr. Schatzki  
5 and Mr. Casey.

6 Then we have Mr. Richard Bishop, who is a  
7 Clark County witness. He is the chief corrections  
8 deputy and has prefiled testimony as well. I believe he  
9 is only here to answer questions from the council.

10 MR. HALLVIK: That's right. He was added to  
11 the no-call, no-cross list and subject -- to the extent  
12 that council had any questions, Mr. Bishop could be  
13 available to answer those.

14 JUDGE NOBLE: I think the arrangement was  
15 that Mr. Bishop would not have to appear, and that he  
16 would be available for telephone questions if the  
17 council had any. I've notified the council to read  
18 through his prefiled testimony again this evening and  
19 let me know in the morning about that. But he probably  
20 won't be taking up very much hearing time tomorrow.

21 MS. BOYLES: That's correct. I understand  
22 he's actually going to be in Olympia anyways, and so  
23 having him here in person --

24 MR. HALLVIK: It is possible. So whether  
25 it's by phone or in person, that's possible.

1                   JUDGE NOBLE: All right. Well, the council  
2 needs to have a little bit of time to see if they have  
3 questions, and so they told me they will let me know in  
4 the morning.

5                   MR. HALLVIK: Thank you.

6                   MS. BOYLES: Then we have the testimony of  
7 Mr. Timothy Walsh. That is a Department of Natural  
8 Resources expert. Mr. Walsh will testify regarding the  
9 need to adequately assess landslide hazards in the  
10 Columbia River Gorge. He has prefiled testimony.

11                   And then finally we have Mr. Robert Johnson,  
12 also a Department of Natural Resources witness.  
13 Mr. Johnson will testify regarding wildfire risks  
14 presented by the transportation of crude oil by rail  
15 associated with this project, and he also has prefiled  
16 testimony.

17                   JUDGE NOBLE: All right. That sounds like a  
18 full day. Is there anything else we need to do on or  
19 off the record before we adjourn for today? And I think  
20 we took care of the exhibit issues. Anything else?

21                   MR. JOHNSON: I think that's it.

22                   MR. POTTER: I have one question just  
23 procedurally on an oath of affirmation. So we had a  
24 number of City witnesses who their prefiled testimony  
25 they did in a declaration form of swearing to the truth

1 under the penalty of perjury. They all affirmed their  
2 prefiled testimony when they were under oath. So I am  
3 hoping that that is sufficient for the council.

4 JUDGE NOBLE: It is. Yes, it is.

5 MR. POTTER: Then there was one witness who  
6 we did not call, Mr. Wayne Senter. Again, his prefile  
7 was under declaration format. Is it necessary to  
8 supplement that?

9 JUDGE NOBLE: No, it's not necessary.

10 MR. POTTER: Thank you.

11 JUDGE NOBLE: Anything else?

12 MR. JOHNSON: Not from the applicant, Your  
13 Honor.

14 JUDGE NOBLE: All right. We're adjourned  
15 for the day. We will reconvene tomorrow morning,  
16 Tuesday, the 19th of July at 9:00 a.m. Thank you.

17 (Hearing adjourned at 3:55 p.m.)

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