BEFORE THE STATE OF WASHINGTON

ENERGY FACILITY SITE EVALUATION COUNCIL

In The Matter Of: Application No. 2013-01 TESORO SAVAGE, LLC VANCOUVER ENERGY DISTRIBUTION TERMINAL	)))) Case No. 15-001)))

HEARING, Volume 14

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ADMINISTRATIVE LAW JUDGE CASSANDRA NOBLE

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HEARING
Volume 14: INDEX

EXHIBITS

PROCEEDINGS

JUDGE NOBLE: Good morning, everyone. This is July 19, 2016, 9:01 a.m. and we are ready to go back on the record in the case before the State of Washington Energy Facility Siting Council, Case No. 15-001 in the Matter of Application No. 2013-01, Tesoro Savage LLC Vancouver Energy Distribution Terminal.

Before we get started, I wish to inform everyone that the council has no questions for witness Richard J. Bishop and so that witness does not need to appear and council will -- has reviewed the prefiled testimony.

And we can deal with any other issues at the break or just at noontime, but I did want to tell the parties that Councilmember Rossman does have a few questions for a witness that we previously said did not need to make himself available. It was for Gibbs, the witness Gibbs. I can check my notes to see who was the sponsor of that witness.

MR. JOHNSON: That's our witness, Your Honor. We'll try to make -- we'll have to contact the witness and determine his availability and then I can let you know when he's available.

JUDGE NOBLE: Yes. And Councilmember Rossman said that previously he did not have questions,

but given some testimony yesterday, he did have -- that did give rise to a few questions, so he apologizes for that. But if you can make that witness available, that would be good.

MR. JOHNSON: We'll work on that.

JUDGE NOBLE: Okay. So we're ready -- oh, one more thing. There was a witness submitted by Columbia Riverkeeper, a witness -- excuse me. Exhibit No. 5591, and I needed to ask whether there was an objection to that exhibit. I'm sure it's been shared with the other side, but could you just let me know if there's any objection to 5591.

MR. DERR: Your Honor, is that one from last night?

JUDGE NOBLE: It's --

MR. DERR: I have some questions of the witness before I can agree to that entry.

JUDGE NOBLE: Good. We'll do that. Thank you. All right. Would you call your next witness, please.

MR. POTTER: Yes, Your Honor, I will call Scott Johnson. And Mr. Johnson has been listed by both the City of Vancouver and Clark County. So I'll likely do it -- like Mr. Hildebrand, I'll be doing direct; Mr. Hallvik may have some follow-up on direct or

redirect.

JUDGE NOBLE: Mr. Johnson, would you raise your right hand.

(Witness sworn.)

JUDGE NOBLE: Thank you.

Please be seated. You may proceed, Mr. Potter.

SCOTT JOHNSON,

having been first duly sworn,

testified as follows:

DIRECT EXAMINATION

BY MR. POTTER:

Q. Mr. Johnson, please state and spell your name.

A. Scott Johnson, S-c-o-t-t J-o-h-n-s-o-n.

Q. And, Mr. Johnson, before we get started, just a couple of ground rules. This gentleman here is the court reporter. He's making a record of this proceeding. It will be helpful if you keep your answers to questions slow.

A. Yes.

Q. And then it would also be helpful if you and I don't speak over each other. So even if you can anticipate my question, let me finish it before you start your answer.

A. All right.

JUDGE NOBLE: Thank you, Mr. Potter.

MR. POTTER: We'll see.

BY MR. POTTER:

Q. Mr. Johnson, how are you employed?

A. I am the emergency management division manager for the Clark Regional Emergency Services Agency.

Q. And is that agency referred to as CRESA?

A. Yes.

Q. All right. What is CRESA?

A. CRESA is an interlocal governmental agency that provides 9-1-1 dispatch, emergency communications support and emergency management for the seven cities in Clark County and the county itself. We are governed by an internal administrative board in accordance with the RCW and WAC instructions for an interlocal governmental agency.

Q. So are you a department of the city?

A. No, we are not.

Q. You're not a department of the county?

A. No, we are not.

Q. Okay. What are your responsibilities at CRESA?

A. As the emergency management division manager, I am responsible for administering the emergency management program in accordance with RCW instructions and WAC instructions for each of the seven cities within

the county as well as the county. We help to plan for, prepare for, mitigate against, respond to and recover from natural and technical disasters. We work with our partner agencies to create plans that are specific to our community.

Q. How long have you been at CRESA?

A. I have been at CRESA a little over three years.

Q. And did you start at the position of the emergency management division manager?

A. From February of 2013 until June of 2014, I was the training and exercise coordinator for Washington State Homeland Security Region 4, which is a position housed within the CRESA emergency management department. I have been the emergency management division manager since June of 2014.

Q. And could you just review for the council members your education and training and experience in emergency management planning and preparedness prior to going to CRESA.

A. I retired from the US military in 2008 having served for 22 years. During that time I was an on ground -- boots-on-the-ground responder to four declared presidential disasters. I have a bachelor's degree in business management, as well as attending the basic and advanced noncommissioned officer's courses in the

Navy -- I'm sorry, the Army. My final duty assignment in the Army was a battalion operations sergeant in charge of an operations center for an 800-person unit. I have completed the FEMA professional development program and I'm a FEMA certified master exercise practitioner.

Q. Mr. Johnson, have you reviewed your prefiled testimony that was filed in this proceeding?

A. Yes.

Q. Do you have any corrections to make to your prefiled testimony?

A. Yes.

Q. Okay. What is that, just briefly?

A. On page 9 I referenced a one-mile evacuation radius. I meant to say one mile, but the testimony actually says half.

Q. Okay. Other than that, do you have any other corrections?

A. No.

Q. All right. So other than that one correction, do you affirm that the testimony in the prefiled testimony is true and accurate?

A. Yes.

Q. Okay. We'll get more detailed about that correction later on. Please tell us what a hazard

identification and vulnerability analysis is.

A. HIVA, hazard identification and vulnerability analysis, is a tool that we use to identify hazards that are probably going to impact a specific community and what our vulnerability is to that. It's the foundation that we use for our emergency planning, both for mitigation and response.

Q. So does CRESA have an HIVA?

A. Yes, we do.

Q. When was it prepared?

A. 2011.

Q. When it was prepared, do you know how many crude oil trains were going through Vancouver?

A. Based on information provided to us from Burlington Northern Santa Fe and Union Pacific Railroads for the year 2010, no crude oil trains transited Clark County.

Q. Do you have more recent information on the number of crude oil trains that are going through Vancouver today?

A. According to information provided to us by the State Energy Resource Committee, SERC -- I may have the acronym wrong, but the SERC, and our LEPC, we have 10 to 16 trains moving through the county that are in excess -- I'm sorry, 10 to 18 trains moving through the

county in excess of a million gallons.

Q. And that's per --

A. Currently.

Q. Per what? Per week?

A. Per week.

Q. Okay. If you were to take the number of trains, zero in 2011, and add what is occurring today, plus another 28 trains per week related to the oil terminal, would that impact the accuracy of the HIVA?

A. Yes.

Q. How so?

A. Our current vulnerability to hazardous material was based on zero trains, so adding that would change that vulnerability from moderate. It would likely change it to a high vulnerability to a hazardous material incident.

Q. Can you tell us what a comprehensive emergency management plan is?

A. A comprehensive emergency management plan is a document that we are required to maintain by WAC that identifies how we will take an all-hazards approach to responding to emergencies within our jurisdictions. All hazards means that we look at how an incident impacts life safety, incident stabilization and infrastructure protection, not from a specific threat, but how all

responding agencies can work together and collaboratively to respond to a threat.

Q. So is the HIVA used in the preparation of the comprehensive emergency management plan?

A. Yes, it is.

Q. So if you were to change the HIVA to assess the risks associated with the amount of oil trains going through Vancouver, would that likely cause an impact to the -- call it CEMP?

A. Yes.

Q. Okay. As the manager of the emergency management division of CRESA, do you have concerns related to the ability of CRESA and emergency responders to adequately respond to a spill or a fire from oil trains from an oil terminal?

A. Yes.

Q. What are those?

A. My concerns center primarily around three areas: our ability to support incident command through rapid and timely public alert and notification, our ability to support incident command by helping to provide situational awareness that supports effective evacuation from an impacted area, and our ability to support incident command and policy makers in providing assistance in sheltering individuals who could

potentially be evacuated.

Q. Okay. In your answer, you're referencing supporting incident command. Could you explain to the council what "incident command" is and how CRESA interacts with the incident command.

A. Yes. We are required by FEMA to follow the national incident management system. Under that system, when an incident occurs, the responding agencies establish command of the incident to make the best decisions to facilitate life safety, instant stabilization and protection key infrastructure. Our role in the emergency operations center and my role specifically as the emergency manager is to provide support to the incident commander in the areas of getting them additional resources that they may need to deal with an incident, providing information to the public about the incident that can help facilitate an effective response to the incident and providing situational awareness to both the commander on scene at an incident or to the policymakers that are supporting that incident commander. We're not the incident commander for a large-scale incident. We help coordinate the response of the incident by providing resources, information and decision-making support.

Q. I would like to ask you some questions related

to notification. Can you, first of all, explain how does CRESA currently provide notification to the public of an emergency?

A. Currently, in the event of an incident, we have five ways that we can provide timely and accurate emergency alert and warning. The first is through an emergency community notification system. It is a telephone-based system that allows us to call into people's telephones, landlines, cellular phones, if they're registered, to provide them with information that's pertinent to an incident.

The second is an FCC licensed wireless Emergency Alert System that allows us to communicate with any cell phone that is within range of a cell tower that we have identified as being related to an incident.

The third is a FlashAlert system that is used to communicate with community news organizations, public and private, that we use to send messages out.

The fourth is the Emergency Alert System. It's primarily targeted at commercial radio and television. Many of you are familiar with the alert sound that you hear frequently, the three-tone alert.

And the fifth one is social media.

Q. Can you tell us how -- just with each of those methods, what do you do to prepare the message and the

transmission of the message?

A. When we have an incident commander or in the opinion of our duty officer that we need to provide public alert and warning, we will identify the scope of the incident for the emergency community notification system. We log into a web-based provider. We identify the geographic area or the predetermined list of people that we wish to contact. We record the message and then we launch the message so that it goes out to those indicated.

Q. Now, the emergency communication notification, that's over the telephone?

A. That's the telephone system, yes.

Q. Okay. And to send that out, do you map an area that that message is going to go to?

A. Yes.

Q. Okay. What's your ability to customize messages within that mapped area?

A. We don't have the ability to customize messages within the mapped area. We would identify an initial area. We would send the message. If we wished to then subdivide that area, for example, to tell a certain segment of that population to take one action and a certain segment to take another, we would have to send follow-up messages.

Q. Okay. And if you had to send a -- if you wanted to send a special message to a special type of facility, would you have to do the same sort of --

A. We would have to do the same thing, which could be complicated by our -- our ability to identify that there is a special facility within that mapped area. Our current system does not allow us to identify areas such as schools, medical facilities or other high-occupancy areas that could use -- or could require special messaging.

Q. All right. And you -- the second method was the emergency -- excuse me, the wireless emergency alert. Just what does that look like? How would I get that?

A. We log into, again, a web-based system. We type up a brief message and we identify a geographic area and any cell towers that are in that area. The message is broadcast and it rings into any cell phone that is in that area. The Amber Alert system is part of the wireless alert system that many people may be familiar with as to how that system works.

Q. Okay. To get that message on my phone, does everybody with a cell phone in that area or within the range of those towers get the message or do I have to subscribe to get it?

A. For the emergency community notification system,

you would have to subscribe. For the wireless emergency alert, if your cell phone is within that area, then you receive notification.

Q. Okay. The FlashAlert?

A. FlashAlert is, again, something that we log into separately from the previous two. We compose a message. We send it out, and it goes to a predetermined list of flash news alert providers who then push the message for us.

Q. And give us an example of who those providers might be.

A. Commercial news stations, print media. Those are people that receive flash news alerts.

Q. All right. The fourth method?

A. Emergency Alert System is, again, a system we log onto. We send the message out. We record the message. And that goes out primarily through radio and television broadcasting. It pre-empts programming that is going on, and as part of that alerting system our message goes out across those media.

Q. Okay. So that would be a pretty broad -- across anybody watching the news or if the alert happens to come on?

A. Roughly speaking, our area is from Salem, Oregon -- very roughly, Salem, Oregon, to approximately

Centralia to approximately Hood River.

Q. And then the last was social media. How do you send out messages over social media?

A. We have established social media accounts that people who follow our messaging go to for updated information about incidents that are occurring. So we use social media form of Twitter and Facebook, both of which have different types of messaging because they have different people following them. Twitter has a character limitation. Facebook we can provide a little bit more specific and detailed information. But again, it becomes a challenge of crafting a message that people are going to read without providing so much detail that they don't read it.

Q. You say each of these methods of notification have to be launched, for lack of a better word, separately?

A. Yes.

Q. With respect to providing notification of an incident involving an oil train or an oil terminal, is the ability to prepare notification different for that type of an event than other emergencies?

A. Yes.

Q. How so?

A. Our hazard identification and vulnerability

analysis identifies three natural and one technical as our primary threats. Weather events, flooding events allow for a certain amount of pre-event notification that can facilitate accurate pre-event messaging. People can be informed that events are going to happen. We can identify areas of likely impact and we can provide more detailed and timely messaging to the potentially impacted population.

A hazardous material event occurs with little to no warning and so our ability to prepare people to respond to the event isn't the same.

Q. And what about weather? Can that impact the notification and who you need to notify in the event of a hazardous material incident?

A. Weather conditions, especially wind direction, temperature, humidity, can have a bigger impact on a hazardous material event than on some of the other natural disasters, which can make identifying the impacted segment of the community more of a challenge than in a natural disaster.

Q. So I think you've described the limitation on your ability to provide customized messages through these notification systems, but why is it important to be able to send customized messages?

A. When an incident commander makes a decision

about what they would like the public to do, and that's just what it is, it's what they would like the public to do because people are going to respond in a way that's in their best interest, we want to identify specific actions. So if an incident occurs in a location and we wish to tell people north of that location to evacuate to the north, people south to evacuate south, providing that is really crucial so that people don't drive through the incident as they're trying to evacuate.

An incident commander may say that they want a certain part of the population to evacuate and then find out that there is a hospital, school within that impacted area; they may change their mind and say that they want that subset to actually shelter in place prior to evacuating. So the more situational awareness that we can provide to the incident commander to help them make those informed decisions becomes really important for our public messaging.

Q. Do you believe that your current system, with it, you'll be able to adequately cope with the demands of notification of an oil train fire or a terminal fire?

A. No, I don't.

Q. All right. Is CRESA exploring new systems that will enable you to craft customized messages and do these notifications simultaneously?

A. Yes, we are.

Q. Do you currently have funding to implement such a system?

A. No, we do not.

Q. Anything else you'd like to tell the council about notification?

A. No.

Q. All right. Let's move on to evacuation, then. What are your concerns as they relate to the evacuation of the public in the event of an oil train fire or an oil terminal fire?

A. If an incident commander is asking that an area be evacuated, our concerns are providing information to facilitate getting resources in, identifying which avenues are more effective in getting resources in, as well as effectively and safely getting people out of the impacted area. So those would be my two biggest concerns. Resources may be also needed to support special needs communities, people who have access and functional needs, people who have mobility issues, those are some of the concerns that we have when it comes to evacuating.

Q. Can you identify some of these special needs populations in Vancouver and Clark County?

A. People that live in assisted living facilities.

We have a significant number of those in Clark County. According to the Washington State Department of Health and Human Services, 43 percent of those people suffer from some form of cognitive diminished function ability and 13 percent are receiving the equivalent of in-patient hospital care.

People that attend schools, in particular to Vancouver, the State School for the Blind, the State School for the Deaf. And then people that are incarcerated are in a special needs community because they have unique sheltering requirements and evacuation requirements.

Q. Have you estimated the number of people that you would have to evacuate from certain areas in the event of an oil train fire?

A. Yes, we have.

Q. Okay. I'm going to ask you what you've done to calculate these numbers and we have an exhibit, Exhibit 3136, and I put a hard copy of that on the table next to you. Just take a moment. 3136 consists of three maps. And I'd like you to just generally -- this hasn't been admitted yet, and that's 3015, I think -- no, that's 3136. Thank you.

MR. POTTER: So, Tammy, if you could just not show it quite yet. Thank you.

BY MR. POTTER:

Q. So generally, without getting into details or numbers, what do these three maps show?

A. These maps show proposed evacuation impact areas for a hazardous material incident occurring at four areas along the rail line as it goes through Vancouver.

Q. Okay. And what radius of an area does map 1 use?

A. Map 1 uses a half-mile radius.

Q. Okay. What does map 2 show?

A. Map 2 also shows a half-mile buffer and --

Q. Can you explain what you mean by half-mile buffer?

A. So the half-mile buffer refers to a half-mile corridor on either side of the rail line.

Q. Thank you. And map 3?

A. Map 3 shows a one-mile radius and one-mile buffer.

Q. All right. Were these maps prepared at your request?

A. Yes.

Q. By whom?

A. They were prepared by the Clark County GIS office and my EOC planning staff.

Q. Why does CRESA use the county GIS database for

emergency management planning rather than other software programs?

A. There's a couple of reasons. We are an all-hazard emergency management planning agency. We've found that using our county GIS with their ability to identify geological hazards within the county, with their ability to help us identify things like flood plains as well as various infrastructure makes them a very good all-hazards planning tool for geospatial information. There are many threat-specific programs that are available, but since we're focused on all-hazards planning, not threat-specific planning, GIS is more effective for us.

The second reason is that the database that the GIS department and Clark County uses for population is updated periodically. Most of the other databases that are available that I'm aware of use the census data provided by the federal government, which is only updated every ten years. Our Clark County GIS department, again, regularly updates to reflect plot -- tax plot data, to give us a more accurate picture of how many people we may have in a certain area.

Q. Do the maps in Exhibit 3136 accurately display the -- either evacuation areas or the half-mile buffer area along the railroad tracks and the number of people

living within those areas accurately?

MR. KISIELIUS: Your Honor, at this point I'm going to object just to get it on the record. I think this is an exhibit that was provided to us over the weekend, so it's new, and in that regard, not timely. Mr. Potter has now provided foundation, I think, for this witness to testify to it, which had earlier been a concern and I think that's been resolved. But from the standpoint of timeliness, we're now entering exhibits that support testimony that was filed six weeks ago that could've been prepared six weeks ago that were not, and having to react and respond to that.

JUDGE NOBLE: Did you look at it when you received it?

MR. KISIELIUS: Yes, Your Honor. I'm more concerned about our ability to present evidence in response to that. So, again, if it's -- if Your Honor's inclination is to admit it, we'd request latitude on rebuttal to be able to now address this new exhibit that is different than his prior written testimony.

JUDGE NOBLE: All right. I haven't heard from Mr. Potter in response. I am inclined to admit it, though, and so I would grant latitude.

Mr. Potter, did you want to put something on the record?

MR. POTTER: Given your indication, Your Honor, I'll be brief. First of all, I move to admit 3136. Partly, the reason for the recent preparation of this exhibit was Mr. Rhodes' testimony where Mr. Rhodes commented on Mr. Johnson's calculation of the numbers, so I went back, reviewed that. That's when I discovered the misreference or error in that half-mile, one-mile radius and prepared these exhibits to more clearly present the information on the population calculation. I think it's completely appropriate, and I think the proponents will have adequate time to prepare any rebuttal to this exhibit between now and their rebuttal case.

JUDGE NOBLE: All right. Mr. Kisielius, did you want to say anything further?

MR. KISIELIUS: No, Your Honor.

JUDGE NOBLE: All right. Exhibit 3136 is admitted and there will be latitude on rebuttal so you should be able to respond to these, Mr. Kisielius.

You may proceed, Mr. Potter.

MR. POTTER: Thank you, Your Honor.

Now if we could display 3136.

BY MR. POTTER:

Q. And, Mr. Johnson, while that's coming up, I'm going to ask you to go through each of the three maps,

and you have a laser pointer on your table. And if you want to point to anything on the map, please use this screen here and continue to speak into the microphone. All right?

A. All right.

Q. I want to start with map 2, please.

JUDGE NOBLE: Excuse me, Mr. Potter. Can I interrupt you for a minute? Is there a way that we could get the lights turned down a little bit? Council hasn't seen this previously, and if they're looking on the screen, it's very hard to see because of the brightness of the lights. Does anyone have a switch near them? Thank you for the effort. We'll just -- there we go. Thank you. A little bit better.

MR. POTTER: Please, if we could, zoom in on that, just maybe one click.

BY MR. POTTER:

Q. Okay. So, Mr. Johnson, can you explain what the tan area is displayed on this map.

A. The tan area right here is the city of Vancouver.

Q. Okay. And what about that yellowish area?

A. The yellowish represents a half-mile buffer radius -- or not radius, but half-mile corridor on either side of the rail line as it moves through the

city of Vancouver.

Q. Okay. And did you calculate or did the GIS staff calculate the number of people living within that half-mile corridor?

A. Yes, they did.

Q. What's that number?

A. Clark County GIS identified 25,701 persons as living within that corridor.

Q. So you specified it as living. Does that include people working in the area?

A. No, it does not.

Q. Does it include people who may be recreating in the area?

A. No, it does not.

Q. What about people commuting?

A. No, it does not.

Q. Okay. Anything else on this map?

A. No.

Q. All right.

MR. POTTER: If we could go to the map on page 1, please.

BY MR. POTTER:

Q. This map has some circles -- or semicircles on it. Just please explain what these are.

A. I asked my staff to identify four areas at

random along or close to the rail line as potential incident sites and what our evacuation needs could be should an incident occur in these locations.

Clark County GIS identified, in conjunction with my staff, the intersection of Columbia and Third Street, Evergreen and 164th, Evergreen and 88th, Fourth Plain and Lincoln. These are locations that are close to but not on the rail line.

Q. All right. So those four locations, can you show us which circles correspond to those locations?

A. So this right here would be Fourth Plain and Lincoln. This right here is Evergreen and 88th. This is Columbia and Third. And this is Evergreen and 164th.

Q. Okay. What is the radius of this circle?

A. These are half-mile circles.

Q. Okay. Can you tell us the number of people living within each of those areas?

A. The number of people living within a half mile of the intersection of Columbia and Third Street --

Q. Again, just point to those.

A. That's this one right here.

Q. Okay.

A. And that's 1,095 people. Evergreen and 164th is 1,533. Evergreen and 88th is 1,532. And Fourth Plain and Lincoln is 4,436 people.

Q. Okay. Now, the last circle that you've pointed to doesn't look like it's centered right on the railroad, is it?

A. It is not.

Q. Why not?

A. When I gave the instructions, I said to find an intersection because those are easily plottable using our GIS technology. Moving on to areas off is a little bit more of a challenge for our program, so for estimated numbers, I felt that the location of Fourth Plain and Lincoln was close enough for the number estimates that we were looking at.

Q. Okay. And in your prefiled testimony, the numbers that you just testified to today is different than the number in the prefiled testimony. Is that because the difference between using a half-mile and a one-mile radius?

A. Yes.

Q. All right. Did you review the testimony of Mr. Rhodes as related to his use of a software program called MARPLOT to calculate the number of people within a half-mile radius of points along the rail line?

A. Yes.

Q. First of all, can you explain why CRESA does not use MARPLOT?

A. MARPLOT is a program developed by the US EPA that is very specific to hazardous material incidents. And as I mentioned, we do all-hazards planning. So I feel it's more effective for my staff to have a tool that applies to all hazards than to use threat-specific tools.

Q. Okay. It may be obvious, but can you just tell us what you mean by "all-hazards planning"?

A. All-hazards planning means that we look at the impact of a disaster, not specific to what caused it, but to what the disaster's impacts are on life safety, what our incident stabilization needs are and what our infrastructure protection is.

The example that we use sometimes in our public education is that if I have a flood caused by an earthquake caused by a dam failure, do I use my flood plan, my earthquake plan or my dam failure plan?

All-hazards planning doesn't look so much at the causation; rather, what efforts do we need to take to protect life safety, stabilize the incident based on what is occurring.

Q. Did you use MARPLOT to calculate evacuation numbers for a half-mile radius area?

A. Yes.

Q. Can you tell us the locations that you used it

for and the number of people that you found would require evacuation?

A. Using MARPLOT for Columbia and Third, this location right here, MARPLOT data indicated that the number of individuals is 1,179. If I move the MARPLOT pointer to the actual nearest point on the railroad at that location, the number is 1,142.

At Evergreen and 164th, MARPLOT indicated 1,479. If I move the MARPLOT pointer to the nearest railroad point, the number was 1,110.

At Evergreen and 88th, this location right here, at the exact intersection, MARPLOT had 1,227. The nearest railroad point, which is 1.79 miles difference, was 696.

At Fourth Plain and Lincoln, MARPLOT indicated --

Q. Where is that?

A. That would be this location right there. Fourth Plain and Lincoln, MARPLOT indicated 4,291. Moving that location to center it on the railroad track, MARPLOT indicated 3,563 individuals.

Q. So I just want to be clear. You're not critical of Mr. Rhodes for using the MARPLOT software, are you?

A. No.

Q. All right.

MR. POTTER: Let's go to the map on page 3 of Exhibit 3136. Thank you.

BY MR. POTTER:

Q. Same locations? Different locations?

A. These are the same locations, but this map indicates a one-mile evacuation radius.

Q. Okay. And if you could just go through the -- show us the locations and the number of people that would need to be evacuated from each.

A. So for the Columbia and Third Street, 4,469 people; for Evergreen and 164th, 7,467 people; for Evergreen and 88th, 7,015 people; and for Fourth Plain and Lincoln, 13,205 people. The total people in the one-mile buffer zone is 63,503.

Q. Okay. And the legend to each of these maps has the numbers in it; is that right?

A. Yes.

Q. Okay. Now, are you familiar with the Emergency Response Guidebook?

A. Yes.

Q. Does it have a guidance for the size of an evacuation area in the event of an incident involving a fire and a tank car containing crude oil?

A. Yes.

Q. What is that guidance?

A. The recommendation is that the initial evacuation zone be one-half mile from the incident, but the ERG also indicates that if the incident has or does expand, that that evacuation zone could expand beyond the half mile.

Q. And when you refer to the incident expanding, is that involving multiple tank cars?

A. That could involve multiple tank cars, that could involve weather conditions that cause fumes or smoke to move from the direct scene of the incident to areas around the incident, outside the half-mile area.

Q. So as the emergency management division manager, why would you use a one-mile radius in addition to a half-mile radius for planning?

A. As the emergency management division manager, my obligation is to plan for a probable event that gets worse. It's a fundamental tenet of emergency management that it is better to have more resources lined up and not need them, than to need them and not have them.

When we look at this specific threat, the initial guidance is a half mile. If that threat expands, I had to make a decision on how far I felt it would realistically or probably expand. I chose one mile. And that is the distance that I chose to do for our planning for the number of people that we would

potentially need to help move from an impacted area or potentially provide sheltering services for.

Q. All right. Are there specific locations or facilities in Vancouver where evacuation will be especially difficult, and I think on Exhibit 3015, we have a map that has some facility locations.

MR. POTTER: This exhibit's already been admitted.

BY MR. POTTER:

Q. This exhibit has two maps, this first one being displayed -- and perhaps we could just zoom in a little bit. Are there facilities with -- that are shown in this map that would present challenges for evacuation?

A. Challenges for evacuation include schools, especially primary schools where we need to bring in transport to help facilitate the movement of students out, the main area of Downtown Vancouver, which houses not just the city's central leadership, but that of Clark County, including Clark County jail, the main jail, the State School for the Deaf, as well as some of these areas south of SR-14 are areas of concern.

Q. What about CRESA? Where is it located?

A. CRESA is located approximately right there. So the main dispatch center for Clark County, as well as the emergency operations center, are within a potential

impact area.

Q. And the blue lines showing the borders of the buffer area, do you see --

A. Yeah, those are right there.

Q. Are those based on a half mile?

A. Those are based on a half mile, yes.

Q. You mentioned schools. Is there a school in the Fruit Valley neighborhood?

A. Fruit Valley Elementary, right there.

Q. You mentioned the jail and Clark County. There's two correctional facilities, are there not?

A. Yes. There's the Jail Work Center, which I think is slightly off the map, and then there is the main Clark County jail located at Franklin and Grant.

Q. You've mentioned that jail facilities are included in the special need facility. What's unique about jails in evacuation?

A. In emergency management, when we refer to "special needs population," there's populations whose evacuation or sheltering require special needs, people who may require more assistance when they get to their sheltering location because they have medical needs, people who may have communication needs.

Those who are incarcerated have special needs because of the need to provide adequate security during

transport, as well as the need to provide segregation during transport.

Once they arrive at a shelter location, there is, again, that need for additional security, and that needs to be both physical site security as well as additional law enforcement officers providing that security and, again, the segregation required for an incarcerated population. So we view them as a population that has special needs when it comes to their evacuation and sheltering.

Q. Now, the second correctional facility is the Jail Work Center, correct?

A. Yes.

Q. And the location of that is within -- surrounded by the oil terminal; is that correct?

A. Yes.

Q. Other than what you've already testified to, are there any other issues that make the evacuation of the Jail Work Center challenging?

A. As I mentioned when we began talking about evacuation, assisting with getting resources in at the same time that we're trying to get the impacted community out becomes a challenge for that particular location because of the narrowness of the roads and the fact that we would be trying to get -- if we had an

incident specific to that location, we would be trying to get a lot of resources in at the same time we're trying to bring resources in to facilitate evacuation.

Unlike a population that has their own mobility, the population at the Jail Work Center does not. So we would have to bring in transport, again, high-security transport, to facilitate movement from that location at the same time we're trying to bring resources in to deal with the incident.

Q. And how many methods of ingress or egress are there to the Jail Work Center?

A. I've looked at it, but right now I don't have it at the top of my head. Sorry.

Q. Okay. Do you have any concerns about being able -- the community having sufficient assets to provide staffing to conduct evacuations?

A. Yes.

Q. Tell us what those are.

A. When we evacuate an area, we have additional need for law enforcement personnel to facilitate the flow of resources in, as well as assisting people in getting out -- you know, traffic direction, door-to-door notification. Sometimes we have people who notify us that they have mobility issues and that they can't evacuate, and we often have to ask for additional law

enforcement personnel to assist in helping those people leave the area.

Q. In your prefiled testimony, you provided some estimate of the number of police officers that would be required for an evacuation of 7,000 to 13,000 people; is that correct?

A. Yes.

Q. And do you have those numbers?

A. Yes.

Q. What are they?

A. The number of officers required for a 7,000-person evacuation would be four sergeants and 26 officers. The number of officers required for a 13,000 evacuation would be seven sergeants and 38 officers.

Q. Yesterday, Chief Lester testified that during the day shift, Vancouver Police Department has ten officers on patrol duty, five in the west precinct and five in the east precinct. Is the difference in those numbers from what you said for the need versus what is available on the day shift a concern?

A. Yes.

Q. That 7,000 to 13,000, to be clear, is based on the one-mile radius evacuation?

A. Yes.

Q. Did you calculate a staffing need for a half-mile radius evacuation?

A. No.

Q. Did you do one for a 2300-people evacuation?

A. I did do that for lower number evacuations.

Q. What's the number and what's the need?

A. For an evacuation of approximately 500 to 1000 people, one sergeant, three officers, but there's a caveat that there would probably need to be other first responders assisting in that, potentially up to six firefighters or EMS personnel.

For a 1,000-to-2,000-person evacuation, one sergeant, five officers and, again, up to eight additional response personnel.

For 2,000 to 3,000, two sergeants, eight officers and an additional ten emergency responders to facilitate.

When you get above 3,000, then you add two officers per 500 people and one sergeant per 2,000 people.

Q. How did you calculate these needs or the number of officers needed to conduct evacuations?

A. When we began trying to look at what our staffing planning needs would be, I called several emergency management departments around the nation,

including one in Florida, and there is no template that I was able to find that indicates number of officers needed per population. It becomes an every-available officer evolution. So I took a different approach where I looked at a situation where you have a defined population in a location that you're trying to effectively move from one point to another point along limited access routes. Very similar to a university special event, using that as a base model, the University of California Riverside Police Department has a matrix using those numbers that I indicated that they use to plan for special events. Those are the number of personnel that they use to effectively move people from a special event. A lot of their population demographics would probably be similar in that they have people go to events from all segments of the community. Additionally, the need for officers at potential relocation and reunification sites would also fit in with those numbers.

Q. Okay. So the UC Riverside matrix is not specific to evacuation, is it?

A. No.

Q. And the need for officers in those events include things like crowd control as well?

A. Yes.

Q. But -- so you used it why?

A. I used it as a starting point for planning. Without an evacuation template, often it becomes our obligation to find a good starting place and then work with our partner agencies to evaluate through exercise to determine what is a good template for us. So it was a place to start.

Q. And you said you've already -- you contacted other police agencies?

A. One of the things that I also did when I was initially looking for a template is I contacted two retired Washington State Patrol troopers who work in Clark County in positions of public safety and asked them about their experience as Washington State troopers. They told me that having served on wildfire evacuation, that it was not uncommon for 46 to 60 troopers to be assigned to evacuate a population of 10,000 people for large-scale wildfires.

Q. And during an evacuation, what type of activities do the officers need to engage in?

A. Traffic control, which is both helping to get people out as well as blocking roads and streets in so that people don't enter the area. There is on-site security. There is sometimes the need to escort large transportation vehicles, like buses, to specific

locations to make sure that they get there. There is often the need to provide security at specific locations while they're being evacuated, so an area like the Jail Work Center, the main jail, other areas that might need additional security to help facilitate a safe evacuation of the facility. There's also the need for law enforcement at the location site to help identify people and provide information.

Q. The location site is what?

A. If we tell people to evacuate a location, we tell them where to go for their initial collection and information.

Q. Okay. And you need officers there?

A. Ideally we have law enforcement officers there because they help to provide information, they help provide a calming influence on people, and they help us to maintain an orderly identification and ability to provide adequate sheltering.

MR. POTTER: If we could have Exhibit 3011 displayed. Can you see that all right, or do you need the lights dimmed?

BY MR. POTTER:

Q. Exhibit 3011 has five maps to it, I believe. What is that yellowish area that is shown on this first map?

A. That would indicate the areas of the city south of State Route 14.

Q. And is there a reason that that area would be particularly challenging to evacuate?

A. I have concerns because there are five roads, Columbia Shores, Shorewood, Liesser, Ellsworth and 164th.

Q. So just --

A. So here, here, here, here and here, that allow people to go from south of SR-14 to evacuate north of SR-14, if that were called for.

Q. Are those the only routes to go over Highway 14 to evacuate the south area?

A. Yeah. Yes.

Q. Were those streets designed to serve as evacuation routes?

A. No.

Q. And what's the difference between those roads and --

A. Width. Choke points. The fact that you can't easily circumvent them. Ideally, evacuation route roads are either more than two lanes, have the ability to have lane dividers easily removed to facilitate large-scale one-directional traffic or have the ability through other side streets to move around a bottleneck if it

occurs.

Q. Are these two-lane roads?

A. Yes.

Q. You testified earlier that you have to get resources into the area as well as get people out of the area.

A. Yes.

Q. With this being limited to five roads, would some of them serve as ingress and others serve as egress?

A. Yes. And one of the challenges is that the initial responding units will probably identify which roads are ingress roads, and then we would begin notifying the public which were the egress roads. But we're going to have individuals that may not be able to get to the egress roads because they're between the -- the incident is between them. There's also the need for additional law enforcement to unsnarl traffic that may have been heading to use an ingress road as an egress road.

Q. So with respect to informing the public, does that go back to your earlier testimony about the notification system and the limitations on being able to customize messages?

A. Yes.

MR. POTTER: And if we could just scroll through the other remaining maps. I believe they just show a closer view of these five roads, but let's just...

BY MR. POTTER:

Q. So where is Downtown Vancouver in this map? So we're starting from the west?

A. Yes.

MR. POTTER: And the next map. So moving east.

BY MR. POTTER:

Q. All right. Anything else you'd like to tell us about your concerns on evacuation?

A. Our ability to help facilitate that flow if we get that request.

Q. Let's move to sheltering, then. Does the need for sheltering occur in phases?

A. Yes.

Q. Explain.

A. When an incident occurs, there is the first 72 hours from the time it occurs to approximately three days. Experience and information provided by FEMA and the American Red Cross generally tells us that our greatest shelter need is going to occur during that period. After 72 hours, when we enter the second phase

of sheltering, we usually have a better understanding of the incident, its impact, who the affected individuals are, and so we're able to tailor our sheltering needs more specifically.

Q. And did you calculate the sheltering needs for the seven to 13,000 -- that's kind of ominous.

A. Yes, I did.

Q. I'll restate the question. Hopefully without music.

Did you calculate the sheltering needs for an evacuation between 7,000 and 13,000 people?

A. Yes, I did. Again, FEMA and the American Red Cross data indicate that within any impacted community, between 5 to 20 percent of that community could need sheltering within the first -- for an incident that lasts longer than 12 hours. And so we did some calculations based on the seven to 13,000.

Q. And what were the numbers?

A. So 1,400 to 2,600 for up to 72 hours based on the FEMA model for a one-mile evacuation.

Q. And did you also do a calculation for a half-mile radius?

A. Yes, I did. For a half mile, using the same FEMA ARC methodology, 219 to 888.

Q. So explain to us what are some of the sheltering

challenges that you would foresee in the event of an oil fire in either the terminal or along the train route.

A. Unlike prenotice events where those who have economic resilience are often able to relocate themselves away from the area of impact, which lowers the need for sheltering, no-notice events or events that occur in areas of low economic resilience increase the number of people that need sheltering. So that's one concern specific to this hazard.

The second, again, is the lack of, you know, the ability to identify what segments of the community may need sheltering. For such an incident like this, we may have to have multiple shelters. We have shelters where we'll have people who have access needs which have to be ADA compliant. We have shelters where we'll have people that will have communication needs. We could potentially have shelters where we need to move large groups of people and keep them together, like I mentioned the Jail Work Center. So those are some of our sheltering concerns.

Q. Do you have a sufficient number of shelters for -- to shelter 2600 people?

A. Right now, that would be a challenge. I don't know if we could effectively shelter that number of people within the 12- to 24-hour time frame.

Q. Does the socioeconomic status of the affected population exposed to a catastrophe have an impact on their evacuation or sheltering?

A. Very much.

Q. Explain.

A. Individuals that have economic resilience are more likely to have the ability to leave an impacted area on their own. They're more likely to have the ability to provide for sheltering, either by paying for temporary lodging, or travel to some place where they can stay with a different individual. They're less reliant on public transportation. And so areas with greater economic stability have lower sheltering needs for most type of natural disasters.

Q. How would the Fruit Valley neighborhood fit in this socioeconomic scheme?

A. The Fruit Valley neighborhood is one of the lowest economically resilient areas in Vancouver.

Q. And it is also one of the neighborhoods closest to the oil terminal?

A. Yes.

Q. All right. Final question. We're just going to give you an opportunity to summarize what you think are the greatest challenges for CRESA presented by this project.

A. Our ability to adequately provide effective public alert and warning in support of incident command, our ability to provide timely situational awareness to help incident command make evacuation decisions and our ability to support the community by helping to identify suitable sheltering locations and provide information and resources to support effective sheltering.

MR. POTTER: Mr. Hallvik may have --

MR. HALLVIK: I don't have any additional questions.

JUDGE NOBLE: Cross-examination?

CROSS-EXAMINATION

BY MR. KISIELIUS:

Q. Good morning, Mr. Johnson.

A. Good morning.

Q. My name is Tadas Kisielius. I'm an attorney -- one of the attorneys for the applicant. I have a couple of questions for you about your testimony -- your written testimony and your testimony here today.

I would like to start with your discussion about planning and the planning documents, and here I'm referring specifically to the comprehensive plan that you described, the emergency management comprehensive plan, as well as your hazard identification and vulnerability analysis. Do those documents in their

current form address hazardous material spills?

A. Yes.

Q. Do they address derailments?

A. No.

Q. Do they address acts of terrorism?

A. Yes.

Q. So when you say you'd need to adjust those documents, is it because those risks aren't addressed or because you're seeing a potential greater need based on your assumption of the rail volumes?

A. If I understand the question correctly, you're asking would an increase in rail volume cause us to reevaluate the hazardous material vulnerability?

Q. I'm referring to your testimony earlier this morning where you said you would need to rerun the HIVA and it was on the basis of increased rail traffic. I guess what I'm trying to understand is, given that these documents address hazardous material spills, is your testimony that the change that you described is prompted just by the increase in rail traffic?

A. The 2011 HIVA was based on data provided in 2010 which indicated what type of hazardous materials were prevalent at that time. If we have a significant change in the amount of those hazardous materials, we would have to re-do the hazard and identification

vulnerability analysis to determine what impact that increase in volume would have.

Q. Okay. But the documents address hazardous material spills?

A. Yes.

Q. And the response would be the same for a hazardous materials spill today from a derailment as it would be if this facility was built, if there was more traffic?

A. That's a response question. We support responders. So how they would respond is beyond my knowledge. We support incident command when they request resources, information and decision-making.

Q. But the documents you're describing, and particularly the comprehensive plan, talk about mobilization of response efforts and county and city resources, correct?

A. Yes.

Q. And that would be the same today if there was a derailment of a unit train of oil as it would be after this project is built?

A. Yes.

Q. I would like to ask you a couple of questions related to the mapping. I think this was Exhibit 3136.

MR. KISIELIUS: Ms. Mastro, if you could

pull that up for us. Thank you.

BY MR. KISIELIUS:

Q. So I think you explained why none of the circles depicted on the map are centered on the rail line. You said, in your opinion, they were close enough. I think that's the phrase you used.

A. Yes.

Q. Do you know how far the center of those circles were from the rail route? Let's say, for example, the Fourth Plain and Lincoln.

A. Fourth Plain and Lincoln is approximately .176 of a mile different from the center intersection of Fourth Plain and Lincoln to the nearest railroad point going generally in a westerly direction.

Q. And how about the Evergreen and 88th?

A. Evergreen and 88th is approximately .179 miles difference going generally in a southerly direction.

Q. How about Evergreen and 164th?

A. Evergreen and 164th is approximately .083 miles difference, again, going in a generally southerly direction.

And Columbia and Third is approximately .016 miles different going generally in a southwesterly direction.

Q. Okay. Let's focus a bit on the Fourth Plain and

Lincoln location specifically. Why was that specific location selected?

A. I asked them to pick areas of low rail traffic to high rail traffic in that proximity to the rail yard is why that one was identified.

Q. So are you -- so it's -- just to be clear, it's close to the rail yard?

A. Yes.

Q. And is that on the north-south line?

A. Yes.

Q. What's your familiarity with -- or understanding of the route that the loaded trains that are traveling to this facility will take?

A. It's my understanding that they would likely not be on that, that they would -- that it's unlikely that a loaded oil train would be in that location.

Q. Okay. So is it your testimony that this is still somehow representative of a risk created by trains traveling to this project?

A. If there were a train carrying hazard material that had an incident close to that location, then that could be a -- representative of an affected population.

Q. Okay. But you just said that trains traveling to this facility are not going to be using that route.

A. Trains traveling to the proposed facility, no.

But a hazardous material incident -- because we would use this same type of methodology for any hazmat incident occurring along the rail. So that's why it's valuable to us as a planning tool because it provides information that's compatible with our all-hazards approach to planning.

Q. So it's reflective of a risk of existing rail traffic?

A. Yes.

Q. I want to ask you, you at one point used the phrase -- as you were describing the difference between the half-mile radius and the one-mile radius, you talked about your job and you said you were looking at a probable event, was the phrase that you used, in trying to plan for that.

A. Yes. Yes.

Q. Is it your testimony that the derailment incident in these locations is probable?

A. If an incident occurs, there is a probability that the incident could expand.

Q. Okay. So you're not saying -- have you looked at all at whether these incidents are probable or the probability of one of these things occurring?

A. I have not looked at the specific probability of this type of incident. But when an incident of any type

occurs, there is a probability of expansion.

Q. And so here we're talking, again, about the expanse from a one-half mile evacuation to as much as a mile evacuation. Are you familiar with the testimony of the Mosier fire chief about the evacuation distances in that recent event?

A. No, I'm not.

Q. Okay. And he testified that it went from a half mile, and it was actually reduced to a quarter mile.

A. Yes.

Q. So can they go the other direction as well?

A. Yes.

Q. Also on the mapping, you testified to the population within the half-mile corridor, which is depicted in the first page of the map, and the population within the one-mile buffer area around the rail line. You're not suggesting that that number, the total population that's within that corridor, is the pop representative of a potential evacuation of an event, are you?

A. I'll use the term "impacted, but not necessarily requiring evacuation." Our experience working as part of the 9-1-1 center tells us that when an incident occurs, we have a lot of people that may not be in what emergency responders define as the impacted area, but

their perception of their safety means that we have to address their concerns.

Q. Okay. But in terms of the radius that you're talking about, there's no scenario under which you get numbers like that, whether it's half mile or mile?

A. No.

Q. I want to talk about some of your testimony related to evacuation, and I think you -- you focused a lot on -- today, on the area south of Highway 14, but in your written testimony, I think you identified two other areas so I want to talk about all three briefly.

A. Sure.

Q. For the areas south of Highway 14 --

MR. KISIELIUS: Ms. Mastro, if you could pull up Exhibit 3011.

BY MR. KISIELIUS:

Q. This is the map to which you had testified.

MR. KISIELIUS: And if you could pull up page 2 of that exhibit, please.

BY MR. KISIELIUS:

Q. In your count of the various ways out, I noticed that you don't identify Southeast Columbia Way. Doesn't that road also get out of that area and into downtown?

A. Yes, it does.

Q. Okay. Let's switch to some of the other areas

that you referenced in your written statement. You had also talked about Old Lower River Road and State Route 501. So just to orient us, is that the intersection when you're heading away from the project site, there's that new flyover that hits then the first main road?

A. No. The SR-501, that's the Jail Work Center.

Q. Correct.

A. Yeah.

Q. And so, again, that's -- to get to that intersection, if you're leaving the facility, there's that new flyover that was built to get there.

A. Yeah. Yes.

Q. So is it -- is it your testimony that that's the only way out for the Jail Work Center?

A. I think it would be the most effective way that an incident commander may want to bring people in or out.

Q. Okay. But are there other ways in or out?

A. Yes.

Q. Can you recall how many?

A. No.

Q. The third area you talked about was a Fruit Valley evacuation. So first and foremost, under what scenario do you envision a train traveling to the

facility or a facility incident itself would prompt an evacuation of the Fruit Valley neighborhood?

A. That, again, would be a general hazardous materials incident in that area on one of the rail tracks requiring us to notify or potentially evacuate that area.

Q. I guess I'm trying to understand. Is that -- is there any scenario under which a train traveling to this facility could have an incident that would trigger an evacuation based on the half-mile radius of the Fruit Valley neighborhood?

A. A train traveling specific to the proposed facility, not that I was able to see in a half mile, but we did this planning as a general all-hazards.

Q. So you're talking again about the trains traveling through the city and to the north again?

A. Yes.

Q. Okay. And on that topic, I guess let's just assume that you do have to evacuate the neighborhood. You had mentioned a potential bottleneck that you were concerned about. Isn't there a way to go north on Fruit Valley Road and avoid the bottleneck that you were talking about?

A. If an incident occurred that precluded evacuation to the north, that would be my concern if we

were bringing resources in through the Mill Plain/Fourth Plain interchange and trying to get people out.

Q. But there is more than just one way in or out, correct?

A. If you're heading north up Fruit Valley, no.

Q. But there's the south way, then, to Mill Plain Boulevard --

A. Yes.

Q. -- is what I meant. Okay. With the evacuation of populations, kind of staying on this topic, doesn't the comprehensive plan talk about transportation and mobilizing C-TRANs?

A. Yes.

Q. And in your testimony you don't really talk about that?

A. No.

Q. Are there other aspects of the comprehensive management plan that you do not consider when assessing risk from this facility?

A. Depending on what type of incident, we may look at one specific part of the comprehensive risk management plan. There could be various parts. It depends on what the incident is.

Q. I want to talk a little bit about the planning standard that you described, the University of

California staffing levels for evacuation. So to be clear, this is a standard that is related to crowd management at a university event; is that correct?

A. Specifically, it was designed for special events occurring at the University of California, Riverside.

Q. And as I look at that matrix, I guess it looks like there are four different scenarios that they identified. Does that sound familiar?

A. The matrix identifies low risk, medium risk, high risk, and then they also look at the type of event.

Q. So can you tell us what those types of events are?

A. They had musical concerts, I believe, sporting events and guest speakers, those type of events.

Q. Do you have the document in front of you?

A. No, I don't.

Q. Would you like to see a copy? I have a couple more questions for you about that.

A. Sure. Thank you.

Q. So of the various events listed in that matrix, did you pick the one with the highest staffing need?

A. Yes.

Q. Okay. Is there any particular reason?

A. I thought that in the context of an event that isn't an exact match but shared some of the same

characteristics, a large body of people, body of people that may be emotional about an event, I felt that between the invited guest speaker and the live concerts probably, for a very rough planning tool, came the closest to the type of event that we could be looking at.

Q. Okay. In your testimony, to kind of walk through, I think, the numbers in that matrix, you identified the number of officers and sergeants. But then you also said, there may be more need for other types of first responders and you gave specific numbers. Does that matrix talk about other first responders?

A. So in this matrix they used the term "private security," and looking at some of the other documents that support this, there was one that said, that for a wildfire evacuation, private security would be supplemented by firefighting personnel.

Q. Does this matrix talk about that?

A. No, not this particular one.

Q. And in this matrix, as they're talking about a live concert event, is it your testimony that the need for private security in front of a stage is the same thing as a -- tantamount to first responder needs?

A. This is a rough planning tool to give us a place to start to identify potential staffing needs.

Q. Have you ever used this planning standard before this case?

A. This is one that we use specific to looking at this type of incident.

Q. But before this case, have you ever?

A. No.

Q. Okay. And it's not in the City's plan?

A. No.

Q. Okay. I want to touch a little bit on the sheltering numbers that you gave. I think in your written testimony and I think today, again, you also said, between 5 and 20 percent of an evacuated population needs sheltering.

A. Yes, based on FEMA and American Red Cross data for an event lasting more than 12 hours, 5 to 20 percent is a generally accepted planning number.

Q. And in your written testimony and also again today, you gave a number assuming the seven to 13,000 population.

A. Yes.

Q. Was that the 20 percent or the 5 percent?

A. That's the 20 percent.

Q. Did you look at the 5 percent?

A. Yes.

Q. Could you tell us what that is?

A. I don't have that math here.

Q. Okay. If I told you it was between 350 and 650, does that sound about right?

A. Yes.

Q. Okay. Now, you also ran through some of the lower evacuation numbers and I think you said between -- correct me, but I think you said between 200 to 887?

A. Yes, 219 to 888.

Q. And is that based on the 20 percent number or the 5 percent?

A. That's based on the 20.

Q. Did you run the 5 percent number?

A. I did, but I don't have them here.

Q. If I told you that was between 55 and 221, does that sound about right?

A. Yes.

Q. And let's stick with that for a second. The high end of both of those, whether it's the 5 percent or the 20 percent, is that based on the Fourth Plain and Lincoln population?

A. Yes.

Q. Okay. Staying on the topic of sheltering, does the comprehensive emergency management plan talk about sheltering and the resources that can be mobilized to provide that beyond the hotels that you testified to in

your written statement?

A. Yes, we have an annex that addresses mass care and shelter.

Q. And do you incorporate things like park district facilities?

A. We -- the plan has different partners indicated we would work with to try to provide adequate sheltering.

Q. And is one of them the park district?

A. The park district?

Q. The park district facilities for sheltering, yes.

A. I'm not familiar with the park district.

Q. Okay. How about schools?

A. Yes, it does identify schools as partners.

Q. And what about the Red Cross?

A. The Red Cross is identified as a partner in sheltering.

Q. Okay.

MR. KISIELIUS: Mr. Johnson, I have no further questions. Thank you.

THE WITNESS: Thank you.

JUDGE NOBLE: Mr. Potter, it is almost 10:30. So I would suggest this is a good time for our 15-minute break.

MR. POTTER: That would be fine.

JUDGE NOBLE: Thank you. We will be off the record until 10:43.

(Recess taken from 10:28 a.m. to 10:45 a.m.)

JUDGE NOBLE: Are we ready to go back on the record? We're two minutes late.

All right. Redirect?

MR. POTTER: Thank you, Your Honor.

REDIRECT EXAMINATION

BY MR. POTTER:

Q. Mr. Johnson, just a couple of questions on the need for the revision of the hazardous -- HIVA, what's it stand for again?

A. Hazard identification and vulnerability analysis.

Q. Thank you. You testified that at the time that was prepared in 2011, you relied on 2010 data from BNSF and Union Pacific that there were no oil trains going through Vancouver at that time?

A. Yes.

Q. And that today, the estimate is somewhere between 10 and 18 oil trains per week going through the city?

A. Yes.

Q. And this project would add approximately another

28 oil trains per week, so you'd be going from zero to 38 to 46 oil trains per week?

A. Yes.

Q. Does the frequency of an exposure to a risk factor into the HIVA?

A. Yes.

Q. How so?

A. It factors into both the probability and the vulnerability. Both for natural and technical or manmade disasters, how often we are exposed to that risk could impact its probability or our vulnerability. So in the case of hazardous materials, when we look at that, we look at the ones that come through, what their impact could be if an incident was around that type of material and then the volume of it. So an increase in volume has the potential to change our vulnerability to that type of incident.

Q. We've talked a fair amount today and in your prefiled testimony about the number of people needing to be evacuated within a defined area, correct?

A. Yes.

Q. When you send out an evacuation notice, or agencies like yours, do only the people within that mapped area leave?

A. No. When we send out a notice to specific

geographic areas, several factors contribute to that message going beyond that defined area. In the case of telephones, telephone switches can stretch for multiple blocks, meaning that people outside a defined area could receive that type of notification.

In the case of wireless emergency alerts, the coverage area for a particular cell tower could extend beyond our defined area. There are people who sign up for alerts based on locations where they have interest -- it's the location where they work, where their children go to school -- so they can take action based on their concern for that area.

Predefined mapping also creates hard lines where people react based on their interest. I may draw a line that bisects a street and I may plan for only the people on the south side of that street to react. Experience tells me that the people on the north side are likely to react as well, even though it's outside of my predefined line. Those numbers are used for realistic order of magnitude planning as opposed to very specific.

Q. Lastly, with respect to sheltering, you said that the American Red Cross, maybe one other agency --

A. FEMA, Federal Emergency Management Agent.

Q. -- has that range of 5 to 20 percent, and you used 20 percent.

A. Yes.

Q. Why?

A. One of the basic tenets of emergency management, it is that it is better for me to have assets in place that I don't use, it's better for me to activate assets that I stand down, than to need assets that I have not planned for. If we have the capacity to provide sheltering for the 20 percent, then I know I will have sheltering capacity for the 5 percent.

Q. And the staffing needs for evacuation was not just based on the University of California, Riverside matrix, was it?

A. No. It was also based on the information that we got from the two retired WSP officers, as well as looking at some of the needs we have had for other type of emergency incidents where we've had to divert people.

MR. POTTER: No further questions.

JUDGE NOBLE: Council questions?

Mr. Snodgrass?

MR. SNODGRASS: Good morning. And thank you for your testimony. A couple of questions.

You had talked about protocols for a response to an incident, and I think that was discussed of a train with a fire. Would there be an evacuation of a train derailment in the residential corridor within

Vancouver where there was a release but no fire?

THE WITNESS: That would be a decision that the incident commander would make based on their assessment of the situation.

MR. SNODGRASS: Okay.

THE WITNESS: If they asked for one, we would help facilitate it. If they didn't feel it was a need, then we wouldn't.

MR. SNODGRASS: Okay. Trying also to get a sense of costs for responses to these kind of incidents. As part of your planning, either for a rail incident or any other, can you give us a -- do you know a ballpark sense of what the public costs would be to respond, or at least the evacuation if that's all you have, to an incident?

THE WITNESS: No, I don't.

MR. SNODGRASS: Do you know of any other way we might find that information? Part of our charge is to look at some of the economic impacts as well, and so I'm just wondering -- I have no idea at all what a response is to some of these incident costs, but I could imagine it might be significant.

THE WITNESS: I would have to give that some thought as to how to do that. That's -- we do financial disaster modeling, but that's usually direct costs.

MR. SNODGRASS: Thank you.

MR. SHAFER: Mr. Johnson, thank you for your testimony this morning. One question.

Just trying to better understand the context of being -- the preparedness for this event in the context of other events at large, but just generally, say across the community as the agency prepares for either natural or manmade events, whether it be flooding, earthquake, other inclement weather events, whether it's more manmade, if you look at, say, the power grid, the electrical power grid, the grid of natural gas, maybe industrial sites, so of all the potential sites and incidents out there, does the agency keep like a listing or a ranking of all of those and if you do, where would this -- where would this project fit on that list?

THE WITNESS: The hazard identification and vulnerability analysis lists the hazards that we have the greatest probability in high, medium and low, and our vulnerability on high, moderate and low. The top four are earthquake, winter weather, flooding and hazardous material. All three of those have a high probability rating. The three natural disasters have a high vulnerability rating. Hazardous material currently has a moderate vulnerability rating.

MR. SHAFER: Thank you.

JUDGE NOBLE: Any other questions, to my right?

Mr. Moss?

MR. MOSS: Just one quick thing. I believe I heard you say "all three had a high probability." Did you mean all four?

THE WITNESS: Yes, sir.

MR. MOSS: Thank you.

JUDGE NOBLE: Any other council questions?

MR. SIEMANN: Just a quick one. Who provides your funding for CRESA?

THE WITNESS: CRESA as an agency or the CRESA emergency management division, sir?

MR. SIEMANN: Well, let me ask actually a different question. So one of the concerns that you raised was about all of the -- so the alert systems and the funding for -- or the lack of resources for sheltering and challenge with evacuation. How would the sheltering and the alert systems be funded?

THE WITNESS: The systems that we have now are funded, in part, by federal emergency management grants that support our program, in addition to contributions through the per capita that is used to support the emergency management program.

If we were to increase the functionality of the department, then we would go to the eight jurisdictions that support emergency management and ask for an increase in per capita to support that. That's one potential funding source.

Another would be to request a specific amount of funding for a specific project from each of our participating jurisdictions.

MR. SIEMANN: So in some ways it comes from FEMA and in some ways it comes from local taxpayers; is that --

THE WITNESS: The emergency management, yes, we are supported by federal grants, as well as per capita taxpayer from each of the jurisdictions.

MR. SIEMANN: Do you know if the railroad provides any support for your -- for those efforts for the -- either for your -- for CRESA, as an emergency management agency, or for the alert system or for the sheltering?

THE WITNESS: We have no contributors to the emergency management other than the eight jurisdictions, the county, the seven cities and federal emergency management grants.

MR. SIEMANN: Thank you.

JUDGE NOBLE: Mr. Rossman, did you have a

question?

MR. ROSSMAN: No.

JUDGE NOBLE: Okay. Mr. Lynch?

MR. LYNCH: Good morning. Thanks for your testimony today.

Are you familiar with the NuStar facility?

THE WITNESS: In general, yes, the proposed location.

MR. LYNCH: Right. And that will be bringing in oil trains to the Port of Vancouver?

THE WITNESS: Yes.

MR. LYNCH: Is there any planned update to your emergency plans as a result of that proposed project coming in?

THE WITNESS: If that project were to come in, we would speak to the port about their increased emergency management vulnerabilities, gaps, needs and ways that we could assist them in addressing those needs, gaps and vulnerabilities.

MR. LYNCH: Does the volume of that proposed project, the amount of oil coming in, how would you say that increases the probability vulnerability?

THE WITNESS: When we have zero exposure in 2010 and we have a significant increase -- pardon me. We had zero volume in 2010 of a particular hazardous

material and we increase it significantly, I believe it would change the vulnerability aspect of our hazard identification and vulnerability. How it affects it is something that would be determined when we looked at the totality of the project.

MR. LYNCH: But you don't have an opinion at this time on how that would affect it?

THE WITNESS: I think that it would increase the likelihood that we would see the challenges -- or that the concerns I have that we would -- that we would face those, because we have an increase in the amount of material.

MR. LYNCH: Okay. Thank you.

JUDGE NOBLE: Any questions based on council questions?

MR. KISIELIUS: No, Your Honor.

JUDGE NOBLE: Mr. Potter?

MR. POTTER: Just the one on Council Member Lynch's questions.

REDIRECT EXAMINATION

BY MR. POTTER:

Q. The NuStar facility, do you know the amount or the number of trains per week that that project would bring into the city?

A. No.

MR. POTTER: Okay. That's all.

JUDGE NOBLE: Mr. Johnson, thank you for your testimony --

MR. BARTZ: Excuse me, Your Honor. This is Dave Bartz from the Port of Vancouver.

JUDGE NOBLE: I'm sorry, Mr. Bartz. Didn't see you.

CROSS-EXAMINATION

BY MR. BARTZ:

Q. Mr. Johnson, just one brief question. Are you aware --

JUDGE NOBLE: The court reporter needs to hear you.

MR. BARTZ: I'm sorry. I didn't have the mic on. I'm sorry.

JUDGE NOBLE: Okay.

MR. BARTZ: Thank you.

BY MR. BARTZ:

Q. Mr. Johnson, briefly. That NuStar facility you were just discussing, are you aware that that's now proposed to be an ethanol facility and not a crude-by-rail facility?

A. No. But our addressing any potential hazardous material incident methodology would remain the same.

Q. Have you visited the Port of Vancouver in the

last couple of years to discuss the current proposal for this project?

A. I have visited the Port of Vancouver on a general awareness tour. We have spoken to the Port of Vancouver's emergency manager about various assistance that our program provides, but nothing specific to this project.

MR. BARTZ: Thank you.

No further questions. Thank you, Your Honor.

JUDGE NOBLE: Anyone else?

MR. POTTER: Nothing further.

JUDGE NOBLE: Now, Mr. Johnson, you are excused for real this time.

THE WITNESS: Thank you, Your Honor.

JUDGE NOBLE: Thank you for your testimony.

Are the parties ready with another witness?

MS. BOYLES: Yes, Your Honor. I would call Mr. Ian Goodman to the stand.

JUDGE NOBLE: Mr. Goodman, would you raise your right hand, please.

(Witness sworn.)

JUDGE NOBLE: Thank you. Please be seated.

Ms. Boyles.

IAN GOODMAN,
having been first duly sworn,
testified as follows:
DIRECT EXAMINATION

BY MS. BOYLES:

Q. Mr. Goodman, could you please state your name and spell your name for the record.

A. Ian Goodman, I-a-n G-o-o-d-m-a-n.

Q. And did you prepare prefiled written testimony for this adjudication?

A. Yes.

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

A. Yes.

Q. Mr. Goodman, a copy of your CV has been provided to the council.

MS. BOYLES: And for the council's reference, that's Exhibit 5589.

BY MS. BOYLES:

Q. But could you please give the council a summary of your educational and professional background.

A. Yes. My academic training was at the Massachusetts Institute of Technology, MIT. My major was in civil engineering with a specialty in transportation systems. The transportation systems have

strong linkages with energy systems. I was attending college during the energy crisis of the 1970s and became very interested in energy systems.

Since I graduated, I have specialized in the analysis of energy systems, specifically in energy economics and regulation. I have over 35 years of experience in the analysis of energy systems. I have published over 60 articles and other publications on a variety of energy topics and I've also appeared as an expert witness. This is my 50th appearance.

Q. And currently you work as The Goodman Group with Ms. Brigid Rowan; is that correct?

A. Yes. My testimony in this case was prepared with the in-depth participation of Brigid Rowan. Brigid's academic training is in economics. She has over 20 years of experience in energy regulation and economics.

MS. BOYLES: And, again, for the council's information, the resume of Ms. Rowan is also -- can be found at Exhibit 5590.

BY MS. BOYLES:

Q. I want to deal with just outstanding objections to two of the exhibits to your testimony, sir. Most of them have been stipulated and admitted. The Port has objected to the admission of two documents, that's

Exhibits 5581 and 5582. Without discussing their contents, could you describe what these documents are.

A. These are two reports by the Sightline Institute. They are snapshots of existing and proposed crude-by-rail facilities and other energy transportation facilities in the Pacific Northwest.

Q. And did you rely on these reports in arriving at your opinions about the Tesoro Savage project?

A. I reviewed these reports to identify the projects and then did additional analysis, looking at the footnotes, doing independent research to verify the information contained therein.

Q. And are they the type of report that experts in your field typically rely upon?

A. Yes.

MS. BOYLES: Your Honor, I move the admission of Exhibits 5581 and 5582.

JUDGE NOBLE: Objections to the admission of Exhibits 5581 and 5582?

MR. BARTZ: Yes, Your Honor, Dave Bartz for the Port of Vancouver. I'll begin with more at the end, which is Rule 703, which allows an expert to talk about these things, but the evidence doesn't need to -- or the facts upon which he relies doesn't need to be in evidence. So we're not talking about his opinions or

stopping anything that he's prefiled or we'll talk about today, but these exhibits are not worthy and not qualified to be admitted into evidence. They're irrelevant. They're pitch pieces by an organization which is an antifossil fuel organization which is tightly aligned with one of the plaintiff groups represented by Earthjustice. One of the articles provides acknowledgments to Ms. Boyles for her review and consulting on the development of the document. It's not the kind of review documents that ought to be in here. These are just recitations by the people who don't like this project, which there are plenty of those here already, and they don't add anything, not affecting his testimony. We just don't think these two exhibits rise to the level of exhibit quality material that ought -- that are not relevant. They don't make anything more or less probable, it's the recitation of others, at best. And as the witness just acknowledged, he investigated the footnotes and verified the independent information himself. So he doesn't need the articles. The articles don't affect his opinion. They don't need to be in evidence. They shouldn't be admitted.

JUDGE NOBLE: Response?

MS. BOYLES: Mr. Bartz is mischaracterizing

what those two reports are. They are, in fact, factual reports summarizing and putting in one document, one convenient place, the type of projects which are proposed in the Pacific Northwest.

Sightline Institute is a research institute which is unaffiliated with any other particular group and has been relied on by other experts to provide that kind of factual sifting and summary.

I am indeed thanked in a footnote on one of these articles, but given that I have been involved in many of these proceedings asking me about the legal -- where things stand, seem to be a fairly cautious approach to finding out the facts. So there is nothing about these and the advocacy in these that is related to what Mr. Goodman relied on for.

MR. BARTZ: Your Honor, if I might, just the mere fact that we have to have this conversation with a counsel representing the party, suggests these exhibits shouldn't be in evidence.

MS. BOYLES: I have no idea what that means, Your Honor. I did not write them. I was thanked as having looked at them.

JUDGE NOBLE: Mr. Bartz, do you want to say any more? I wasn't sure what you meant.

MR. BARTZ: I'm sorry for being plain.

Evaluating whether or not counsel participated in the production of an exhibit relied on by her witness just shouldn't be the kind of conversation we should have about an exhibit. It doesn't need to be in evidence. We can get his testimony. That's all we're saying.

JUDGE NOBLE: All right. Plain is good. I'm looking at Evidence Rule 703, and I have looked at both of the exhibits. They do appear to be facts and data upon which this expert's based his opinion. The one thing I am considering is whether they are of the type reasonably relied upon by experts in a particular field in forming opinions, and I'm looking over the two exhibits and they do appear to be so. So I just -- I think that they're both admissible under 703, and I also think that they're admissible under APA statute that I quoted a few times here, 34.05.452. So I'm overruling the objection, and Exhibits 5581 and 5582 are admitted.

MS. BOYLES: Thank you, Your Honor.

BY MS. BOYLES:

Q. Mr. Goodman, in preparation for your testimony today, what else did you review?

A. Since the filing of my testimony, I reviewed the written and live testimony of Brad Roach, the written and live testimony of Todd Schatzki, the live testimony of Keith Casey. I've also watched online all of the

hearings that were posted and reviewed the exhibits. I will admit I didn't give every second as complete a review as the witnesses I specifically identified, but I did watch all of them, listened to all of them.

In addition, I have reviewed reports by the Washington attorney general relating to gasoline pricing in Washington, since that issue arose in the testimony of Brad Roach.

Q. Could you please give the council your views on the economic need for this project in Washington.

A. Yes. In my testimony we define economic need for the VEDT as the economic need for the facility to supply Washington energy consumers with abundant energy at reasonable costs. There is no economic need for the VEDT to supply energy to Washington.

Q. And what is your opinion based on?

A. Washington is already receiving abundant energy at reasonable costs from its existing energy logistics facilities, which are -- as well as refineries, which are very extensive. The Washington refineries produce far more refined products than are consumed in Washington. Approximately half of the output of the refineries is sent to neighboring states and internationally.

This is a strong indication the existing

refineries -- which are operating at capacity and have continued to operate at capacity under a very wide variety of circumstances and are expected to continue operating at full capacity in the future -- are already helping to supply Washington with sufficient energy supply, as well as sending extensive energy supplies to neighboring states. The VEDT is not necessary to provide energy supplied to the Washington refineries.

Q. I believe in your testimony, you describe the Vancouver Energy Distribution Terminal, that's the VEDT, as a conduit energy facility. What is that?

A. This is a terminology which we've utilized for a facility which receives crude that is produced in another jurisdiction, handles the crude and then sends it on to be refined in a -- distribution outside of -- in a jurisdiction outside of this jurisdiction. So basically, the activity within Washington is just handling the crude, but it is not producing the crude, it is not refining the crude.

Q. Where are the Washington refineries currently receiving their crude from?

A. The Washington refineries have an overall capacity in the order of 650,000 barrels per day. Their crude supply is around 560,000 barrels per day. Approximately 250,000 barrels per day comes from Alaska,

Alaska North Slope, which has also been referred to by the abbreviation ANS. They also receive 140,000 barrels per day by pipeline. There's a pipeline that originates in Alberta that goes to the Vancouver area. There's a branch that comes into Washington and connects the four of the five Washington refineries. All of the refineries, other than the US oil refinery in Tacoma, have access to pipeline crudes.

In addition, the -- four of the five refineries have built on-site crude-by-rail unit train unloading terminals in recent years. They're -- Washington refineries are currently receiving in the order of 140,000 barrels per day via crude-by-rail. Finally, the Alaskan -- pardon me, the Washington refineries can receive crude by tanker from sources other than Alaska. Currently, they're receiving in the order of 30,000 -- 30,000 barrels per day via tanker from international sources. So it's a very small portion of the overall crude slate.

Q. Mr. Roach and Mr. Casey have previously discussed the decline in Alaska North Slope crude as one reason for the need for this project. Do you agree with this?

A. No. First, as a reality check, Alaska North Slope is currently providing 250,000 barrels per day of

supply to the Washington refineries. So even if in the very unlikely case Alaska ceased to provide any crude to the Washington refineries, that is less than the size of the Vancouver Energy Distribution Terminal. So that facility, even if it were going to wholly replace Alaska crude supply is oversized.

Alaska crude production has been declining, as Mr. Roach discussed. It's in long-term decline. Its future revolution is uncertain, but it may well continue to decline. The decline in recent years is relatively gradual. Based on the forecasts which Mr. Roach also relied upon from the Alaska taxing authority, it is projected that Alaska crude production may decline by another 10 percent by 2020. So 10 to 20 percent, so there might be a reduction in crude supplied to Washington in the order of 25 to 50,000 barrels per day by 2020. There may be continued decline after 2020. So by 2025, there might be a similar reduction, another 25 to 50,000 barrels per day. So to the extent to which there's decline in Alaskan crude production, it is small relative to the size of the Vancouver Energy Distribution Terminal and it's also a gradual decline.

The Washington refineries will have a number of alternatives to replace Alaskan production, if necessary.

Q. Did you listen -- did you hear the conversation that Mr. Roach and I believe Mr. Casey echoed as well about the need for a low-sulfur fuel?

A. Yes. I saw -- I reviewed that in their direct testimony. That was not an argument that was made previously. It was not in the application. It was not in any of the other documents.

I also reviewed Tesoro investor publications on an ongoing basis. I had not seen that specific argument made.

In response to that issue, it is possible that the Washington refineries will want a lower sulfur crude slate in the future. There are two issues. The Washington refineries produce extensive transportation fuels, notably gasoline. As was discussed, there are Tier 3 requirements that would require lower sulfur content in gasoline.

In addition, several of the Washington refineries produce marine fuel. It's called bunker fuel. It's a very heavy fuel. It's used in ships. It can contain a sizable amount of sulfur. There are requirements being phased in to reduce the sulfur content in marine fuels. As a result of that, there may be some benefits to having a lower sulfur crude slate because with less sulfur in, there's less sulfur out.

However, the Washington refineries have a number of other options to meet any requirements for a lower sulfur crude slate. In particular, four of the five Washington refineries receive crude via pipeline from Canada. There are a wide variety of crudes available by pipeline from Canada, ranging from very low sulfur to very high sulfur. Currently the Washington refineries in some cases process relatively high sulfur crude from Canada. If they need to reduce the sulfur content of their crude slate, they can shift to lower sulfur fuels available by pipeline and that's an advantaged feed stock because pipelines are a relatively low-cost logistics method to bring the crude to Washington.

There are other options if the Washington refineries need to reduce the sulfur content of their products.

Tesoro has a project currently in permitting at the Anacortes refinery to process fuels in a way to have less sulfur content in the end products. There's similar technology available to the other refiners.

Q. So in your opinion, where is this crude, if this terminal is built, most likely to go?

A. The short answer is the only US market that is sizable and feasible for crude from the Vancouver Energy Distribution Terminal is California. It is also

possible that crude from this terminal may be exported. I'm aware of the fact that the lease amendments place restrictions on exports. However, there is a potential economic case for exports and if in the future that's an attractive market, it is possible the lease will be further amended.

Q. Mr. Roach testified that Washington would benefit if this facility would supply California with oil based on its -- the global nature of the PADD 5 area on the West Coast. Do you have a response to his testimony in this regard?

A. I found that a very interesting argument. First of all, he alluded to that California consumes fuel and that it might use it in airplanes made in Washington; it might use it for trucks bringing agricultural products from Washington. It is very likely, with or without the VEDT, that California will continue to have access to sufficient crude supply and refined products to operate its economy. So with or without the Vancouver Energy Distribution Terminal, the California economy will be essentially the same.

It is possible that the Vancouver terminal will supply crude to California. It is unlikely that will have any significant impact on the economic performance of California.

Furthermore, Mr. Roach's argument seems to indicate it's to the benefit of Washington to improve the California economy. I'm a California resident. I would certainly welcome any contributions that Washington wants to provide to California, but I think if it was a public policy proposal as a thought experiment to tax Washington residents, send the money to California because some of the money will come back to Washington, I don't think that would receive serious consideration. So this facility is sited in Washington, it's being reviewed by a Washington agency, so the focus is on the Washington economy and the Washington public interest.

Q. Has California been siting new such facilities?

A. The experience with crude-by-rail in California is very different than the experience with crude-by-rail in Washington State. California is a much larger state in terms of population and economy. It has approximately three times as much in refining capacity as Washington.

Unlike Washington, it's not a major exporter of refined products. It's largely self-sufficient. It refines enough crude to produce the products to basically serve the California market.

Washington now has 195,000 barrels per day of

crude-by-rail unit train unloading terminals. There are no on-site refinery crude-by-rail unloading terminals in California. There have been proposals for such terminals. All of the proposals have been stymied. In one case there was a project that was approved. The proponent later stopped the project because they found the economics no longer supported construction of the terminal.

There is one crude-by-rail unloading terminal, unit train terminal, in California by a company called Plains. It's not located at a refinery. It's designed to bring in crude-by-rail and then transfer the crude into pipelines to be delivered to refineries. This has a capacity of 70,000 barrels per day and is reported to be operating at a fraction of its rated capacity.

Currently, crude-by-rail is supplying very little crude to California refineries. At its peak, it met about 1 percent of the state's crude slate. It's now down to less than .3 percent. So crude-by-rail is not a significant factor in supplying refineries in California. In large part this is because the construction of unloading terminals in California has been stymied.

Q. Mr. Roach testified that market fundamentals -- I believe that was his term -- not price were more

important considerations for proposing this terminal. Did you recall hearing that?

A. Yes. And I struggled to understand what he meant. At the risk of sounding like an economist, we consider price a market fundamental. As he indicated, it's a barometer of market conditions and it's a very important determinate of the cost effectiveness of crude-by-rail. Crude-by-rail is one of the most price-sensitive activities in the petroleum industry.

Q. I would like to use the exhibit -- exhibit to illustrate your next point.

MS. BOYLES: Ms. Mastro, could you get ready to pull up, but don't pull up yet, Exhibit 5591.

BY MS. BOYLES:

Q. Can you tell me, Mr. Goodman, what this exhibit is that we're about to see?

A. This exhibit is a graph of data from the Energy Information Administration, which I downloaded yesterday. The Energy Information Administration is a US federal agency that provides information on the energy sector. In his testimony, Brad Roach utilized a number of graphs and data from the Energy Information Administration. It's routinely used by experts in the field.

Q. And did you modify this graph in any way?

A. No.

Q. And what was the monthly release date on this graph; do you recall?

A. This is data of crude-by-rail shipments in the US. There is region-to-region breakdowns. Data is released monthly at the beginning of the month with a -- with a several-month lag. The data that became available on July 1 included data through April 2016. This graph shows the data through April 2016. So it includes data that was not available when my testimony was produced.

Q. Thank you.

MS. BOYLES: Your Honor, I move admission of Exhibit 5591.

JUDGE NOBLE: Objections?

MR. DERR: No objection.

JUDGE NOBLE: Exhibit 5591 is admitted.

MS. BOYLES: Now, Ms. Mastro.

BY MS. BOYLES:

Q. Okay. We were discussing -- or you were discussing the crude-by-rail and price market fundamentals.

A. Yes. This graph includes three lines. The top line in blue is total US crude-by-rail shipments. So this includes all crude-by-rail within the US as well as

shipments from -- originating in Canada and coming into the US and shipments originating in the US and going to Canada.

The scale is thousands of barrels per month. So when you see 35,000 barrels, that's actually 35 million barrels in a month. That's equivalent to approximately 1.1 million barrels per day. So we see in the blue line, which shows total crude-by-rail, that when you go back to 2010, there's virtually no crude-by-rail. Crude-by-rail gradually increases. Then starting in 2012 increases very rapidly. Peaks in 2014. And then since 2014, crude-by-rail shipments have declined by approximately two-thirds. You see the very rapid decline in recent months. This decline is intimately tied to changes in crude prices.

In the earlier period, crude prices were consistently high, in the order of $100 per barrel. That incentivized a very rapid expansion in crude production.

In particular, the second line in green, is crude-by-rail originating in PADD, P-A-D-D, 2 to all destinations. PADD 2 is the region -- and Mr. Roach discussed PADDs. They were set up in World War II as part of the Petroleum Administration. PADD 2 is the Midwest. PADD 2 includes Bakken. And Bakken has been

the main source of crude for crude-by-rail. So you'll see that shipments from PADD 2 increase very rapidly. They're the key factor in the very rapid growth in crude-by-rail.

During the peak period, you get a significant amount of crude-by-rail, still a minority, but a significant amount of crude-by-rail from other regions. And then recently, production in the Bakken, with lowered crude prices, has plateaued and is now starting to decline. So crude-by-rail out of the Bakken is dropping.

Also crude is shifting from rail to other means of logistics. This is also related to price. Crude-by-rail is a relatively expensive means of moving crude. There was discussion in the -- I think in council questions about the fact that crude is imported to the West Coast from the Middle East, a very long distance. The fact is that moving crude by ship, especially on large ships even over long distances, costs $3 a barrel or less. So it's -- crude markets throughout the world are very -- linked because crude can be moved at a relatively low cost over very long distances. On shore, pipelines are the principal means of moving crude. They're not as low cost as pipeline -- as tankers, but they're still relatively low cost.

Crude-by-rail is a higher cost means of logistics. The reason why crude-by-rail became a large-scale activity was in this period when crude prices were high and production was booming, especially in the Bakken, it overwhelmed the logistics facilities that were otherwise available. There was not sufficient pipelines to move this booming production to market. Rail was used to move crude to market. But at that time, when crude prices were very high, they were especially -- they were high on the coastal locations where they were -- crude prices were tied to international markets.

In the Midwest where crude was being produced at the Bakken, it was heavily discounted. So even though crude-by-rail is expensive, it was still profitable to pay the high cost of crude-by-rail to get crude from where it was stranded, bottlenecked in the Midwest, to the coastal markets where it was valuable. That gave rise to the increase in crude-by-rail.

As crude prices dropped precipitously from mid-2014 until this year, part of what also has happened is the differential in crude prices between inland North American locations and coastal locations have -- there's no longer a large differential. Basically, now the coastal locations not only have access to North American

crudes potentially by pipeline or by rail, they have access to imported crude by water from all over the world. These imported crudes are available at a price that is very competitive with North American production. Thus, coastal refiners, especially in locations like the East Coast, have shifted away from crude-by-rail back to imported crude from other sources.

The final line on the bottom is shipments in crude -- in brown, is shipments in crude-by-rail from PADD 2 to PADD 5. As Mr. Roach discussed, PADD 5 is the US West Coast, including Alaska and Hawaii.

The crude-by-rail that comes into PADD 5 principally comes into Washington. California has very limited crude-by-rail unloading terminals so very little crude goes to California. There's some facilities in Oregon which can off load crude-by-rail and then put it on ships to take to Washington or California. They're relatively small and have not been that big a factor.

So the large amount of crude-by-rail coming into PADD 5 is coming into Washington. And we see that it increases gradually, peaks out at approximately 150,000 barrels per day. There's been -- there's fluctuation. There's been a little bit of decline recently. But the crude-by-rail shipments from PADD 2 to PADD 5 have been relatively stable.

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Initially, analysts have examined why this is the case, because if you were paying the incremental price of crude-by-rail, it would not be profitable to bring in crude-by-rail.

One of the explanations is that the Washington refineries have built unloading terminals, they have entered into contracts -- for example, the Tesoro facility is now owned by Tesoro Logistics. So Tesoro refining contracts with Tesoro Logistics for the crude-by-rail unloading terminal, they need a commitment to use the facility. So they have to pay whether they use it or not. The other facilities are either owned by the refiners or have these same kinds of commitments. In addition, refiners have bought tank cars. So they have a variety of commitments so that the incremental cost of using crude-by-rail is less than the full cost.

However, typically, these commitments for crude-by-rail are not as long lasting as for a pipeline. For a pipeline, you might commit for 15 or 20 years to the pipeline to facilitate its construction. Crude-by-rail commitments are frequently shorter, in the order of five years. So as these commitments are phasing out, crude-by-rail lines are dropping. That's been more visible in other regions, but it may take place in the future in Washington as well.

Q. Mr. Roach did discuss that crude oil prices have rebounded from their lows earlier this year. Does that change any of your thoughts?

A. As many industry analysts have commented, it's a sign of the times when $50 is celebrated as better crude prices. This is an industry which had enjoyed crude prices in excess of $100 a barrel for several years and that was very favorable. Since then crude prices have dropped. They dipped down to $30 a barrel or below earlier this year. They have rebounded to $50 a barrel when Mr. Roach testified. I believe they're around $45 a barrel today. It's possible they will again decline further. But even if they stay at a $50 level or rebound somewhat from there, these crude prices are very low relative to the levels of several years ago.

In particular, at these crude prices, there's no longer an incentive driving a rapid expansion of US crude production. In fact, US crude production has been declining because of the lower prices. It's expected that it may continue to climb. It's unclear how much. US shale producers are proving to be very resilient to the low prices, more resilient than many anticipated, but it is not expected there's going to be a rapid increase in US crude production any time soon unless prices rebound to a much higher level.

Furthermore, by the time there may be a rebound in US crude production, logistics have changed dramatically from the period when crude-by-rail was booming. In particular, when the Bakken was booming, there was not sufficient pipeline capacity to move the crude -- crude out of the Bakken to destination markets, so rail stepped in because there was not enough pipelines. And at its peak, rail was moving, you know, two-thirds of the total crude production out of the Bakken.

Pipelines continue to be built to move crude out of the Bakken and the economics have changed so that it's favorable to -- it's very favorable to use pipelines versus crude-by-rail because of its lower cost. As a result, the use of crude-by-rail out of the Bakken has dropped. It now accounts for only a third of the crude output and it's expected, with the continued build-out of pipelines, in particular the Dakota access pipeline, that within a year or two, there may be sufficient pipelines to move all of the crude produced in the Bakken to markets via pipeline. Doesn't mean that rail will drop to zero, but it looks like there's -- the likely outcome is a continued decline in crude-by-rail out of the Bakken.

So even if production in the future starts to

rebound, it may be moving by pipeline instead of moving by rail.

Q. Let's change the scale slightly and look at consumers. In your opinion, would this terminal benefit Washington consumers, especially lower the price at the pump?

A. The relationship between crude prices and crude supply and refined products is a very complex relationship. It's been considered extensively because there's ongoing concerns about whether the refined products market is sufficiently competitive, whether prices are being manipulated or they're unfairly high.

The Washington attorney general did a study in 2007-2008 because of concerns about crude pricing, looking at how prices were determined in Washington. The attorney general continues to publish quarterly reports tracking gasoline prices within Washington. Washington receives its refined product supply principally from the five Washington refineries.

However, in Eastern Washington, which is not -- does not have pipeline access to the refineries in Western Washington, crude -- pardon me, refined products come in by pipeline from PADD 4.

Based on my understanding of the market dynamics in Washington, the price -- and this is typically the

case. The price of refined products is related to crude price, but it's typically related to broad international crude prices, basically, not the price of the crude to a given refinery or even necessarily the price of crude to the set of refineries locally. It's more broadly based on the price of crude of the refineries in a large area that are producing crude not just for the local market but for neighboring markets which have linkages with the local market.

Given the fact that the Vancouver Energy Distribution Terminal is unlikely to provide substantial crude supplies to the Washington refineries, it is unlikely to have a significant impact on refined products pricing in Washington.

Furthermore, given the fact that a portion of Washington receives crude supply from PADD 4, those refineries are not going to be receiving crude from the Vancouver Energy Distribution Terminal. That's another reason that reduces any potential linkage between the Vancouver Energy Distribution Terminal and refined product prices in Washington.

There is some connections between the Washington refined products market in California, but the linkages are limited. California typically produces all of the refined products consumed in California and sends some

products to Arizona and Nevada, which are connected by pipeline. So typically the price dynamics in California are heavily based on conditions in California.

However, there are Washington refineries, notably Tesoro Anacortes, that can produce the gasoline used in California. California has very specialized, very demanding specifications for gasoline because of air quality considerations. So California doesn't use the same gasoline as Washington. So refineries have to produce specialized gasoline that California needs. Tesoro Anacortes is configured so they can produce some of this gasoline.

So there are conditions where prices will spike in California if there is disruptions in the refinery operations. There's a short supply. In those situations, California has to bring refined products in from other markets. They -- those other markets, in many cases, are remote. It takes a long time. There's sizable costs. Thus that causes price spikes. When that happens, those price spikes in California can have some impact causing price spikes in Washington.

However, whether the Vancouver Energy Distribution Terminal supplies crude to California, it's not going to affect those dynamics. So it's not out of the question that there could be some very secondary

ripple effects that have -- the Vancouver terminal sends crude to California and California refines this crude and there's some linkages between the California market and the Washington market, it is conceivable that there could be some effect on refined product pricing in Washington. But from what I understand and from the analyses I have reviewed, any of those impacts appear to be very small and you would need a very extensive analysis to demonstrate that there's a meaningful effect. Tesoro Savage has not provided any such analysis in this case.

Q. Did you watch the testimony of Mr. Schatzki?

A. Yes.

Q. Mr. Schatzki critiqued your testimony where you stated that there was analysis of other -- when other regulatory boards had done analysis, they consistently found that the energy logistics facilities were a bad deal for their particular location. Do you have a response to that critique?

A. Yes. Mr. Schatzki specifically referred to studies and analysis by the Canadian National Energy Board and the Conference Board of Canada. The analysis in my testimony of energy logistics facilities and specifically conduit energy logistics facilities focused on facilities and jurisdictions which are in some ways

analogous to the Vancouver Energy Distribution Terminal and the state of Washington.

So we focused on analyses that look at the impacts on the state or provincial level rather than a national level. The National Energy Board in its recent decision approving the conditions of the Trans Mountain expansion pipeline, it did approve the project, but it specifically discussed the geographic pattern of impacts. The Canadian National Energy Board, as its name would indicate, is a federal Canadian agency. Its charge is the Canadian public interest. So it looks at impacts throughout Canada.

As they discuss in the decision, much of the benefits, potential benefits of improved energy logistics facilities and in this case a pipeline that would move crude from the Canadian tar sands to the Vancouver British Columbia area where it could be loaded on ships and sent to California and Asia, the benefits are largely to crude producers which are located in Alberta, while the costs, the risks, the burdens are concentrated locally in proximity to the facilities.

Thus, while much of the benefits are at the Alberta level and at the national level, the costs and risks are heavily in British Columbia.

In particular -- or in addition, the Provence of

British Columbia has considered its position on development of pipelines that would bring crude from the tar sands to the coast of British Columbia for export. British Columbia's thus a conduit jurisdiction. Crudes come from Alberta, it goes through British Columbia, it's not refined in British Columbia, so somewhat analogous with the situation with the Vancouver Energy Distribution Terminal.

They have conducted studies of their position and said, in effect, we are getting most of the costs, most of the risks, most of the burdens and we're getting very little of the benefits.

The Conference Board of Canada, their studies were done on behalf of the proponents for the Trans Mountain expansion pipeline as well as for the Energy East pipeline. Their analyses also focused on the benefits at the national level, because they're providing information to the Canadian National Energy Board.

In my report, which was attached as an exhibit, analyzing the economics of crude by -- economics of the Trans Mountain expansion pipeline for British Columbia, we did an extensive review and critique of the conference board studies, but we found, even if you accept the conference board numbers, British Columbia's

receiving less than 2 percent of the total estimated benefits of the project. The benefits are mainly going to Alberta where the crude is being produced, where taxes are being paid and royalties based on that production. They're also going to the national level which receives some tax revenue from the crude producers. Very little is going to British Columbia.

So the studies that focus on the impacts for a conduit jurisdiction at a state or provincial level consistently find that the energy logistics facilities are a bad deal for the hosting jurisdiction.

Q. Mr. Schatzki also asked about the relative -- was also asked about the relative size of the estimated benefits for the facility versus the overall economy. And he responded that he had not looked at that. Have you looked at that?

A. Yes, I have. In my practice I conducted a large number of studies of the economic development impacts, employment and other economic spin-offs of energy facilities. In a number of cases, these were performed with the IMPLAN model, the same model that Mr. Schatzki used.

In analyzing the economic development impacts at energy facilities, it's very important to be aware of the context, because typically these facilities are a

very small, even a minimal portion of the overall economy.

In the case of the Vancouver Energy Distribution Terminal, the estimated employment benefits and other economic spin-offs are less than .1 percent of the total employment and the total economic activity in the ten-county region that Mr. Schatzki examined.

The ten-county region which he analyzed is three counties in Washington, including Clark County, and seven counties in Oregon. So the bulk of the metropolitan region which he examined is not in Washington. So it's reasonable to assume that the bulk of the impacts he's estimating will flow to Oregon rather than Washington. Some of the jobs may be located within Washington; they may be filled by workers from Oregon.

In addition, this came up in a council question, I believe by Mr. Rossman, these are very specialized facilities. Frequently in the construction of energy facilities, there's a lot of very specialized labor involved. There is a workforce that migrates nationally to build energy facilities. Frequently they want -- these facilities, they want to build them rapidly; they want a team that's highly qualified. So many times a large portion of the labor supply comes in from out of

state, you know, stays in motels or work camps, if it's a remote area, while they build it, works long hours, may spend a little bit of money locally while they're in the jurisdiction, but then goes home. So that's another factor that will tend to reduce the impacts within Washington for this facility.

Mr. Schatzki was of the opinion that the Vancouver Energy Distribution Terminal might stimulate the local economy and as a result this may be a positive factor in local property values. Given the minuscule size of the Vancouver terminal in terms of its economic impact locally, it's difficult to see how it could have a significant impact on a positive sense on local property values.

The other comment I would make that was lacking in Mr. Schatzki's testimony and in his discussion of his testimony, he used the IMPLAN model. That's a widely accepted model. I've used it. It has a number of strengths. It's good because it allows you to look at very geographically specific areas down to the county level. It also allows you to look at very detailed linkages. So rather than just generic instruction, you can model all of the specific kinds of inputs from energy facility which are typically very specialized. So you can see, do we make steel locally that we're

going to use in the facility? Then we will get more jobs.

The downside of the IMPLAN model is what's called an input/output model. It's a very static, very simplified model of the real world economy. And it assumes a way a lot of the linkages that operate in the real world economy. In particular, currently, unemployment is very low in the Vancouver-Portland metropolitan area. In a situation like this, if you add an additional economic activity, it may not give you nearly as many jobs as being estimated by the IMPLAN model because effectively it may displace other economic activity.

Q. Why is this terminal a bad deal for Washington?

A. There's no economic need for this facility to provide crude supply to Washington and supply refined products to Washington consumers. So the question then becomes, are there some economic benefits to Washington of hosting this facility that outweigh the cost and risks to Washington?

We looked at a number of studies of energy logistics facilities in other jurisdictions, and the finding was consistently that the benefits locally are very small and that the costs and risks were very sizable.

In the case of the Vancouver Energy Distribution Terminal, it's crude-by-rail in and it's marine out. So aside from whatever -- what impacts there are of the terminal itself, you have the impacts of bringing in an estimated four unit trains per day through Washington, likely from the Washington border in the Spokane area, all the way to Vancouver. You also have the impacts on the Columbia River of taking the crude out.

Q. How about benefits to other jurisdictions?

A. It is possible that this will have some benefits to other jurisdictions. Right now the economics for crude-by-rail are poor. So it's unclear how much this facility will actually operate. It is possible it could have some benefits to hosting jurisdictions.

However, based on my understanding of the relevant economics, the extent to which this terminal is going to have economic benefits, it may have some economic benefits to Tesoro Savage, which would operate the terminal. It may have some economic benefits to Tesoro, the partner company, which owns and filed as Tesoro Logistics and otherwise extensive logistics in the Bakken. It owns ten cars that could bring the crude-by-rail into the facility. Tesoro is the largest US West Coast refiner. It may receive some crude supply into its California refineries. This may allow those

refineries to have lower input costs that may improve their profitability. It's unlikely to have a significant impact on refined product pricing in California.

Put simply and bluntly, one of the ways you make money in the refining industry is by having cheaper crude supply than your competitors, because you can still sell your refined products at the price that's based on the high -- you know, the cost of the overall supply. So if you can get cheaper crude relative to your competitors, you can make more money.

A lot of the interest of refiners in these logistics projects are so that they can reduce their input costs. Those -- a reduction in costs is not going to flow through their refined product pricing. In other words, it's not a benefit to energy consumers; it's a benefit to the processors, the refiners. It is possible that the VEDT, the Vancouver Energy Distribution Terminal, will have some benefits to Tesoro as a refiner.

MS. BOYLES: Thank you. Nothing further.

JUDGE NOBLE: It is now 11:55, and I think this will be a good time to break for the lunch break unless there's going to be no cross-examination. It could surprise me.

MR. DERR: I'm sorry, there will be cross-examination.

JUDGE NOBLE: So I figured. So I think this is a good time to break for lunch. We will resume at 1:00.

(Recess taken from 11:57 a.m. to 1:03 p.m.)

JUDGE NOBLE: We're back on the record. It's time for cross-examination. Mr. Derr?

MR. DERR: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. DERR:

Q. Mr. Goodman, I'm Jay Derr. I'm one of the attorneys representing the applicant for this project and I have a few questions for you on cross-examination.

First, I'd just like to understand a little bit more about your experience. Have you ever bought or sold crude oil for the petroleum industry?

A. No.

Q. So do you have any firsthand experience dealing with industry judgments about stability of the source along with barrel price?

A. I've evaluated industry analysis that's included those issues.

Q. But have you made purchasing decisions based on a consideration of stability of a source to supply a

refinery?

A. No.

Q. How about firsthand experience buying or selling crude oil dealing with the makeup of the crude as compared to the refinery processes that are in place to refine the crude?

A. I considered those issues, but not on behalf of refiners.

Q. Have you ever negotiated a contract to transport crude oil by rail?

A. No.

Q. Do you know whether rail transport prices are or will be changing as the crude-by-rail volumes are changing based on your testimony?

A. In general there are discounts available in the market. Tank car lease costs have come down very substantially. Terminals are not being utilized at a heavy rate, so there may be discount opportunities there as well. Railroads may also be willing to negotiate lower prices for transport --

JUDGE NOBLE: Mr. Goodman, I'm sorry, to interrupt you. Could you speak into the microphone a little bit more and also in this direction.

BY MR. DERR:

Q. I should tell you, we remind witnesses they're

allowed to be rude, turn their backs to us and speak to the council.

A. There may also be discounts available from the railroads for carrying the crude, because volumes are down and in general rail volumes are down, notably because of the reduction in coal transport.

Q. Question about -- I'm trying to understand your testimony about sort of focusing the need on the state of Washington, the petroleum need on the state of Washington. First, as to total production, I believe you testified that Eastern Washington is receiving a portion of its refined product from PADD 4; is that correct?

A. Yes. And that was also I believe the testimony of Mr. Roach.

Q. And when you made statements about whether Washington was producing more crude -- more refined products than it consumed, did you offset the amount that was being imported from PADD 4 in those statements?

A. Yes.

Q. So is it still your testimony that Washington exports more than 50 percent of its refinery production if you take into account the import currently?

A. No. I believe the analyses in that case were on a gross basis rather than on a net basis. But on a net

basis, Washington State refineries still produce more refined products than are consumed in Washington.

Q. Isn't it true that a -- at least a significant portion of what Washington exports is distillates or aviation fuels and diesel fuels?

A. Yes. The balance for distillate is much more -- as production exceeds demand, much more distillate than for gasoline.

Q. Question about Oregon. Does Oregon have any refineries?

A. No, it does not.

Q. So is it your testimony that Washington is not supposed to supply refined product to Oregon?

A. No, that is not my testimony.

Q. Is it your overall opinion that Washington petroleum market functions independently of the rest of PADD 5?

A. No, there are linkages within PADD 5. The linkages within PADD 5 are likely not as strong as the linkages in other parts of the United States, as is testified by Mr. Roach. Other portions of the United States have a large network of product pipelines that interconnects product markets throughout the Eastern US. There's limited pipeline connectivity between PADD 5 and other regions. There is some pipelines that

interconnect PADD 5 to Arizona and Nevada and also to Texas. So there is some connections, but PADD 5 is relatively isolated.

Q. How about prices of crude? Are prices of crude set separately in Washington without regard to other markets?

A. No. Crude markets in Washington are strongly linked to markets elsewhere.

Q. And just sort of a question about basic economics, and I'll start by saying my last economics class was probably over 30 years ago, but isn't it a fair, if not simplistic, economic principal, that if I have only one or two choices of a product, I may have less ability to negotiate price than if I have multiple choices for a product?

A. In general, having more options is beneficial to -- is beneficial in terms of negotiating, yes.

Q. So isn't it a fair statement that in trying to understand Washington's petroleum markets, in particular, price of product in Washington petroleum markets, that it's necessary to consider the context of all of PADD 5, if not the globe, in making those evaluations?

A. There are certainly linkages between the markets in Washington and the markets elsewhere in PADD 5. The

Washington refiners already have a very wide variety of crude supply available. So the impact of additional supply to Washington is less for that reason.

Q. I want to -- actually, great transition. I want to ask you some questions about your testimony regarding the refinery sources of crude for the state of Washington.

First, I'm curious, what mode of transportation of crude oil to the Washington refineries do you support to get crude to the refineries?

A. I don't want to quibble with language, but I don't support or not support modes of transportation. I evaluate them. And I can't answer that question in the abstract. There are many different modes. They have their advantages and their disadvantages.

Q. So maybe I'll ask more specifically. You testified about pipelines, as I recall. Am I remembering correctly that there's currently a pipeline that supplies some of the crude oil to the state of Washington; is that correct?

A. Yes.

Q. So is it your opinion that that pipeline, I believe it was the Kinder Morgan Trans Mountain express pipeline, that that pipeline is a preferred mode of transportation of crude oil to Washington refineries?

A. The pipeline that supplies four of the five Washington refineries, the ones in Northern Washington, is a branch off of the Trans Mountain Pipeline. That's Kinder Morgan. That's the existing pipeline. There is a proposal to expand that pipeline; that's called Trans Mountain expansion. So I just want to be clear on terminology.

Q. Thank you.

A. That pipeline from the available information provides crude supplied at a tracked price. Pipelines are generally preferred as an overall crude transportation method because of their low cost, high capacity and high reliability.

Q. Will the Trans Mountain expansion project increase the opportunity for crude oil supplied to Washington refineries?

A. Yes. It is my understanding that Tesoro is one of the committed shippers on the Trans Mountain expansion and may receive increased deliveries because of that. There are apparently also some issues that the spur that goes into Washington might need to be expanded if the crude deliveries go up above a certain level. Currently the Trans Mountain pipeline is -- runs full all of the time. It carries both refined products and crude. It's the only pipeline that goes from Alberta to

the West Coast, and as a result there's very strong demand. Basically as I say, it always runs full.

If it's expanded, that would create the possibility of more crude coming to Washington via the Trans Mountain pipeline or the Trans Mountain expansion.

Q. So would that be the case only if it's expanded, that it would provide reliable capacity for crude to Washington refineries?

A. As discussed in my testimony, Washington refineries are now and in recent years are receiving more crude via Trans Mountain than previously. So it seems like they have shifted to get more crude from Trans Mountain, but they may now be -- effectively reached a limit until the pipeline's expanded.

Q. And is that pipeline transporting what other witnesses for the intervenors have labeled as Canadian tar sands?

A. It transports a variety of Canadian crudes that the EIA data on crude imports to Washington. Based on that data, the refiners import from Canada a variety of crudes. Tesoro recently is importing light crude, sour crude with a high sulfur content. Other refiners are importing heavier crudes. So it is almost certain that there's -- what is called tar sands, heavy crude or dilbit flowing in that pipeline. And it's definitely

known that there's dilbit flowing in that pipeline to the Westridge Marine Terminal.

Q. So would that be one of the types of crude you would expect would flow to Washington refineries if the crude-by-rail facilities were not constructed to supply crude oil to the refineries?

A. That type of crude is currently flowing to Washington refineries. So it's not clear that the Vancouver Energy Distribution Terminal will have any impact in terms of how much of that type of crude comes to Washington.

Q. You also, I believe, testified to some amount of foreign sources of crude oil to Washington refineries. How are -- how do -- how is that crude oil transported to the refineries?

A. By tanker.

Q. And where does that come from?

A. It comes from a variety of sources. Over the years it shifts. It's basically price sensitive. I believe some distributions has come from the Middle East which is a large crude supplier. Some is probably also coming from Latin America. I didn't investigate the issue in depth because it was such a small portion of the total crude supply for Washington.

Q. You said you did not investigate that in depth.

A. I didn't go down to a super deep level. I looked at the EIA data on crude imports to Washington. I noticed that the -- I focused on the Canadian imports, which are largely coming by pipeline. The other crude imports, I noticed that Argentina appeared. The EIA data, especially when there are small amounts of imports, does not always give a very complete country breakdown.

Q. So did you investigate the price fluctuation or the reliability or stability of those sources of crude oil to supply Washington refineries?

A. In general, the global crude markets are very competitive. They're very low prices. We're in a buyer's market, would be a good way of saying it. In terms of reliability, crude suppliers vary, but in general, the reliability of imported crude has been good.

One issue I did investigate, when I was looking at the data for California, which does import a very large amount of crude via tankers from foreign sources, I noticed that Iraq was a major source of crude to California, and I wondered how much -- you know, has this been a consistent source, because if there's any country in the world you might be concerned might not be a very reliable supplier, and I learned that Iraq has

been a large consistent supplier to California as far back as the year 2000. So even during the period of war, Iraq continued to get crude out.

So in general, reliability of crude imports, especially since you have a choice of many suppliers, is very good. The largest single supplier of overseas crude is Saudi Arabia, which is a very reliable supplier.

Q. And did you evaluate the local benefit or the environmental impact of those sources of crude in comparisons to other sources for the Washington refineries?

A. By local benefit, are you talking about at point of production or at point of refining, or elsewhere?

Q. I would say point of production. The refinery -- the refining, as I understand your analysis, would be the Washington refineries. But for a source of crude coming from Iraq or Saudi Arabia, for example, did you evaluate the benefits of those hosting communities of that oil production or the environmental protections in place for that oil production as part of your evaluation of overall benefits of that source?

A. I did not undertake a detailed study. However, as discussed in my testimony, I did consider the nature of different crude production. Typically, Middle East

producers have very large reserves. It's easy oil, for want of a better word. It doesn't tend to require extensive enhanced recovery. Some of those issues that are not required, some of those techniques, actually the fact it's coming out easily, reduces the environmental impacts and reduces the -- in particular the greenhouse emissions. Typically the more effort you need to do -- go through to get the crude out of the ground, the more energy is required.

It also can -- those techniques can also have environmental impacts. So it's not a simple comparison. There are overseas crude suppliers like Nigeria that have extensive flaring. That would increase environmental impacts. North Dakota has had extensive flaring as well and that's been -- flaring is when wells produce natural gas or natural gas liquids and there's not the infrastructure to gather that -- those energy products. Instead of venting them, which is very destructive because it's methane and it's dangerous, they flare. They basically burn the crude off. So, for example, in North Dakota, the night sky would be lit up by all of these wells burning off natural gas and natural gas liquids.

Now that the infrastructure in North Dakota is catching up with production, flaring is being reduced.

But that has been a downside in terms of the environmental impacts of Bakken production.

Q. I want to ask you some questions, I believe you testified to some other rail unloading facilities that already are in place at other Washington refineries; is that correct?

A. Yes.

Q. And so is it your testimony that those should be expanded to address declining sources that you described from the Alaska North Slope?

A. It is not my -- that is not my testimony. I did look at those facilities. There's some indication that they're not being utilized quite as fully as possible so that they might be able to increase their deliveries. I watched a video where I believe the manager of the BP facility for the crude unloading terminal said, we're working with the railroad. We've had some issues in terms of reliability of deliveries. We're trying to improve that so we can get higher utilization.

So there is some possibility that the existing facilities, even if not physically expanded, could actually deliver somewhat more crude.

Q. And did you also look at the proposed facilities that were identified in -- I can't remember the exact number -- the Sightline reports that I believe were

introduced with your testimony this morning?

A. I looked at those facilities, in particular there is the proposal that had -- Shell made some consideration of that. I also looked at the proposed -- the Westway project in Grays Harbor. It was somewhat of a moving target because some facilities had been -- that were proposed had been either canceled or they no longer handled crude.

Q. Did you look at the routes that that crude oil would travel between the sources in North Dakota and those alternative, either refinery direct unloading facilities or the Westway project in Grays Harbor?

A. There's definitely concern that these other facilities are further into Washington than Vancouver, so that the loaded crude trains which typically come in via the Columbia River route, instead of just going to Vancouver, would be operating further into Washington, either -- like Grays Harbor is a somewhat greater distance and the Shell facility is even further to the north.

Q. So to be clear, would those -- would unit trains of crude oil traveling to those other facilities also travel through the city of Vancouver to reach those destinations?

A. I looked into that issue. If they come in

through the BNSF route on the north side of the Columbia River, the likely routing going to Shell would be into Vancouver and then north along the Seattle line. So it would be most of the same route as into the Vancouver Energy Distribution Terminal. It would diverge just before the crossing of the Seattle mainline and then turn north.

It is also possible they would operate into -- on the south side of the river in the Oregon side. As the incident at Mosier indicates, crude trains which are destined for Washington, that train was destined for Tacoma, was operating on the Oregon side of the river. So that's another possible routing.

There was also some discussion that rail routings are dynamic. That while they generally go -- may go via a certain route, there's issues of traffic, there's issues of congestion, there's issues of weather. So as a result of that, crude trains may take different routings.

Also if crude is originating from Canada as opposed to North Dakota, it is possible the crude will travel west through Canada and then travel -- come into Washington from the north.

Q. So let's say the crude source is the Bakken field in North Dakota and is coming to the Washington

refineries or to the Grays Harbor facility, the Westway facility, would you say it's likely those unit trains would travel the BNSF route through Washington than through Vancouver?

A. That is probably the most likely routing. I would say the routing through Oregon on the UP line on the south side of the Columbia is probably the second most likely routing. Part of what also drives that is where the crude originates in North Dakota. Some of the terminals in North Dakota are served by BNSF. So if you load it -- if you load the terminal on a BNSF, the trains tend to operate on BNSF as far as possible and generally all the way to the destination, if that's feasible.

There are other terminals in North Dakota that are on the Canadian Pacific railroad. That was the case for the Mosier -- the train that was in the accident at Mosier. Those trains frequently travel into Canada, then travel on Canadian Pacific railroad tracks through Canada, come into the United States through Idaho and then travel on the Union Pacific right-of-ways, which would tend to take them on the south side of the river. So Bakken production could come into Washington either way.

And it's also possible in some cases that

that -- it could take a longer routing, staying in Canada for a longer distance and then coming into Washington from the north.

Q. And I'm curious about your views of what would be the local economic benefit to Clark County or to Vancouver if this project was not built and the same volumes of crude oil simply came through the community direct to the refineries or to the Westway project and Imperium? What would be the local economic benefit of that activity?

A. Within the constraints of the example you're giving, which is, you know, A versus B, accepting that as the choice for this analysis, in general, the economic spin-offs for Clark County would be greater with the Vancouver Energy Distribution Terminal than with crude trains merely transiting through Clark County and not serving the Vancouver Energy Distribution Terminal.

Q. Thank you.

MR. DERR: Can you pull up Exhibit 5591?

BY MR. DERR:

Q. This, I believe, is the exhibit you introduced, the new one from EIA. I just want to make sure I understand the graph and your explanation. So I believe it's brown. I can't see the color. I think the brown

line on the bottom, that is the transport of crude oil to PADD 5; is that correct?

A. That is the transport of crude oil to PADD 5 from PADD 2.

Q. From PADD 2. And PADD 2 is where the Bakken is located; is that right?

A. Yes.

Q. And that -- I believe your testimony was that shows the crude-by-rail transported to PADD 5 from PADD 2 is, I guess in economists' terms, relatively steady. Did I characterize that correctly?

A. Yes. Compared to the wild gyrations of the other lines, this is not completely steady, but it is relatively steady. And as a result, the PADD 2 to PADD 5 shipments have become an increasing percentage of overall shipments from PADD 5 and of overall crude-by-rail in the United States.

Q. And was it your testimony, at least in significant part, that the reason for the sharp declines in the other PADDs is because of new pipeline infrastructure?

A. No, that's only one of the factors. The declining -- the reduced crude differentials between North Dakota and destination markets has undermined the profitability of crude-by-rail, and that has been as

large or perhaps a larger factor in the decline of crude-by-rail.

Q. And to your knowledge, are there any other new pipeline projects in the works to bring crude oil from PADD 2 to PADD 5?

A. To the best of my knowledge, there are no pipeline proposals currently to move crude from PADD 2 to PADD 5. PADD 5, in terms of crude pipelines, is not interconnected with the United States east of the Rockies. The only crude pipeline in the PADD 5 is the spur off the Trans Mountain Pipeline from Canada.

In the past there have been crude pipelines between PADD 5 and areas to the east of the Rockies and there have been some proposals to reactivate those pipelines and there's been proposals to convert gas pipelines back to crude, but so far those proposals have not gone ahead.

Q. Thank you. And last I just want to ask you a couple of questions about your -- I think you called them energy conduit logistics facilities or energy conduit logistics hosting communities. So I want to understand a little bit more about that. It sounds to me like the projects you were describing in Canada you testified to, those were pipeline projects; is that correct?

A. We examined a number of projects in Canada which were pipelines. We also considered crude-by-rail facilities in California.

Q. And I believe one of your reports was for Ontario, which looked at what are the benefits specific to Ontario for a pipeline project. Am I remembering that correctly?

A. We did a study which looked at the Line 9 expansion, which is an Enbridge Pipeline that goes from Sarnia, Ontario, to Montreal. So possibly you're thinking of that. We also quoted a study that was not done by The Goodman Group; it was done by the Ontario Energy Board, that looked at the cost and benefits of pipeline -- conduit pipelines through Ontario, specifically the Energy East project.

Q. When you have a conduit pipeline running through your community, is there typically revenues paid to the local community for the volume of oil that transfers through the pipeline?

A. They typically pay some property taxes. There is a very small number of local operating jobs and there may be tax revenues associated with that. But there's not typically a toll that's paid to a local jurisdiction based on flow through pipelines.

Q. So is it the case, then, if you compare that

economic situation with the Vancouver Energy terminal situation, the local economic benefits would be expected to be substantially higher than the property taxes and the few jobs that you just described for a pipeline?

A. Well, you have to consider the life cycle of both projects. Pipelines have a higher capital cost and associated with that higher capital cost, there are sometimes more spin-offs constructing the pipeline.

Crude-by-rail is a lower capital cost facility. It's using existing railroad right-of-ways typically, although in some cases the railroads may need to expand capacity. Crude-by-rail terminals -- to put it in simple blunt terms, crude-by-rail loading and unloading facilities are cheap compared to pipelines and they're fast to build. So because of the fact that they have lower capital costs, they also tend to have lower overall impacts than building a pipeline, because you're spending less money and the impacts are highly correlated to how much money you're spending.

The flip side is that once you build pipelines and one of the reasons the oil industry prefers pipelines is once you spend the money to build them, they have very low operating costs and very low labor requirements.

Crude-by-rail is a higher operating cost mode.

Because of the fact that it has higher operating costs, there may be somewhat higher spin-offs associated with a higher operating cost.

Q. So we -- for example, we heard testimony earlier about the revenues to the port from the proposed terminal facility that were a function of land lease rates and wharfage fees and fees per barrel of crude oil, and those estimates range between 40 and $60 million a year. Would there be similar revenues to a community that's simply hosting a stretch of pipeline once it's constructed?

A. I actually have data on that in one of my reports, so if I can just spend a moment to see. We have the property tax data for the Trans Mountain expansion pipeline in British Columbia. So I could actually --

Q. Yeah, let me -- you can go -- I'll let you go there. I'm sure your attorney will let you go there. Let me ask you first, though, about the port fees, because I was going to ask you next about property taxes, which is a different question. But can you tell me about the port fees for the volume -- the fee per volume of crude oil that's a part of the port lease, the wharfage fees that are part of the loading operation; would the pipeline have those similar fees to the local

community?

A. Actually, Trans Mountain expansion is a proposal to expand the existing Trans Mountain Pipeline from Alberta to Burnaby, British Columbia. In Burnaby, British Columbia, it serves the Westridge Marine Terminal, which loads crude oil to tankers. So very analogous in that sense. The crude gets there by pipe instead of rail, but then there's a terminal operation loading ships that's very similar to the Vancouver Energy Distribution Terminal. So a pipeline project that was serving marine, you know, transloading, in other words, was using marine to its ultimate destination, would have similar impacts and similar spin-offs.

Q. And would there be similar economic benefit revenue to the jurisdiction that hosts the terminal loading facility itself, as opposed to the jurisdiction that simply hosts the pipeline segment?

A. Could you repeat the question? Or could the court reporter repeat the question?

Q. I can try it again, if that's easier.

A. Yes, sir.

JUDGE NOBLE: Probably easier.

BY MR. DERR:

Q. Would the community that hosts the loading

terminal -- and your example was the British Columbia terminal and our example is the Vancouver Energy terminal, would the community that hosts the terminal expect to receive greater local economic benefit from that operation than a community that merely hosts a segment of the pipeline that transports crude to the terminal?

A. In general, if more money is spent in a jurisdiction on a gross level, you're going to have more economic spin-offs. It's not a simple comparison. You have to look at the details of the activity, how it's sourced. You know, there are cases where you may spend more money but very little of the money goes in the local economy. But in general, all else being equal, which it is not always, if you spend more money, you're going to have more economic spin-offs.

There may also be, with increased activity, more costs and risks associated with the activity. So if you're going to look at the total cost and benefit picture, you need to look at both sides of the ledger.

Q. Thank you. And again to go back, if in looking at that scenario, the host community, in this case Vancouver, would experience increased unit trains traveling to other facilities but not experience the terminal economic activity, wouldn't it be worse off

from an economic's benefit standpoint than it would if it hosted the terminal?

A. If you're looking just at the gross spin-offs, it is likely that the gross spin-offs for the city of Vancouver are greater with the VEDT than with an equivalent number of crude trains merely transiting through Vancouver. That is a very partial analysis, but set up as that comparison, I would agree that, in general, the city of Vancouver would receive greater economic spin-offs in a gross level from hosting the VEDT terminal as well as the crude trains, you know, coming into Vancouver, than with the crude trains just passing through Vancouver and not being unloaded.

Q. And if the same number of unit trains of crude were to travel the Columbia Gorge to reach the refineries or the Westway facility without the terminal, would the Columbia Gorge and the city of Vancouver experience the same risks and potential adverse economic impact regardless of where the trains were going, if they went the same route?

A. First, the proposed facility in Grays Harbor is much smaller than the Vancouver Energy Distribution Terminal. So we are really comparing apples and oranges. We may also be comparing apples and oranges in terms of the markets they're serving. So while one can

create a thought experiment where you can compare the facilities and say, you know, per barrel, what are the impacts in Vancouver, you're really comparing apples and oranges and it becomes problematic to make this analysis in a very sort of hypothetical sense.

Q. Although I believe I was using your thought experiment, you testified to other unloading facilities at the refineries that could be expanded. You testified to the Westway terminal that could receive crude. And I believe that the -- at least my assumption was, it's the same kind of crude that would go to those facilities as might come to the Vancouver Energy terminal facility, be the same kind of trains that might go to those other facilities as would go to the Vancouver Energy terminal facility. So wouldn't the city of Vancouver experience the same risks and potential adverse economic impact from that train traffic going direct to those facilities as it would from the same trains stopping in Vancouver at this facility?

A. It's not clear it would be the same kind of crude. The Vancouver Energy Distribution Terminal is designed to handle a very wide range of pipeline grade crudes from 15 API up to 45 API. It has -- one-third of the unloading stations have steam capability, so it can unload crudes that require heating. The tankage also is

set up to handle crudes that require heating. I have looked at the other proposals, but I'm uncertain whether they would also be able to handle heavy crude, and especially heavy crude in the quantities that the Vancouver Energy Distribution Terminal is set up to handle.

The Vancouver Energy Distribution Terminal is also set up for crude blending. It's not clear the other facilities will have as much capability. So that could affect the crudes being handled.

There may also be differences in terms of which tank cars are allowed. There's been testimony about what will be allowed through the Vancouver Energy Distribution Terminal. There's a range of possibilities of what could be allowed at the other terminals.

So it's -- it's not a certainty how they would compare. You would need a lot of information and a very detailed analysis.

Q. And just on that last point, isn't it the case that the Vancouver Energy terminal has committed to advance the implementation of the new tank car standard, the 117, whereas perhaps the other facilities don't have that same commitment and can rely on the phase-in schedule for the tank cars?

A. I'm very aware of the fact that the Vancouver

Energy Distribution Terminal has said that they will require DOT-117 tank cars, including both new builds and the retrofits. And under the current schedule established by the FAST Act, F-A-S-T, which was discussed by other witnesses, 117s would not be required. You could continue to use other tank -- lower standard tank cars for several more years. So it is possible that the Vancouver Energy Distribution Terminal would, for a period of time, be using higher standard tank cars than some other crude-by-rail unloading facilities.

Q. Thank you. I will leave the property tax question to your counsel if she chooses.

MR. DERR: And I have no further questions, Your Honor.

JUDGE NOBLE: Ms. Boyles, redirect?

REDIRECT EXAMINATION

BY MS. BOYLES:

Q. Mr. Goodman, Mr. Derr had asked you a series of questions which were assuming a hypothetical, which was A versus B, which was this terminal were a pipeline and then also this terminal or just trains moving through to other terminals. Is it -- is that what you're testifying about? Is that the situation that you're discussing when you're talking about the economic

benefits and risks?

A. Given the evolution of markets, crude-by-rail is currently a rapidly declining activity. The Vancouver Energy Distribution Terminal at full capacity will be equivalent to over 80 percent of all of the crude-by-rail currently in the US in the April 2016 data. It would be larger than all of the crude-by-rail from PADD 2 to all markets. There's currently about 300,000 barrels a day of crude-by-rail out of PADD 2. So we're talking on something that's akin to a doubling of crude-by-rail activity.

It's unclear there's a market for this amount of crude-by-rail, but as a possibility, developing the Vancouver Energy Distribution Terminal could result in a dramatic increase in the amount of crude-by-rail activity in Washington State. Given the evolution of the markets, it's unlikely that any other facility is -- or combination of facilities would result in that large an increase of crude-by-rail activity in Washington.

Q. And if it was simply crude oil unit trains going to other locations, would there be similar marine risks to the city of Vancouver as opposed to the terminal that's proposed here?

A. No. Basically if you're doing a comparison between Vancouver Energy Distribution Terminal and

another terminal, depends on what you're comparing it with. If you're comparing it with Grays Harbor, that's much more approximate to the open ocean, so you're not bringing tankers up and down the Columbia. If you're sending it directly to a refinery unloading terminal, notably Shell, in that case there's no marine leg to the trip. So there's none of the marine risks associated. So generally the alternatives to the Vancouver Energy Distribution Terminal that would be cited in Washington involve less or no marine aspect of the haul.

MS. BOYLES: Thank you.

JUDGE NOBLE: Any further redirect?

MS. BOYLES: No, ma'am.

JUDGE NOBLE: Council questions, to my left? Mr. Stephenson?

MR. STEPHENSON: Thank you. Mr. Goodman, you testified that Washington currently has sufficient crude supply to its refineries, and then you testified, I believe, that there's a larger liability and risk assumption at the terminal as opposed to the producers; is that right?

THE WITNESS: I certainly testified to -- there's California -- pardon me, Washington refineries have currently sufficient crude supply and have been operating at capacity.

And then you asked about the liability risks? The issue is, depending on the logistics involved, typically the transported risks may not be -- the liability may not be with the crude producer. If it's by pipeline, it's usually with the pipeline. If it's with crude-by-rail, there was extensive testimony trying to parse just who would have the responsibility. It could include the railroad, it could include the loading terminal, it could include the unloading terminal. If there's a marine aspect, it could include the marine shipper as well.

And if there was an accident with sizable damages, as I believe Mr. Blackburn testified and I looked into Lac-Mégantic, you would tend to have litigation where there would be -- and I believe Ms. Hollingsed talked about this, there would be an effort to collect from a larger group of entities. But typically the crude producers were sued in Lac-Mégantic, so it is possible they would be brought in. But the ownership of the crude is frequently changing hands when it's being -- basically at the wellhead or near. So at that point, they don't really have liability for the transportation. The liability tends to be with the shippers and the receivers.

MR. STEPHENSON: Thank you. And for the

liability at the facility, it's my understanding that there are accounts in Washington for putting into oil spill response and prevention and there are also accounts in Washington for cleanup for our state super fund. And if crude came to this facility and then left the state, that the facility wouldn't be responsible for paying into either of those accounts. Is that your understanding?

THE WITNESS: That is my understanding, yes.

MR. STEPHENSON: Thank you.

JUDGE NOBLE: Any other questions, to my left?

Mr. Rossman?

MR. ROSSMAN: Thank you for your testimony.

A question on the exhibit that's up. I guess I'm wondering, you've described the sort of volatility in volume in PADD 5 is lower than the others, and I guess I'm just wondering, have you looked at this in some sort of percentage terms as well as in total volume?

THE WITNESS: I didn't do a detailed statistical analysis and, you know, the lines do bump around, but I -- the analyses I've seen indicated that there is actually more stability in PADD 5; that the crude-by-rail shipments have been stickier into PADD 5

than into other destinations.

MR. ROSSMAN: And does the data provide any information on shipments from other PADDs into Washington, or is that just -- or into PADD 5, or is that just negligible?

THE WITNESS: The data -- there is EIA data for shipments of crude from other PADDs, not just PADD 2 into PADD 5. I did look at that data. I didn't display it because it's much smaller. There is some crude that comes into PADD 5 and the EIA data from PADD 5 includes shipments to both California and Washington. But based on the available data, virtually all of the crude-by-rail is coming to Washington. So it's mainly coming from PADD 2, which is Bakken.

There's a small amount coming from PADD 3 which is Texas basically, portions of New Mexico, so some may be coming from Permian.

There is a small amount of crude that comes from PADD 4, that includes Utah where there's production of waxy crudes that have been discussed.

There's also some crude-by-rail that comes into Washington from Canada. The US oil refinery in Tacoma has completely shifted off of Alaska North Slope. It processes a mix of Bakken and Canadian crudes, it appears heavy crudes, and it brings those in by rail

from Canada, the Canadian crudes.

MR. ROSSMAN: Got it. And I guess I'm wondering about the economics in terms of transporting of sort of bringing crude to a terminal in Vancouver and then putting it on a marine vessel destined to a different refinery in Washington State and why that would be sort of economically advantageous rather than bringing it by rail directly in Washington State, if it were going to serve a Washington refinery? This is back to the hypothetical that was being discussed.

THE WITNESS: As I understand it, it would be both lower cost and preferred by refiners to bring crude trains directly to an unloading facility at the refinery. Four of the five Washington refineries have built on-site unloading terminals. Some in the interim used transloading facilities. There's a transloading facility in Tacoma, Targa. In the past there's been transloading through a facility in Oregon at Clatskanie. It's no longer handling crude. So Washington refineries, before they developed their on-site, terminals made some use of this other logistics, but then once they built their on-site terminals, they preferred those.

The information I have reviewed from multiple sources indicate that that's the preferred

mode, especially for serving a Washington refinery. If you're going to bring a crude train all the way to Vancouver, it would be preferred by the refineries to bring it the small additional distance right to the refinery rather than have much more complex logistics.

Also the on-site terminals are owned by the refiner or by the refiner's logistics arm. The VEDT other -- other than serving Tesoro, for other refiners it would be a third-party facility. And in general refiners prefer to use the facilities that they own and control.

MR. ROSSMAN: Got it. And I believe I recall in your testimony, and I'm not sure exactly where, but one of the references that you made to the reason that there is not a build-out of crude-by-rail in California is different regulatory standards. Am I recalling that correctly?

THE WITNESS: There's a number of factors that affect why crude-by-rail has had such a limited development in California compared with Washington. One of the major factors has been extensive regulatory review. One impact that that has created is delay. And because the crude-by-rail economics have shifted so dramatically, during the boom period, facilities that could be built fast, got built. They -- and the

facilities that were slower to build, in many cases now, even the applicants are backing away from them because it's no longer economically attractive for them. But there are also other factors beyond the regulatory environment in California that affect the build-out of crude-by-rail.

MR. ROSSMAN: Okay. But to the extent they're regulatory factors, it's process rather than standard driven; is that right?

THE WITNESS: I would say they're both process and standard driven. In particular, California, it has very extensive regulation anyways. It has very extensive siting review. But in particular it has very extensive review related to air quality because much of California has serious air quality attainment issues, you know. And as a result facilities that handle crude products receive extensive review because there is concerns about the possible air emissions.

MR. ROSSMAN: Got it. Thank you.

JUDGE NOBLE: Mr. Moss?

MR. MOSS: As I listened to your testimony, I'm trying to -- I'm pondering a question of -- to put it in noneconomist terms, what's the angle? If the refineries up in the Anacortes area would prefer to have direct shipment crude by oil -- or crude-by-train to

their terminals at the facilities where it will be refined and there is a barrier to putting such facilities in California itself, is the angle here that this terminal would enable the growth into the California markets for Bakken crude?

THE WITNESS: I've also been trying to figure out the angle. Because it's not presented in the application, and I haven't been able to find it anywhere else, a real clear explanation of the business case for this project. There are several potential angles. Clearly one of the potential angles is that because it is -- California is potentially a large market for crude-by-rail. It's difficult to develop crude-by-rail unloading facilities in California. It's Tesoro's analysis and opinion that the cost to get crude to California is similar bringing it into the Vancouver terminal and bringing it by ship to California versus bringing it by rail all the way into California. It's a long enough distance to California, you know, that it -- a crude-by-rail haul directly to California would be higher cost than a crude-by-rail haul to the Vancouver terminal. The cost of marine transport on the West Coast, it's not low. There's the Jones Act issue, but it's a relatively short distance. The California refineries are set up to receive crude by ship already.

GOODMAN

So definitely one of the angles of this project is because California has been reluctant and resistant to develop crude-by-rail terminals, instead you put the crude-by-rail terminal in Washington and then you bring the crude in by ship to California refineries which are already set up with those logistics. So that's definitely one of the angles.

Tesoro is a large refiner in California. It has a refinery in the San Francisco Bay area of 166,000 barrels a day. It has a much larger refinery in Los Angeles. It bought -- it had an existing refinery, but it bought BP's refinery and it's now combining the two. And based on extensive information, and I just assisted in providing comments in the environmental review of the project to integrate the two Tesoro refineries in Los Angeles, they are very interested in bringing in crude from the Vancouver terminal to Los Angeles.

So -- Tesoro is interested in setting up a system where it has substantial control of the logistics all the way from North Dakota to Los Angeles. And when they bought the BP refinery, they bought very extensive logistics assets in the Los Angeles area. So that's -- California is the most likely US destination because it's approximate and it's large and Tesoro is a major

participant in the California market and it has specifically said, we want to bring in Bakken crude to California through the Vancouver Energy Distribution Terminal.

There are other potential angles for this project. My testimony looked at the possibility of bringing in Canadian crudes. There is -- it could certainly bring in Canadian crudes and then move the crude to US refineries, just as the Vancouver terminal is relevantly proximate to North Dakota, it's also relatively proximate to Alberta. So if crude needs to move out -- move from Alberta by rail, the West Coast is a potentially attractive market. The California refineries are configured to process heavy crude. A lot of heavy crude is produced in Alberta. So another angle is using the Vancouver terminal to bring Canadian crude in and that will also affect the overall benefits, because then you're talking about crude production in another country. So bring that crude into Washington and take it down to California.

The preferred option would be to develop the Trans Mountain expansion pipeline because that gets crude to the coast by pipe. It's cheaper. That has received approval by the NEB with conditions. It still has to undergo additional review in British Columbia.

There's been a lot of delays and difficulty constructing pipelines in Canada. So it's uncertain TMX will get built. In that case the Vancouver terminal could be a plan B. Instead of pipelines in British Columbia, just as the Vancouver terminal's a plan B instead of crude-by-rail in California, it could be a plan B instead of pipelines in British Columbia to get crude to the coast and then it can be put on tankers and taken to California.

Another possibility is taking crude from the Vancouver terminal and exporting it internationally. The lease as it's currently amended places restrictions on that. It is unclear if these restrictions will remain in place. So there's definitely a possibility that it will be plan B, especially for Canadian producers if they can't get crude to the West Coast by pipe, the Vancouver terminal is a second-best option that could be very attractive to them.

MR. MOSS: And you're probably the wrong witness to ask, but if the Canadian scenario were to develop, is there a restriction in the lease against that oil going overseas or is it just oil produced in the US, if you know?

THE WITNESS: As I understand it, the lease as amended requires ships to deliver to US ports. So

that would affect both Canadian crude and US-produced crudes. The restriction on crude exports in the US has been lifted. There was not a restriction on Canadian crudes before, although there were cases where Canadian crudes had diluent that was US produced. That's what you use in the heavy tar sands bitumen. If there is a US-produced diluent, that might have made restrictions on exporting that crude because the diluent was considered US crude. But in any event, the US has lifted its restriction on crude exports. So US crude, including Bakken, could go overseas absent the port restriction. Similarly, Canadian crude could go overseas. The Vancouver terminal is capable of loading large ships similar to the existing and proposed terminal in Burnaby, British Columbia, serving the Trans Mountain Pipeline. So it's definitely an option for overseas exports in a technical and economic sense.

MR. MOSS: One more question on the Canadian bit, and that is if -- if it's purely Canadian crude and it comes to the terminal, do we still have a Jones Act situation or can that be transported to California in non-Jones Act ships?

THE WITNESS: No, because it's a shipment from a US port to a US port, the Jones Act would still apply.

MR. MOSS: Okay.

THE WITNESS: That is an advantage to the Trans Mountain proposal because then you get to a terminal in Burnaby, British Columbia, and you can bring it to California in non-Jones Act ships, which are less expensive.

MR. MOSS: Okay. Now I'll take a step back to the question before all of those, which is, if the refineries, as you say, would prefer to have the crude-by-rail directly to their refineries as opposed to doing this transshipment option, are you -- do you know if there are currently some sorts of limitations on their capability to do that?

THE WITNESS: In terms of their on-site unloading terminals?

MR. MOSS: Right. Is there anything that prevents them from doubling the size of those?

THE WITNESS: The existing facilities have been permitted. I believe they've been permitted at certain levels. They also have a physical configuration. It appears they're not being utilized at full utilization, although it's very hard to evaluate utilization in crude-by-rail facilities because there's a lot of variability. But they could probably squeeze out -- squeeze through some more crude. But if they

want to expand it beyond that, they would need to go through additional siting and permitting. You're probably more familiar with what those requirements would be. My understanding is, in the past, the different facilities have gone through different levels of review. Some of that may be a timing effect; it may also be a size effect, but there would be the necessity for additional siting review.

MR. MOSS: All right. Thank you very much.

JUDGE NOBLE: Further questions, to my left? To my right? Mr. Snodgrass?

MR. SNODGRASS: Good afternoon. A couple of questions.

You had spoken earlier about the timing involved, and I presume it was the contracting and you mentioned for CBR typically on a two- to five-year realm. I guess a question on -- really, I guess, more the refineries, but also, I guess, the CBR. How quick are -- in considering in response either to changes in available sources or pricing, how -- what is the general sense of timing of how quickly refineries can change where they get their oil from?

THE WITNESS: That's an excellent question. In the short-term, refiners make choices every day about what crude to buy. They run very detailed linear

programming models which simulate the operation of the refinery. And so basically they can compare crude A versus crude B, because crudes vary. ANS is different than Bakken. It's different than tar sands dilbit. Different crudes produce a different range of products. So it's not just an issue of price.

A more expensive crude can be more profitable if it produces a higher-valued slate of products. So -- but refineries are also -- each one is unique. It has a physical configuration. Within the physical configuration, there's some flexibility to vary crude inputs. There's some flexibility to vary product outputs. But it's limited.

So they continuously optimize within the limits of the configuration of the refinery. Refineries also on an ongoing basis undertake activities to modify their configuration. Some of these activities are very small; some of these are very large and very expensive. Tesoro Anacortes currently has a reconfiguration project in siting. I would characterize that as a medium-sized project. It also has a very large project in siting review in California to do reconfiguration and integration of its two refineries in Los Angeles.

There are also even larger projects where refineries add like major new processes. Two of the

GOODMAN

Washington refineries have cokers, which is a technique -- a technology to process heavy crudes. So instead of producing heavy asphalt and heavy marine fuels, they basically bake the heavy bottom of the barrel and take off the light products and make more gasoline and diesel and what's left over is petroleum coke.

If it's high-quality petroleum coke, they can then process that, use that for making electrodes. The BP refinery in Cherry Point makes electrodes, produces this high-quality petroleum coke. So it has an incentive to keep -- and it processes ANS, and BP is an ANS producer. So there's some discussion whether Washington refineries want to shift off of ANS. It's unlikely that BP is going to be shifting off of ANS because it is configured to process it. It makes products that are -- ANS is well suited to produce. It's also producing the crude.

Other Washington refineries potentially could undertake reconfiguration projects as crude slate ships. They have not in the past undertaken the massive reconfiguration projects that have been undertaken by some other refineries in the US, and I think that reflects the fact they have a wide variety of crude available. They were largely designed for processing

Alaska North Slope, which is a medium grade crude. So they can replicate that by using other crudes and, for example, blending them. So they also have flexibility because they can get their crudes from Canada. They have access to marine crudes. So they have been able to make good use of their existing configuration and operate at capacity, even as crude prices have changed, even as market conditions have changed.

MR. SNODGRASS: Okay. Thank you. Turning to the costs of transport. Do you have a ballpark estimate of what it costs to move a given amount of oil via rail versus marine recognizing it's all pretty rough?

THE WITNESS: Marine transport -- I give a figure in my testimony. Marine transport by tanker costs in the order of $1.50 to $3.50 per barrel. There are conceivably situations where it's higher. You know, some of it depends on the size of the tanker, some of it depends on the Jones Act. But the bottom line is, tanker transports is very inexpensive and that's why, as I said, you can move crude from Saudi Arabia to California and Washington and similarly all around the world. Crude-by-rail, its costing is very sensitive to distance much more than tankers. Crude-by-rail into Washington from North Dakota is -- as crude-by-rail

goes, is relatively cheap because the distance is shorter than to other markets and there's also relatively little congestion.

When crude goes from North Dakota to the East Coast, it has to go -- frequently goes through Chicago; it's very congested, it slows it down. Crude-by-rail into Washington might cost on the order of $10 a barrel, but that may not be the total all-in cost. But typically it's -- it's an expensive mode and it's typically more expensive than pipeline.

MR. SNODGRASS: So, you know, again, ballpark, how much would it add to total shipping costs to move oil from the Bakken to Vancouver and then by tanker up to one of the Washington refineries versus Bakken to Vancouver by tanker down to California? Is there a big difference in overall costs?

THE WITNESS: I think there would be -- I think there would be a difference of at least a couple dollars a barrel, possibly more. Because it's -- part of the cost of shipping and one of the reasons it doesn't fluctuate with distance as much as you might expect, there's a sizable cost to load it onto a ship and there's a sizable cost to take it off of the ship. If you're going around the world, that's not a big deal. If you're going for a hundred miles in Washington or 200

or 300 miles, that's a lot of overhead. So you're going to have that issue. You're also potentially going to be using barges because they're smaller. So it could be more than $2 a barrel. Could easily be even 4 or $5 a barrel.

MR. SNODGRASS: The difference between, though, going from Vancouver shipping to Washington versus Vancouver shipping to California?

THE WITNESS: Yes. Because if you're bringing in crude-by-rail to -- you have a little bit of additional rail costs because it's a longer distance, but it's not that large an increment. And then you're also using the on-site terminal which in many cases the refinery owns. While if you're bringing it by ship, you're using your refinery -- you're using your marine terminal that you also own, but you're paying the costs -- you're paying the loading costs of the VEDT and you're paying -- you're paying to load it onto a ship in Vancouver, you're paying to move it by ship up to the refinery and you're paying -- even if you own the terminal, you're paying some operating costs to bring it off of the ship at the refinery.

MR. SNODGRASS: Right. Maybe I misunderstand -- I'm just trying to compare the cost of ship by Vancouver up to somewhere in Puget Sound, a

refinery, versus Vancouver by ship down to California.

THE WITNESS: Yeah, I would -- there's some more detailed information in one of the exhibits, but I would say at least $2 a barrel and possibly more, depending on conditions.

MR. SNODGRASS: Just lastly, in terms of figuring the statewide and local economic impacts. The IMPLAN model doesn't include any of -- am I right that it doesn't include any of the costs; it's strictly the economic activity constructing a project and then operating the project and then the multiple air effects or does it also include any of the negative economics?

THE WITNESS: The IMPLAN model can be used to evaluate a number of activities, but typically -- as Mr. Schatzki used it, he was evaluating the economic spin-offs of the positive money being spent. So he's not looking in IMPLAN at any of the costs. And in general, IMPLAN is not very well suited to evaluating the costs -- you know, the negative costs out of the equation, the externalities versus the economics -- the positive economic spin-offs.

MR. SNODGRASS: Okay. Is -- to get a bigger picture on both the positive and negative impacts statewide and locally, should we consider the costs of incidents, both the cost of preparing for those

incidents and factoring a probability and then the costs of cleanup, recovery and so forth?

THE WITNESS: Very much so. I have undertaken extensive analysis of both pipeline and crude-by-rail projects, and one of the key findings of my analysis has been, while the benefits are relatively small, the potential costs are very large. There's some more notable costs, you know, just in terms of preparation. There's been some discussion of that, you know, that you're paying property taxes, but maybe part of the -- what you're using the property taxes for is to pay for emergency preparedness and to pay for infrastructure that's required to support the operation of the facility and the construction.

But then there's the potentially much larger costs in terms of the negative impacts. There's potentially catastrophic accidents. But on top of that, there may be ongoing environmental costs, such as air emissions that can have impacts locally; it can also have impacts more broadly.

MR. SNODGRASS: Should we also consider -- this is sort of a nebulous thing, so it's not typically a -- you wouldn't consider it part of economic analyses, but impacts to brand. I just wonder if you -- in any of your analyses, if you had looked at -- factoring out all

GOODMAN

costs of cleanup and assuming all of that works okay without long-term environmental damage, if an area with a, generally speaking, good environmental reputation becomes known as an area that sometimes has some spills and some derailments, factor into all the costs of those, do you have a sense or can you give any advice on what we should consider the diminution of the brand of communities along the Columbia corridor?

THE WITNESS: This issue has arisen very intensely in Vancouver, British Columbia, in relation to the Trans Mountain expansion proposal, which would send tankers through Vancouver harbor. And the mayor of Vancouver has specifically said, you know, our brand is as a green metropolis, and that's very important for tourism but it's more broadly important for the economic vibrancy of Vancouver and Vancouver is very economically vibrant.

So there's been very intense concern in Vancouver that effect -- to put it in economic terms, acting as a crude port, as a terminal for a pipeline in a crude port is a low-value use of a high-value resource. Vancouver is, in economic terms, a very valuable resource and it's very economically vibrant because of its natural beauty, because of its high quality environment, because of its progressive

policies. You know, that's very appealing.

There's a concern that hosting a large -- you know, a big pipeline expansion for crude tankers, possibility of spills will undercut that very valuable brand. So to put it in other terms, what is outside the crude logistics is much more valuable than what's inside the crude logistics. We hope it stays contained within the tankers and the tank cars and the pipelines. There's a possibility it won't. And in that case the resources that can be damaged are very valuable, and you can have catastrophic accidents which can cost in the billions, and damage to brand is one component of that.

MR. SNODGRASS: Were they able to guesstimate a value on that or put any numbers around that?

THE WITNESS: I'm not aware that they've directly quantified that. That's difficult to quantify, but it has been expressed as a concern.

MR. SNODGRASS: Thank you.

JUDGE NOBLE: Mr. Lynch?

MR. LYNCH: Thank you for your testimony, Mr. Goodman. I'm sorry if you've already answered this before, especially if you've answered it more than once. I've been trying to understand a little bit more about if this facility is not built, if there's essentially

going to be more -- essentially the same number of these unit trains going to other Washington refineries to provide crude oil there. And I'm going to note a few things from your prefiled testimony and then ask you kind of a longer question. But the thing to keep in the back of your head is, is there going to be roughly the same number of trains coming into Washington but going further up the tracks because this facility won't be built.

So I noticed that on your prefiled testimony, you said, Washington refineries had made sizable commitments to crude-by-rail, and then you also note that Washington receives some foreign crude supply by tankers from a variety of global sources. You also note that future crude supply from crude-by-rail will be affected by actual build-out of proposed facilities. And you said, even without this proposed facility -- I'm looking at page 13, paragraph 54 of your prefiled, even without the proposed facility, crude-by-rail could potentially provide up to 120,000 barrels per day of crude supply for Washington refineries.

So what I'm trying to understand is, if this facility is not built, is it more likely that refineries in this state would displace the oil that they're currently receiving from global sources with this oil

and are they also more likely to build-out their facilities? Do you have an opinion on that?

THE WITNESS: Yes. It is unlikely that a sizable portion of the crude from the -- handled by the Vancouver terminal will be going to Washington refineries. So to the extent that -- as a thought experiment, make it simple; it's all going to California. If it's all going to California, it's adding crude trains into the terminal on top of whatever other crude trains are going to be operating in Washington. It's completely an incremental activity that's supplying California refineries, not Washington refineries.

Looking at a more nuanced case that you were asking, is it possible that if there is the VEDT, there will be less crude-by-rail -- other crude-by-rail in Washington than there would be without the VEDT. In terms of the existing unloading facilities, it's unlikely that the existence of the VEDT will affect the utilization of those facilities. The refineries would typically prefer, if they're going to use -- receive crude-by-rail, to get it in the terminals they already have.

Shell has a large proposed facility in permitting. It has not cancelled that project because

of the Vancouver proposal. I don't know what -- you know, Shell is continuing to build that facility. There will be a determination on siting, whether it's permitted or not. But I think whether it goes forward or not is not affected by the Vancouver energy terminal. It is possible that the existence of the Vancouver terminal may play some role in whether Westway goes forward, but right now they're trying to build Westway. So it's unclear to me that there is likely to be much displacement.

I think the Vancouver terminal is largely positioned to supply markets outside Washington. It's -- size -- at 360,000 barrels a day, it's very large for Washington. There's already almost 200,000 barrels a day of crude-by-rail unloading capacity in Washington. If you added the Vancouver terminal on top of that, that would provide the entirety of the crude supplied for Washington refineries. It's very unlikely they're going to shift to using all crude-by-rail, not bring in crude by the Trans Mountain Pipeline, not bring it in the Alaska North Slope.

Currently the overseas imports are 30,000 barrels a day. That's a tenth of the Vancouver Energy terminal. So it's hard for me to see a significant impact of the Vancouver terminal supplying Washington

refineries. I am not going to say not a single barrel is going to Washington. That's -- I can't -- there's not -- you can't know that. It is possible some will go to Washington, but it's likely to be small. And it may increase over time, but it's still likely to remain a small portion of the overall facility.

Given the size of this facility, it's designed to serve large markets. The large market that's nearby is in California. 360,000 barrels a day is an enormous amount of crude for Washington. California refineries process 1700 barrels -- 17 hundred thousand barrels a day, 1.7 million barrels a day. They import half of that from overseas. So it's conceivable there's a market in California for this terminal.

MR. LYNCH: Thank you.

MR. SHAFER: Mr. Goodman, thank you for your testimony today.

I think I have this, but I just want to confirm with you that I'm getting at least some of the essence of your testimony correct, meaning -- and in terms of the relationship between the project and getting the product to market.

So I think you spoke quite a bit to the facilities and the array of pipelines out of the North Dakota area and the Bakken -- where the Bakken crudes

are and such, but pipelines, array of pipelines, more pipelines being built. We've got a number of rail facilities.

Does this project -- the VEDT, does it really have any bearing at all, would you say, relative to just simply getting that source of product to market? I mean, if it's not built, does the market notice that at all, or does it really have any effect on getting the product to market, or is there so much infrastructure in place already that's almost immaterial?

THE WITNESS: Currently crude-by-rail loading facilities in North Dakota are overbuilt. Pipelines are coming on stream rapidly. So Bakken production is not stranded. It's not unable to move to market. All of Bakken production is moving to market. It's increasingly moving to market via lower cost pipelines instead of rail. And within two years, it may be virtually all pipeline.

So it is not the case that the Vancouver terminal is necessary to enable Bakken production to reach markets. It would provide an additional market, you know, some expansion of the market for Bakken, but it's unlikely to really, I think, move the market in terms of Bakken.

MR. SHAFER: Do you think there's any

possibility that infrastructure and market conditions could go to the extent within the 20-year life period of this proposed project to even render the project obsolete? Do you think that's a possibility?

THE WITNESS: Currently, there's a lot of overcapacity throughout the crude-by-rail sector. So there are unloading terminals and loading terminals that have been mothballed. There are some that are operating at a fraction of capacity. There is a huge build-out of tank cars. A large portion of the tank cars built in recent years are now being stored because they're not being used to move crude.

Given that scenario, crude-by-rail is a very price sensitive and volatile activity. It has other risk factors, including accidents, regulation. So there's definitely the possibility that over the life of the facility that it would be utilized at a low rate. At some point if it's being utilized at a low rate, there's the possibility it would be mothballed.

MR. SHAFER: Great. Thank you.

JUDGE NOBLE: Mr. Stone -- Mr. Snodgrass. Mr. Stone first, and then you.

MR. STONE: Good afternoon. I would like to ask a similar question as Mr. Shafer did. This proposal, as I understand it, was made about three years

ago. Given the volatility in the oil markets, the decline in the price of crude, the decline in the shipment of crude-by-rail, in your opinion, would it make good business sense to make this proposal for a Vancouver terminal today?

THE WITNESS: That's an excellent question and I've thought about that and I've examined the application and the other information provided on the record by the applicant looking for the business case, because the world has changed dramatically from three years ago. The graph demonstrated that. The discussion demonstrated that. Crude-by-rail is contracting rapidly.

Looking at other facilities, it is definitely the case the proponents have changed their mind. As I said, there was a project approved in California in the Bakersfield area for a crude-by-rail unloading terminal. The applicants have decided, even though they did receive siting approval which is not easy to get in California, that they didn't want to build it because it was not attractive economically anymore. So I am -- I had been curious why this project is still advancing.

I think there are advantages to Tesoro that may make this project more attractive or at least a

better gamble than to some other crude-by-rail developers. But it's -- part of the impact may be if the economics are not as good, that may -- even if the project is built, it may very much affect utilization. And the applicant has said, we have committed to take or pay for 60,000 barrels a day. That's a small portion of the total. The rest is available to Tesoro if it wants it. It could potentially sell it to third parties. It's unclear how much third parties are going to be interested. So there's a possibility this -- if it gets built, is built and then could operate at a very low utilization. But the business case has not been established in the record and it's hard to know what the current business case is, because right now crude-by-rail is not a profitable activity in general.

MR. STONE: Thank you.

JUDGE NOBLE: Mr. Snodgrass?

MR. SNODGRASS: Just one quick and kind of specific question I had forgotten earlier regarding -- you had testified today about the limited impacts to price at the pump from -- likely from this facility. And as I recall that was the original testimony of Mr. Roach, I think. On redirect there was an issue brought up of -- that perhaps the price marker, whatever that is, might somehow influence, might positively

result from this project on local pump prices. Can you talk about that specific issue?

THE WITNESS: Yes. As I understand Mr. Roach's testimony, he first said, it would be hard to detect any impact on refined product prices because they're volatile and it would be hard to pick out the impact. And I agree that refined product prices are volatile and it would be hard to pick out an impact even with a very detailed economic analysis.

There was then some discussion about whether this project could affect crude prices in Eastern Washington, and that's where he was discussing that there's linkage between pricing in Western Washington which does receive product from the refineries in Washington and Eastern Washington which receives most of its supply from PADD 4, and he said that it could -- it could potentially have some impact on refined product pricing.

I looked into the question. It's a very complex question, and it's very tricky to do analysis of refined product pricing because there's a lot of moving parts. In general, the analyses I've reviewed relating to Washington, California, Midwest, you know, other jurisdictions are -- the refined product pricing doesn't -- is not very sensitive to the price of crude

supplied to single refineries and may not even be sensitive to the price of crude supplied to all of the refineries serving a local area. It tends to track much more with global crude prices, because there's enough linkages both on the crude side and on the refined product side that the prices tend to track these global benchmarks rather than local benchmarks.

Since the Vancouver facility is unlikely to supply much crude to Washington, it's unlikely to influence refined product prices in Washington.

MR. SNODGRASS: Thank you.

JUDGE NOBLE: Any other council questions?

MR. SIEMANN: I have one.

JUDGE NOBLE: Mr. Siemann?

MR. SIEMANN: Good afternoon. I was curious about the Jones Act ships, and as I understand it, they have a size restriction in terms of capacity. And there's been some testimony that the applicant would like to expand the amount of crude that it can load on vessels, sort of go beyond the capacity that the Jones Act requires, if I understand correctly, by doubling it. And I'm curious if that would change the economics of the process of unloading and transporting -- transiting?

THE WITNESS: Yeah, as I understand it, there are actually two related issues. There is a

restriction on how much crude can be loaded on the tankers on the Columbia River, that I believe the sea captain, whose name is escaping my mind at the moment, who testified for Tesoro Savage, discussed -- it's at a certain level now, there's an interest in doubling it, I believe, a Ms. Harvey or Dr. Harvey also testified to that. That's not a Jones Act restriction. That's a navigation restriction.

There was also testimony that the supply of Jones Act ships is limited so that currently there are not a lot of larger Jones Act ships available. There are -- in the fleet of Jones Act ships, there are some -- there are larger tankers. BP in particular uses large tankers to move crude from Alaska to its Cherry Point refinery, I think probably perhaps larger than could even transit the Columbia River.

Directionally, to the extent to which there's capability to bring larger tankers into -- and load more crude onto tankers in the Columbia River, that will affect the economic attractiveness of serving more remote destinations. If you're serving -- if you're moving crude from Vancouver to Washington or potentially even to California, to the Bay Area, you might do it in a barge or a very small tanker. But once you're going a longer distance, like to the Los Angeles area or

certainly to Asia, it's much cheaper to use a larger tanker. So to the extent to which you can load larger tankers, that increases the economic attractiveness of serving remote markets.

Also if you are serving markets outside the United States, you do not need to use Jones Act ships. So increasing the navigation limits on the river and relaxing the restrictions on use of non-Jones Act ships to sort of non-US ports from the terminal would create a recipe where it would be economically attractive to move crude from the Vancouver facility to offshore markets, notably Asia.

MR. SIEMANN: That's very helpful. And then the other question I have, since we import oil from international markets, is it also economic to export oil to international markets? How does that work?

THE WITNESS: Well, in economic terms it's called cross-hauling. And there is -- the US is actually a large crude importer, still, from international markets, as well as from Canada, overseas international markets, but the US also now does export crude.

One of the reasons why you may have crude going in both directions is you have different types of crude. So it may be -- and once you get -- as we

discussed, once you get on a tanker, it's relatively inexpensive. In some cases you can even do a backhaul. You can bring in one crude to, you know, the ship, take that off, load another crude onto it, take it to another destination. That makes it even cheaper.

So it can potentially be attractive to bring in a certain kind of crude that is available at a low price and export another crude that's available in this market at a low price to other markets that want it. Because refiners are very interested in getting specific crudes that are well suited to their refinery.

In particular, Bakken, there were some concerns when its production was booming that it would overwhelm the capability to process that type of light, sweet, meaning low-sulfur crude, within the US. And one of the reasons there was a lot of impetus to relax the restrictions on crude exports, there was a concern that the US refineries might not be able to process all the light, sweet crude from Shell.

It turns out they were able to, and now production's not skyrocketing, but part of the appeal was, we may have too much of this particular kind of crude, it might be more valuable to send it to other markets and meanwhile we can import the crude that the refiners want, which may not be this light, sweet crude.

So it is conceivable in changing market conditions that the Vancouver terminal could be used to export Bakken. It's more likely it would be used to export Canadian crude. There's been a very, very strong interest by Canadian crude producers to get access to Pacific tidewater so they can serve markets in Asia, as well as potentially other international markets.

MR. SIEMANN: Thank you very much.

JUDGE NOBLE: Any other questions for Dr. Goodman?

Questions based upon council questions?

MR. DERR: No, Your Honor.

MS. BOYLES: No, Your Honor.

JUDGE NOBLE: All right. Dr. Goodman, thank you very much for your testimony today. You are excused as a witness.

THE WITNESS: Thank you.

JUDGE NOBLE: And, parties, it's time to take the afternoon break. We will be back at 2:50.

(Recess taken from 2:36 p.m. to 2:55 p.m.)

JUDGE NOBLE: Are we ready to go back on the record? Do you have another witness?

MR. PRUIT: Yes, we do, Your Honor. Terry Pruit, on behalf of the Department of Natural Resources. DNR calls Timothy J. Walsh.

JUDGE NOBLE: Mr. Walsh, would you raise your right hand, please.

(Witness sworn.)

JUDGE NOBLE: Thank you. Please be seated. You may proceed, Mr. Pruit.

TIMOTHY J. WALSH,

having been first duly sworn,

testified as follows:

DIRECT EXAMINATION

BY MR. PRUIT:

Q. Please state your name and spell your last name for the record.

A. My name is Timothy J. Walsh, T-i-m-o-t-h-y J. W-a-l-s-h.

Q. Where do you work, Mr. Walsh?

A. I work for Department of Natural Resources in Olympia at the natural resources building.

Q. What do you do for the DNR?

A. I am the assistant manager of the division of geology and earth resources, also known as the Washington Geological Survey.

Q. What do you do as the assistant manager for the Washington Geological Survey?

A. I oversee the landslide hazard section, the geologic hazard section, the mapping section, the GIS

and editing section and the LIDAR section.

Q. How long have you been the manager of the division?

A. Assistant manager.

Q. Assistant manager.

A. Just since February 1st.

Q. And what were you before that time?

A. Prior to that, I was the chief hazards geologist. I managed all of the geologic hazards investigations, and I did that since September of 1988.

Q. What is your educational background?

A. I have bachelor's and master's degrees in geology from UCLA.

Q. And what professional licenses or certifications do you hold?

A. I have geologist and engineering geologist licenses in the state of Washington. And I also actually have a certification in blowout prevention, which has a little bit of relevance here.

Q. You have provided an abbreviated resume as an exhibit to your prefiled testimony; is that correct?

A. That is.

Q. Does that exhibit accurately describe your relevant work experience?

A. A lot of it. I have -- I've been doing this for

many, many years. I have a long resume.

Q. What were your responsibilities as chief hazards geologist for the Washington Geological Survey?

A. I oversaw all of the staff doing geologic hazards work and I participated in most of those investigations. So for instance, relevant to this, we did landslide hazard mapping in Cowlitz County, Thurston County, and I have participated on the Washington Department of Transportation's committee on landslide hazards on the railroad tracks between Seattle and Everett for the last several years.

I also have been involved with doing geophysical investigations, active fault studies and probably most of my time is spent doing tsunami hazard mapping.

Q. Could you explain the difference between a landslide hazard and a landslide risk?

A. There are a lot of competing definitions for hazard and risk, but the one that I like to use is that hazard is -- a geologic hazard is a physical process that has some defined probability of occurrence that could have negative consequences. And risk also incorporates the potential consequences, so I like to think of risk as a function of hazard, including the probability estimate, the value of assets at risk and the vulnerability of those assets.

Q. What are some of the causes of landslides?

A. Well, landslides ultimately are caused by gravity, but gravity is acting against the strength of the materials. And so the strength of the materials is not a constant; it's significantly oftentimes affected by water. So when sediments become water saturated, that increases the weight, which increases the gravitational load. It also causes a buoyancy effect, which decreases the strength of the frictional interactions between individual sand grains. And sometimes if pore pressures become great enough, they can actually push grains apart and reduce the frictional resistance very close to zero, a process called liquefaction.

Q. Are some areas more prone to landslides?

A. Oh, yes.

Q. What -- what makes an area prone to landsliding?

A. Well, another factor that I didn't mention, which is one that's relevant to the present case, is that rocks and sediments don't have equal strength in all directions. It's called anisotropy, and in cases of bedded rocks and bedded sediments, the orientation of the bedding typically is the weakest orientation in the rock or sediment. And so if the bedding planes are parallel or close to parallel to the slope itself, it's

called a dip slope, then that is the most gravitationally unstable situation and that can be exacerbated by adding water to the mix or by earthquake-induced ground shaking that can further add gravitational load to that.

Q. Are there areas in Washington that are more prone to landslides for these reasons?

A. There are. The -- probably the most prolific landslide producing area of Washington would be the coastal bluffs around Puget Sound, but we also have a landslide province in the Columbia Gorge that houses some of the world's most famous landslides.

Q. What are some of the examples of those landslides?

A. The Bonneville landslide, for instance, also known as the Bridge of the Gods, which is about a 600-year-old landslide that dammed the Columbia River. And it was called the Bridge of the Gods because the Native Americans were able to cross the river along that before it was breached.

There also is the Old Maid lahar that came down Sandy River and was noted by Lewis and Clark when they came by, that sand was oozing out of the river, which is why they named it the Sandy River.

There's the Girl Scout Camp landslide.

There is the Red Bluff landslide.

Just a huge number of landslides all along the -- particularly, the Western Columbia Gorge.

Q. How does the Washington Geological Survey identify landslide hazards?

A. There are several ways that we do that. I mentioned the landslide hazard study that we did for Cowlitz County. That was done because after the Aldercrest-Banyon landslide in 1998, the legislature gave us an appropriation to do landslide hazard mapping. So we initially did that in Cowlitz County.

So what we did was an intensive air photo study of all of the areas that Cowlitz County identified as being within their 20-year-or-so urban growth boundary.

We then visited everything that looked like a landslide in those air photos, documented evidence of movement within them, estimated the degree of activity of it, whether it was active, inactive, whether it had been reactivated or if it was dormant or questionable. And so we put all of those together into a map and database that we supplied to Cowlitz County, which they now use for their Growth Management Act critical areas ordinance for unstable slopes.

We did similar work along the coastal bluffs along Thurston County and Mason County. And so those

are systematic studies that we did to get at that.

But we also have on our website a -- on what we call our interactive geologic mapping portal or the Washington interactive geologic map, we have a database of landslides that is a database of opportunity, that is to say, they were collected from any place that we had digital mapping available to us that showed a landslide.

And when I say they were maps of opportunity, that was because they were available to us. They weren't systematically collected as landslide data, necessarily. Some of them were, but many of them were landslides that were noted by geologists making a geologic map for some other purpose, and so they wouldn't necessarily have as full a database of all of the relevant information about the landslide that we would do if we were collecting it in a systematic fashion.

And now as a consequence of the Oso landslide or the SR-530 landslide, we've been funded to do a systematic landslide hazard program throughout the state, which we have prioritized on the basis of what we consider our most hazardous areas, but also areas for which we have the best available LIDAR. LIDAR is a very useful and perhaps even essential tool for mapping landslides in forested terrain in Western Washington

where air photos typically only show you the tops of the trees.

So we've started that process in Pierce County because they have the best available LIDAR, but we're now going to move to the Columbia River Gorge next year where there also is high-quality LIDAR and a serious landslide hazard.

Q. So moving back to your inventory --

A. Can I say one more thing? We also, after these large events, such as December 2007 and January 2009, we do reconnaissance investigations of landslides that have happened in those significant disasters.

Q. So what -- moving back to your inventory, the database that you maintain; you call it a database of opportunity. What is the purpose of that inventory?

A. It's meant to be a minimum. So because it is not systematically collected, it only shows landslides in places where somebody has put them down on a digital map that's publicly available. And so that doesn't imply that in the adjacent map there may not be landslide hazards, merely that they haven't been addressed yet. And typically one doesn't address landslide hazards on a very systematic, large scope way, unless you're funded for it or unless it's in support of a specific project where the slope stability is of

significant importance.

Q. So what percentage -- or what part of the state does your inventory cover?

A. We estimate that it's probably no more than 10 percent. And I should also say that it's a work in progress. So there are more data available to us that we have not managed to get into the system yet, so it's always incomplete and it will always be incomplete until and unless we actually do a systematic landslide survey of the entire state.

Q. And you've completed a systematic landslide survey of Cowlitz County; is that correct?

A. It wasn't all of Cowlitz County. It was what -- we talked to the planning department at Cowlitz County and we asked them where they saw issues that might arise from slope stability in areas where they were expecting to have some urban growth. So we did not do it, for instance, in forest land of long-term significance. We did it in areas where we expected that there would be infrastructure that could suffer an impact from landslides.

Q. Is your inventory intended to be sufficient for planning purposes if you have a project, for example?

A. No. It's a minimum. We anticipate people using it as the initial screening tool. So if there is a

landslide that shows up on that in an area of interest to whoever it is who's looking at the database, that would be a flag to do further studies. If not, that tells you nothing.

Q. So the absence of a landslide indicated in the inventory doesn't mean there's no landslide there?

A. That's right. And one of the things that we've done to illustrate that, is we've started showing the extent of the maps that have landslide information on them. And so it can be tricky to use, but it shows where there are significant gaps of mapping at a suitable scale to be able to identify landslides in a way that would be useful for planning purposes.

Q. So where you -- in the locations that you've done a more systemic study, is that all you would need to do if you were planning to do a project in that area? Were they intended to be sufficient for planning purposes?

A. No, there are -- well, it depends on how the planners are going to make use of information. So just doing a hazard identification is useful for growth management planning to put together a critical areas ordinance. But if we show an area or if whatever maps the jurisdiction has that show an area that has a potential slope hazard, that would indicate that if

there is an application for a permit on the property, some sort of a land use action, that further studies would be taken in order to characterize whether or not there truly exists a threat to the project. And if by -- that further study demonstrates that there is a real threat, then you would have to do more thorough geotechnical studies to identify potentials for either avoidance or mitigation.

Q. So why hasn't DNR done that type of detailed investigation throughout the state?

A. There are only three of us. That would take several thousand-person years.

Q. Are you familiar with the Tesoro Savage Vancouver Energy project proposal?

A. A bit.

Q. Have you reviewed the application for that proposal?

A. Well, not all 8,000 pages, but I've looked through for elements that have to do with slope stability.

Q. Could you give a brief overview of your general understanding of that proposal?

A. That it will be a crude-by-rail transport to a facility to be located in Vancouver where it will be then shipped by freight, or whatever, to some other

facility where it will be refined.

Q. In your review of the application, did you see any analysis of the landslide hazard along the rail route for -- where they would be bringing the crude oil into the facility?

A. I was not able to find any analysis of that in the application itself.

Q. What is the Washington rail route for the crude that would be shipped to the facility?

A. My understanding is that it would come into the state near Spokane, go down to Pasco, from Pasco to Wishram and then across through the Columbia Gorge to Vancouver.

Q. What can you tell us about geologic hazards along the rail route?

A. There are a couple of active faults they would have to traverse along that passageway. They are active in the sense that geologists talk about it. I have a different sense of timing perhaps from most of you, and that would mean that they have made earthquakes within the last 14 or 15,000 years. And some of the faults that would have to be traversed have made maybe two earthquakes in the last 15,000 years. So that doesn't represent a high level of activity, but then once they get into the Columbia Gorge, there are a large number of

landslides. The BNSF tracks are built on top of landslides in a significant amount of the Gorge and a number of landslides in the Gorge are still moving. We don't have any indication that anything at the tracks themselves are moving, but, for instance, the Bonneville landslide complex, the Bridge of the Gods complex, the railroad tracks do traverse it, and part of that complex have been moving recently.

There is an INSAR study, interferometrics synthetic aperture radar, that has demonstrated that one part of that landslide complex has moved 50 centimeters in the last four years. And then another piece of that complex is called the Piper Rock Creek landslide, which destroyed two houses in 2009 and threatened the Stevenson sewage treatment plant because it aggraded almost all the way to the top of the bridge on which was hung the conveyance to the sewage treatment plant.

Q. So let's take a little step back. If you could, explain what you mean when you say that the railroad track is built on top of the landslide, the Bonneville landslide.

A. Geologists use the word "landslide" in two different ways, as a verb and as a noun. And I'm talking there about it as a noun, the landslide deposit. So the Bridge of the Gods, the Bonneville landslide,

which had its major movement about 600 years ago, went all the way across the Columbia. It has deposits on the Oregon side of the Columbia River today. And as I said, it briefly dammed the river and became the Bridge of the Gods, which is why the bridge there near Stevenson is called the Bridge of the Gods today.

And so the railroad tracks throughout the Columbia Gorge that -- if you can imagine the geography of the Gorge, there's very little relatively flat ground between the river and the cascade range. And so a great deal of that ground -- of that relatively flat ground is landslide deposit.

Q. Where a landslide has historically occurred, does that tell you anything about the incidence of future landslides in that area?

A. It does. One of the reasons that we start with a landslide hazard inventory is that that tells you that you had an unstable slope there, tells you that you have weak materials, tells you that you have pathways or water to infiltrate. And so some estimates are -- that have been made in the Columbia Gorge, for instance, is that about 70 percent of the landslides that were mapped in a recent map by the US Geological Survey were actually reactivated rather than first-time landslides.

Q. And you mentioned that some parts of the

Bonneville landslide in particular were moving. Is that something we can see if we go out there and look at it?

A. You'd be able to see it with the Piper Rock Creek landslide. It was -- it took about half a year before it destroyed the two houses, but little by little it crept up the hill and eventually -- so we were advising the city of Stevenson that the houses were going to be -- need to be moved, but we didn't know how fast it was going to move and we couldn't tell them how quickly they needed to move, just that the houses needed to be moved. And they didn't move them fast enough, and so they eventually gave one of them to the fire department for practice.

Q. So what are --

A. Oh, so the INSAR -- so that was 50 centimeters in four years. So you certainly wouldn't be able to see that. That's, you know, the speed at which your hair grows.

Q. Are there other landslides that move more quickly than that in the Gorge?

A. Well, there's the Piper Rock Creek, which its major movement took about a year and a half for it to aggrade the Rock Creek to where it limited the freeboard under the bridge. Not that -- it was a surface street bridge, not the Highway 14 bridge. So that was what we

would call a moderately slow landslide. You would be able, if you were watching -- so I should back up a little bit. So the landslide came up high and landed on a bench and then slid across the bench, over the edge of the bench, down into Rock Creek. And so you would be able to sit and watch from across the creek as material kept dumping over the edge, and you would be able to hear it as well.

Q. How could -- how could landslides affect rail operations in the -- in the Gorge?

A. Well, at least two ways. One is that if you have landslide movement that's creeping and it's affecting the part of the landslides on which the tracks are built, there could be distortions building up little by little where the tracks are. And I'm not aware of this in the Gorge itself, but there are other circumstance -- other places, for instance, along the bluffs between Seattle and Everett, where rapidly moving landslides have hit and derailed trains passing by; the most famous of those being in January of 1997 when five mail cars were pushed into Puget Sound just off Woodway.

Q. Based on your review of the proposal, has Tesoro Savage Vancouver Energy done a review or analyzed the landslide hazard in the Columbia River Gorge?

A. I was not able to find that if they had.

Q. What does -- to your knowledge, has anyone done a comprehensive landslide investigation of the rail corridor in the Columbia River Gorge?

A. No.

Q. Are there recent studies of areas within the Columbia River Gorge that provide a more detailed analysis of landslide hazard?

A. Tom Pierson with the US Geological Survey at the Cascades Volcano Observatory and Russ Evarts, also with the USGS out of Menlo Park, have been working on a LIDAR-based landslide hazard inventory of the Western Columbia Gorge. I have seen the map. It's not published yet. And one of the things that they have concluded -- and incidentally, when last I talked to Tom Pierson about it, it was in April and he said he thought it would be published by the end of the month, but it still isn't published, but I know it's gone out for final editing. His comment in part of the text that's going to go out with it, is that they've identified a much more extensive landslide hazard than had previously been known.

Q. To your knowledge, does the --

JUDGE NOBLE: Hold on for a minute, Mr. Pruit.

Okay. Mr. Pruit, thank you. Sorry for the

interruption.

BY MR. PRUIT:

Q. To your knowledge, does the Tesoro Savage Vancouver Energy proposal account for the fact that landslides are more extensive and complex in the Columbia River Gorge than previously mapped?

A. Not to my knowledge. But again, I was not able to find any significant discussion of landslide hazards through the Gorge in the application at all. But it's 8,000 pages.

Q. Does the Pierson study that you mentioned focus on landslide risks to the -- to rail transport in the Gorge?

A. No. No. It's for the Gorge in general.

Q. Could a detailed landslide investigation study be conducted for the entire rail route in the Columbia River Gorge?

A. Well, certainly. It's a matter of the resources that are brought to bear on it. But one can systematically do what we have begun to do, which is to obtain LIDAR and analyze the LIDAR and then go out and field check areas. And there are other tools available, I mentioned the INSAR, interferometrics synthetic aperture radar, that can be used to do multiple looks at an area and then take the difference between the two and

be able to determine whether or not there has been movement. And there are at least two places where that has been done in the Gorge that have demonstrated movements of parts of landslide complexes that are significantly higher up the slope from the railroad tracks, but nonetheless they are active parts of these big landslide complexes in the Gorge.

Q. How useful a tool would it be to do that kind of landslide investigation for the rail route?

A. Well, I would think that areas where you could demonstrate repeated landslide activity as Pierson and Everetts did in areas where you could show active movement taking place today, would highlight areas where you would want to do more frequent and more thorough investigations of the tracks.

Q. So I'll leave it with one last question, and that's why do we care about accurately accessing the landslide hazard associated with the rail corridor?

A. Well, this gets now past the hazard part and to the risk part and that is the consequences. So because the tracks so are close to the river, derailments have significant potential for having an impact on the river, and if that impact is from a volatile or potentially toxic crude oil, that could have significant impacts to the salmon population of the river, for instance.

MR. PRUIT: No further questions at this time.

JUDGE NOBLE: Cross-examination?

CROSS-EXAMINATION

BY MR. JOHNSON:

Q. Thank you, Mr. Walsh, I'm Dale Johnson. I'm one of the attorneys for the applicant. Let me start where you left off, which was consequences -- potential consequences from a landslide risk along the rail corridor in the Columbia Gorge. First of all, those are landslide risks that exist today, correct, and not some future possibility? They're real --

A. Those are landslide hazards that exist today.

Q. Sorry. You made that distinction --

A. Yes.

Q. -- in your testimony. So those are existing landslide hazards?

A. Right.

Q. And so the same threat to existing rail traffic through the Gorge today exists that will potentially pose a risk to trains bound for the Vancouver Energy terminal, right?

A. Yes, that's true.

Q. Okay. All right. And are you aware that existing rail traffic through the Columbia Gorge

includes the transportation of hazardous substances?

A. I am aware of that.

Q. Okay. And that includes unit -- crude oil unit trains?

A. Yes, that's true.

Q. All right. And on that note, you responded to a question by Mr. Pruit about planning to do a project and doing a geotechnical analysis in that area. I assume that means the area of the project, correct?

A. Yes.

Q. Okay. And the area of the Vancouver Energy terminal is in the -- at the Port of Vancouver. Do you understand that?

A. I understand that, but the railroad tracks traverse the Gorge.

Q. Okay. With tracks that lead to the project site?

A. When I said "project," I was not talking about the Vancouver terminal. I was talking about any project that would be in a place that has potential slope hazards. I was using the term "project" generally.

Q. Okay. And are you testifying there's a potential landslide risk at the terminal site, or is your focus on the risks in the Gorge?

A. My focus is on the risk in the Gorge. The

landslide hazards at the terminal site were addressed in the application and they were addressed competently.

Q. Okay. And you also discussed some of the work that is being done by DNR to more fully assess landslide risks in the Gorge. Have you worked with BNSF or any other railroad as part of that effort?

A. Yes. In the -- I mentioned that I'm on the committee with DOT to be looking at landslide hazards along the bluffs between Seattle and Everett, and Gus Melonas, BNSF, is on that committee. There are four or five people from the railroad on that committee, as well as representatives of Sound Transit and Amtrak and then all of the local cities and counties involved in that corridor.

Q. And work that would be done in the Gorge to better define the risks, would that generally involve some coordination with the railroad?

A. We would like it to.

Q. Okay. And do you know if the draft study, I guess, or analysis that was performed by Mr. Pierson, has that been shared with the railroad?

A. I can't tell you that.

Q. Okay. And has the coordination with the railroad that has occurred up in Puget Sound, does that involve a potential risk of track distortion?

A. Largely it's looking at places to mitigate landslide hazards so they don't impact the tracks at all. So a lot of what is being done -- and this incidentally is from -- is money from Federal DOT to do mitigation projects. It's doing things like rerouting drainage from up above, putting in retaining walls, that sort of thing. So it's more geared toward prevention of landslides.

Q. Okay. And would you anticipate that there would be the same kind of effort in the Columbia Gorge as that area is further analyzed?

A. Probably not quite as intensive. I don't know how familiar you are with that stretch of track from Seattle to Everett, but there's an average of one landslide-induced derailment there every year. And the winter before last was a record number of landslide traffic curtailment incidents. There were more than a hundred of them. And that's not necessarily more than a hundred to BNSF, because when passenger traffic has to be halted for 48 hours after a landslide interrupts the traffic, but rail traffic -- freight traffic is continued as soon as the tracks are cleared. So the numbers are the total numbers of stoppages, including passenger rail. I don't know what they are for BNSF by itself.

Q. I was just getting at whether or not you would anticipate the same kind of coordinated effort to identify and mitigate landslide risks in the Gorge working with the railroad and other state -- potential federal --

A. Yeah, I would love to see that.

Q. All right. One last --

A. We're doing it in the place that I mentioned because Federal DOT gave State DOT money to be able to do that, and because it's actual mitigation work, not just identification, it requires the cooperation of the railroad because they do own the tracks and there are some engineering works that involve being in their right-of-way.

Q. Okay. Thank you. And one last question. It's unrelated to your testimony today, but that was included in your written testimony, and that was a discussion of a tsunami risk associated with landslides or rocks flowing into the Columbia River. Do you recall that testimony?

A. Yes, I do.

Q. And I was just wondering if you could say where you might anticipate such a risk to occur in the river?

A. It did occur in 1965, and the landslide came from Bradwood on the Oregon side of the river, caused a

tsunami that washed across Puget Island, knocked a house a hundred feet off its foundation and killed its occupant.

Q. And that's -- that's in the Gorge?

A. No, it's not in the Gorge. The Gorge has --

Q. Can you specifically describe where that would be?

A. I haven't analyzed it. I raised that because the application -- or the -- well, the DEIS mentioned that there would be no tsunami hazard, and they were looking at only a distant source, but particularly not so much from the point of view of rail traffic through the Gorge, but for freighter traffic down the Columbia, the potential for a locally induced tsunami which did affect the shipping channel is something that might reasonably be considered.

Q. Okay. And you don't have any expertise in terms of how that might impact vessels in the river, just that it might occur; is that correct?

A. I don't, that's right. We currently are working with the maritime industries to look at those issues. And so we're dealing with the Coast Guard, we're dealing with all of the ports in Puget Sound and we're dealing with DOT's ferry system.

MR. JOHNSON: Thank you very much. No

further questions.

JUDGE NOBLE: Redirect?

REDIRECT EXAMINATION

BY MR. PRUIT:

Q. You were asked a couple of questions about DNR's work with the railroad, BNSF. What has been your experience of the cooperation of the railroad in terms of providing information about what's going on with the track or planned movement, their assessments of those sorts of things?

A. They've not provided a lot of information. The cooperation that we have had working with the railroad is not so much that they've provided information but that they have participated with us in workshops that we have been going out to Edmonds and Mukilteo, places like that, to educate citizens on what they should do to avoid exacerbating landslide hazard.

They also have made -- given access to their rights-of-way for people to convey water away from landslide-prone areas, and they have provided some assistance to help homeowners hook up to storm sewers as opposed to having runoff. But they've not provided any information that I'm aware of to this committee.

Q. And is DNR's upcoming work in the Gorge doing the sort of systematic analysis that you discussed, is

that focused specifically on rail?

A. No.

MR. PRUIT: I have no further questions.

JUDGE NOBLE: Council questions, to my left? Mr. Siemann?

MR. SIEMANN: Good afternoon.

THE WITNESS: Good afternoon.

MR. SIEMANN: So you mentioned in response to Mr. Johnson's question about locally induced tsunami, that one had occurred before and this is going to be a completely new topic for many. I know when I first heard about it, it was an unfamiliar thing. Can you describe exactly how -- what that means and how it might happen in the Gorge.

THE WITNESS: Well, a tsunami is an impulsive wave that is generated by something, usually it's an earthquake, but landslides do it, as well as volcanic eruptions, that suddenly displace water. And that creates a generally long period wave. And the distinction -- one of the most important distinctions between a tsunami and a regular wind wave is that a wind wave is caused by friction across the surface of the water, it dies out at about half the wavelength depth. A tsunami is a disruption of the water column -- the entire water column from the top to the bottom, and so

it retains more of its energy. And in the case of the Columbia Gorge, for instance, the Bridge of the Gods almost certainly created a monstrous tsunami. No witnesses have come forward to talk about it, but -- and we haven't found anything in Indian legends specifically about the tsunami, but there must have been one.

And there have been a number of landslide-induced tsunamis in Washington State; that one in 1965 being one of two that we know -- that we have documented that have caused fatalities. Another was on the tideflats at Puyallup delta in 1894 that killed two people. We've also had numerous landslide-induced tsunamis in Lake Roosevelt caused by rapid fluctuations in the pool height behind Bonneville -- behind Grand Coulee Dam.

So there are -- oh, and the biggest tsunami we know of ever was out of Spirit Lake in May 18th of 1980, when the debris avalanche landed in the lake and displaced water up to an elevation of about 900 feet.

MR. SIEMANN: So if a locally induced tsunami were to occur in the Columbia River, what would be the effect maybe on -- on the tracks and on an oil train that was going through there? Could it like topple it or in some ways disturb it?

THE WITNESS: That's a question that's

difficult to answer without significant analysis.

MR. SIEMANN: Okay. A second topic of question is around climate change. And I'm just curious. I understand that climate change leads to more storms and that has some implications for landslides. What I don't know is if stronger storms are likely to lead to the potential for more landslides in the Columbia Gorge?

THE WITNESS: I've heard that question from you before. That's also difficult to answer because there are lots of uncertainties in how the weather will change with climate change. One suggestion from the Climate Impacts Group is that while there may not necessarily be more rainfall, that we will have more storminess. And so one of the things that is necessary to look at rainfall-induced landsliding is to look not only on the amount of water that is put into the system by a storm over a period of a day or two, but whether or not the soils were already saturated. So you need to look at rainfall over a longer period of time, typically at least a week, but generally in the USGS model, they go back 15 days.

And so if we have more storminess, what that would likely lead to is more storms bunched together but with less antecedent rainfall leading up to it. So it

could potentially lead to fewer landslides. But I've talked with the people at the Climate Impacts Group about this and they think it's also possible that there would be more antecedent rainfall. Our models just aren't well enough tuned to actually get at that.

MR. SIEMANN: Okay. And a final question, I was sort of curious, with -- you mentioned both sort of track movement and distortion and material blocking them. So I'm sort of curious. Are both of those things possible with landslides? Are you concerned about one more than the other?

THE WITNESS: Both are possible, sure. And, in fact, I should have mentioned an earlier one that's kind of a poster child picture of earthquake-induced landslides in Washington, is what happened to the UP tracks in 1865 going by the old Olympia Brewery alongside Capital Lake, where an earthquake-induced landslide under the tracks left the tracks dangling above the lake. It's a very famous picture that shows up in many, many textbooks on landslides.

MR. SIEMANN: Thank you.

JUDGE NOBLE: Further questions, to my left? To my right? Mr. Stone?

MR. STONE: Good afternoon.

THE WITNESS: Good afternoon.

MR. STONE: Regarding landslides between Seattle and Everett causing derailments, just to be clear, were those derailments caused by the landslide material literally knocking the cars off the track or --

THE WITNESS: Yes. Yes. The two that I mentioned were. In fact, if you Google "landslide derailment in Everett," there's one that happened two years ago that went viral, and somebody just happened to be taking cell phone video of the bluff and as it started to ravel, it then hit the track -- hit the train as it was going by and derailed it.

And the one in Woodway that I mentioned in January of 1997 was -- at Woodway, it cut back into a Dominican convent, the head scarp cut 60 feet back into the bluff and came down rapidly, hit the train, knocked five cars into the water and the landslide material went out into Puget Sound on the order of 75 feet.

MR. STONE: Okay. Related question. If railroad tracks were built on a landslide deposit, that could still be moving in present day, slightly moving, could that misalignment of track, because it's sitting on landslide material that's moving, be detected by the naked eye, or could it be so slight you couldn't see it?

THE WITNESS: Oh, it would definitely be too slight to see. Could be too slight to see. Landslides

can move at rates from extremely slow, and what I mentioned about the Bonneville complex of 50 centimeters in four years, well, 50 centimeters is 20 inches over four years, so that's five inches a year. Certainly not detectable to the naked eye. Whereas, the landslide that caused the tsunami at Puget Sound was essentially a rock falling, so it was falling at 32 feet per second, per second.

MR. STONE: Previously in this hearing we heard testimony from proponent's representatives about the various ways the railroads inspect tracks, one of which was a specialty machine or train car that goes down the track and measures the geometry of the track, very fine measurements. Are you aware of that?

THE WITNESS: I've seen it done.

MR. STONE: Would that be able to detect a misalignment from a landslide-induced misalignment of the tracks?

THE WITNESS: It ought to be able to. The frequency of it is of some importance here because if you have -- landslides don't necessarily move steadily at a consistent rate, they move episodically. And so if you have an area that is at risk of landslide movement, you would need, in order to be certain that you are catching all of that potential, to do -- to understand

the frequency of episodicity and be able to have a shorter inspection period between it.

There also is the possibility, rather than distorting the tracks themselves, of just putting stresses on it so that, for instance, the spikes could be stressed by landslide movement themselves but not enough to actually break until they have an additional load, perhaps of a train going across it. So I'm not sure how you would measure stress on the spikes or the -- I'm not sure what all they -- the methods are that they use to tie down the tracks, but landslide movement could put stresses on all of those tie-downs.

MR. STONE: Okay. Thank you.

JUDGE NOBLE: Mr. Paulson, you had a question?

MR. PAULSON: Yes, please. Mr. Walsh, just a couple of questions. I'm aware of the Seattle to Everett situation. That's a fairly common -- pretty much an annual occurrence, isn't it?

THE WITNESS: It's --

(Simultaneous discussion interrupted by reporter.)

MR. PAULSON: Where you have landslides that impact rail going through.

THE WITNESS: Oh, it absolutely is an annual

occurrence.

MR. PAULSON: What's the incidence of landslides that impact rail in the Columbia River Gorge?

THE WITNESS: I don't know.

MR. PAULSON: No studies on that?

THE WITNESS: I have not studied it. I am not aware of any studies on it.

MR. PAULSON: Have you discussed it at all with BNSF?

THE WITNESS: I haven't. I have not been in contact with anyone from BNSF who is working on that part of their tracks.

MR. PAULSON: Do you have any concept or understanding of the number of land -- landslides in the Gorge itself, whether or not they impact the railroad?

THE WITNESS: I'll have to conjure this up from my memory about Tom Pierson's map, which also includes the database and they've numbered the landslides, and it certainly, in just this one map area, goes over 300, but I don't know exactly how many.

MR. PAULSON: But you don't know how or whether they affect the rail?

THE WITNESS: I don't know.

MR. PAULSON: No other questions. Thank you.

JUDGE NOBLE: Mr. Snodgrass?

MR. SNODGRASS: Just a couple. I think Mr. Stone and Mr. Paulson had asked some of my questions, but I just want to go a little bit deeper on those. In the Everett corridor, did I hear you correctly to say that there is a derailment every year or two years?

THE WITNESS: There's a landslide impact to a train on average every year. There is -- that actually strikes a train. That's a long-term average. There are landslides on the track that disrupt traffic every year and multiple times in many years and at many places.

MR. SNODGRASS: Do you -- I guess if it's a small landslide, how do you become aware of it? What is the -- do the trains report it or how is it known?

THE WITNESS: Well, the -- there are a whole bunch of places where there are high bluffs that are landslide prone, and there's a trip wire system that the railroad has set up whereby if a debris flow comes down, hits the trip wire, it turns a light on at the beginning of that stretch. And so that's how the railroad becomes aware of it. But whenever that happens, whenever the tracks are blocked, that causes a blockage of passenger -- or a stoppage of passenger traffic. And so

that makes the news every morning when that happens because it is then said that the passenger traffic that is expecting to take that will need to take the buses instead.

MR. SNODGRASS: So it also sounded -- if I understood your testimony correct, the derailments have occurred only when the landslide actually hits the train in motion as --

THE WITNESS: Those are the only ones that I'm aware of.

MR. SNODGRASS: Okay. On the question of earthquakes, earthquake-induced landslides, you gave the example of the '65 Seattle quake. Is that phenomenon significant to act independent of the rain saturation?

THE WITNESS: Yes.

MR. SNODGRASS: Okay. Do you have any sense of helping equate -- I think the Seattle quake certainly wasn't a subduction level. How big a quake does it need to take to produce a landslide big enough to produce something like that?

THE WITNESS: That's not a question that can be answered without a couple of more variables to be analyzed.

MR. SNODGRASS: Okay. Just when we're talking about landslides, is there any sort of lower

bound of how big a body of rocks and dirt isn't considered a landslide because it's too small?

THE WITNESS: It just needs to be a mass movement instead of an individual grain movement.

MR. SNODGRASS: Okay. Is there -- you know, in your -- it sounds like you are working with the railroads in the Everett corridor. Is there some lower bound at which it's not -- even if it's not detected, that the train will simply go through it and that's -- to your knowledge, that that's not a threat?

THE WITNESS: Not to my knowledge.

MR. SNODGRASS: Thank you.

JUDGE NOBLE: Further questions, to my right?

I just have a question. You mentioned that when there is -- and I think you were talking about these slides that actually strike the trains on the Everett line, and you mentioned that passenger trains cannot go through there for a certain period of time but freight can go immediately as soon as the track is cleared.

THE WITNESS: Right.

JUDGE NOBLE: Do you know the basis for that? Is that a regulation, or can you fill me in a little bit on that?

THE WITNESS: It's policy on the part of Amtrak and Sound Transit. I don't believe that they are required to do that. But one of the reasons for doing that is that the landslides that affect the tracks typically happen during winter. They happen when the ground is saturated. So given an individual landslide that happens because of that high saturation, there's an enhanced risk over the next couple of days of more landslides occurring. And so to my knowledge, the passenger rail only does that as a matter of policy and out of caution; whereas, the -- going back to the issue of hazard versus risk, the risk of that happening to a freight rail is less than the risk of that happening to passenger rail because there would be far fewer lives at risk.

JUDGE NOBLE: All right. And that -- and, again, you're only -- in talking about the landslides that actually strike the train, where that comes into play, are you talking --

THE WITNESS: No, no, no. Any time there's a stoppage because of a landslide across the tracks, and that happens every winter, and as I say, two -- the winter before last, that happened more than a hundred times. Every time that happens, passenger rail stops for 48 hours.

JUDGE NOBLE: All right. Thank you for clearing that up. Thank you.

Are there any questions based upon council questions? Mr. Johnson?

MR. JOHNSON: None from the applicant, Your Honor.

JUDGE NOBLE: Mr. Pruit?

MR. PRUIT: I just had one question on reporting.

REDIRECT EXAMINATION

BY MR. PRUIT:

Q. Is there a requirement that a railroad report when landslides, say in the Gorge, affect the tracks?

A. Not to my knowledge.

Q. Using your example of the spike that is affected by a slow-moving landslide, if there was an effect on rail transportation because of that, would the railroad have to identify that cause?

A. Well, in general, the railroads are federally regulated, so I don't know what their responsibility is to report to the federal regulators, but they don't have a responsibility to report that to us. And I just don't know what it would be for the federal regulators.

MR. PRUIT: No further questions.

JUDGE NOBLE: Mr. Walsh, you are excused as

a witness. Thank you very much for coming in today.

THE WITNESS: Thank you.

JUDGE NOBLE: Mr. Pruit, do you have an additional witness?

MR. PRUIT: I do. DNR calls Robert Johnson.

JUDGE NOBLE: Mr. Johnson, would you raise your right hand, please.

(Witness sworn.)

JUDGE NOBLE: Thank you. Please be seated.

You may proceed, Mr. Pruit.

ROBERT W. JOHNSON,

having been first duly sworn,

testified as follows:

DIRECT EXAMINATION

BY MR. PRUIT:

Q. Please state your full name and spell your last name for the record.

A. Robert W. Johnson. J-o-h-n-s-o-n.

Q. Where do you work, Mr. Johnson?

A. I work for the Department of Natural Resources.

Q. And how long have you worked for DNR?

A. This is my 34th fire season.

Q. How did you get your start with the department?

A. I started as a seasonal firefighter working on an engine, one of our fire engines, in 1983.

Q. And how long did you do that work?

A. I was on an engine for four seasons as I was going through college.

Q. And after -- after that, how did your role with DNR change?

A. Well, after they became -- well, I went to school at WSU, Washington State University, got my bachelor's in forestry and ended up getting a permanent position with the Department of Natural Resources as a -- well, first a technician and then moving my way up into a forester and several different positions in the organization.

Q. So after you joined DNR full-time, did you continue to be a firefighter for DNR?

A. I've been a firefighter every year since I started in '83.

Q. How many fires would you estimate that you have been on?

A. Well, through the years, I've spent a big chunk of my career as a -- call it fire staff, where my actual daytime job was, in fact, fighting wildfire. I also have spent time as a -- as a forester and as a land manager in the organization. So I spent a lot of time doing initial attack. So I have hundreds of small fires that I've been on through the years. And I've also been

on -- we actually have a system that tracks the larger fires, and I've -- really close to a hundred of the large fires, the fires that you would see on TV, that kind of fire.

Q. Did you have any experience with firefighting outside your work with DNR?

A. I did spend several years in Eastern Washington as a volunteer firefighter, Pend Oreille County. That's been about 25 years ago, though.

Q. What do you do for DNR now?

A. Currently, I'm the wildfire division manager for the agency.

Q. What is the role of the wildfire division?

A. Well -- so my position you would -- you would recognize it in most organizations as the fire chief for the agency, so that includes everything that goes along with wildfire. So that's starting with preparedness, ensuring that the agency is ready for incidents as they come on, training. We have a pretty diverse organization that goes into prevention. We have -- so prevention preparedness, suppression, training, doing all the budgeting on the wildfire side of the equation, safety training.

We have an outreach program, and I'm also the individual that spends a lot of time chatting with our

legislators.

Q. Do you have any certifications related to wildfire response?

A. I do. Through the years, I -- again, starting with the basic wildland firefighter and moving my way up through the organization from the wildfire perspective, having been, you know, engine boss, dozer boss, foam boss, strike team leaders, task force leaders, a division supervisor, and ended up, I am a Type 1 operations section chief and a Type 2 incident commander.

Q. What is an incident commander and operations section chief?

A. So in the -- that's in the ICS, incident command system, nationally recognized system where we train and we use our experience in order to ensure that we've got the ability to take on these incidents that we're involved with, whether we're talking about initial attack, on up through the most complex incidents. So Type 1 OPS chief, operations section chief, is the highest level you can get nationally recognized. And I've been through training in Boise and Tucson at the national academies in regards to -- in regards to that.

And as an incident commander we've got several different levels tied to that, both from initial attack,

which is the lowest level, on up to Type 1 incident commanders, and I'm actually a Type 2. Our organization really doesn't have a Type 1 IC. That's a national resource, somebody that goes anywhere in the US.

And as the incident commander, I spent the last ten years taking out interagency incident management teams. I have -- in most cases we're talking about a wildfire, large complex wildfires. And that includes all aspects of supervision and interaction out there on the line, from the operations side, which most people identify with, that's the firefighters on the ground, to the logistics side, finance side, putting those plans together, safety, interaction with the internal and externals.

Q. So maybe if you could take a step back for us and explain what is a wildland fire?

A. So a wildland fire is a fire that is not in an improvement, not on a structure. So we all think of our homes and, you know, we have fires that happen within a home. In the wildland environment, we have fires that can start from multiple reasons, but they're a fire that is burning natural vegetation in most cases.

We also have the wildland fires that move into the interface environment, meaning they move into communities. And then we have a little different

situation where we have to -- we'll fight both wildland fires and structural fires at the same time.

Q. So what is DNR's primary area of responsibility for fighting wildland fires?

A. So, again, our primary responsibility is on the wildland side of the equation. Very specifically, we've got 13 million acres across the state of Washington that we are tasked to protect. It is not the -- you know, the urban centers. We've got our local fire districts that are responsible for that. But we do have joint jurisdiction in a lot of areas that have small communities and homes in them, but typically you'd think of it as the forested environment or areas close to a forested environment that can carry fire.

Q. How many firefighters does DNR have for that 13 million acres?

A. Well, we've got several different categories. We've got some -- we call our permanent fire staff. We've got approximately 100 permanent fire staff, of which I'm one of them. We've got approximately 700 militia, which are -- a big part of my career I spent as a forester, which meant that during fire season when the alarm went off, I would leave my forester job and become a firefighter, or whatever, you know, my line really was at that time.

And then we have the seasonal -- seasonal firefighters. And currently we have approximately just shy of 600 seasonals that hire in a given year. That's individuals that are on our engines, as well as we have a Helitack Program tied to our helicopters. And so total amount is -- it's over 1300 now, pushing at 14.

Q. So where do those seasonal firefighters come from?

A. Most of our seasonals are college students, just as I started my career. It was, you know, something that you do to try to work your way through college. Of course, in my case I had a forestry degree, so I had that interest, but they have a broad range of backgrounds. But that's a -- the lion's share of our seasonal work force is those young adults.

Q. So is there a particular time when DNR's firefighting force is staffed?

A. Well, we keep our permanent staff on year round. We have -- I mentioned I was on an incident management team and actually led incident management teams for ten years. We could, in fact, have staff that are called out in non-fire situations. I've taken incident management teams down to the Gulf Coast where I was in support of Hurricane Katrina. One of my -- one of the other teams, we were up at Oso during that disaster up

there. So we actually have a staff that's on year round.

From a fire perspective, typically we bring them on some time in -- typically it would have been in June after most of them are out of school, and we keep them on through the first, second week in October. Of course the last couple of seasons that hasn't held true. We started early and ended late.

Q. I think we're going to talk about the last couple of seasons in a minute, but first I would ask you about what -- what equipment and training does DNR have for its firefighters?

A. Again, it's all tied back to the wildland environment. Our training is geared to that. We follow national standards in regards to all of our positions that we fill in the organization. As far as what equipment we have available to us, of course whatever it takes to get the individual firefighter overhead out there on the line, pickups, et cetera, but we also have -- currently have staffed 117 engines that are spread out across the -- across the state of Washington. A large percentage of those are in the more fire-prone communities over in Eastern Washington. We have eight Huey helicopters that are agency owned, and those are maintained and staffed with our pilots that we fly. We

also -- with those, we have a Helitack crew. So we have aerial delivered firefighters that we can deploy out on the landscape with that asset.

We have a fixed-wing single-engine air tanker program that -- currently, we have six -- six of those aircraft. We have five of what we call Fire Bosses, which are amphibious aircraft that can dump water and foam on fires, and we have one wheel-based single-engine air tanker that can drop either water or retardant.

Q. Is any of DNR's training or equipment geared towards hazardous materials?

A. We have -- none of the equipment is. We do just a very basic training with our staff as in regards to hazards identification. Nothing in regards to taking on a hazard out there on the landscape. It's identification so that we can extract ourselves from the situation.

Q. Historically, has DNR needed that kind of training or equipment?

A. Just to the level that we currently do that, which is that recognition that we need to be able to remove ourselves from it. We have not trained. We haven't felt that we have need to be trained in hazmat. Typically, in those cases, we work with our local partners, fire districts very specifically, that have a

substantial amount of additional training. Anything we do out there on the landscape is pretty much interagency anymore, where we are working with both our local partners and our federal partners.

Q. So does DNR provide assistance -- beyond the 13 million acres where DNR has its primary responsibility, does DNR provide assistance outside that area?

A. We certainly do. So 13 million acres does not cover the state of Washington. There are also areas out there that are called single jurisdiction, where local fire districts are the only fire protection. There's also areas that we consider -- or call no man's land, which means there actually is no fire protection out there.

We work with our partners and we work to ensure that fires across the state of Washington have a response. In a lot of cases, we'll send, you know, maybe some specialized hand crews. We actually have several hand crews that the agency has on, or it's seasonals. We also have a correctional program where we have 29 correction crews, ten-person hand crews that we can send out there on the landscape.

So when we have a situation out there under mutual aid, most fire districts don't have hand crews,

they don't have dozers, they don't have helicopters and they don't have air tankers, so we'll deploy those when working with our partners.

Q. So what causes wildfires to ignite?

A. So I guess I'll start with last year. Last year we had approximately 1500 wildfires in the state of Washington. Of that, approximately 500 of those were lightning caused. The other thousand -- actually a little over a thousand were human caused.

So of the human caused, there's lots of reasons why humans are causing fires out there on the landscape. One of the largest is -- are escaped, you know, people having -- starting a fire and the fire getting away from them, escaped debris burns is probably the largest one.

But there's a whole list of reasons. You know, we have debris burning, recreational fires, campfires getting away, fireworks, smoking, railroad fires, industrial operations, children playing with matches. There's a broad array of reasons why there are human-caused fires out there on the landscape, and sometimes the creativity amazes me.

Q. What factors affect the growth of wildfires?

A. So it goes back to some real basics in firefighting, something you learn -- you learn when you start, from, again, 30-something years ago. We call it

the fire triangle. So there's fuels, weather and topography. It's a really basic concept.

So from a fuels, if you have a receptacle -- a fuel bed that will burn, there's the first one.

Topography, so how and why a fire burns, you know, it burns uphill faster than it burns downhill. Or maybe uphill there's a rock wall or a road and maybe it won't go that direction. So topography is a big part of that.

And then there's the weather. The weather, is it dry? Is it hot? Is the wind blowing? All right. And that -- all that affects the relative humidity which reverts back to what are the fuels doing, are they going to receive an ember and start a fire.

Q. You mentioned "wind." How specifically does wind affect a wildfire?

A. Wind is -- wind can be a firefighter's friend because with wind you actually -- you know what direction it wants to go. It just may be not the direction you want it to go. Right. So wind can do a couple of different things. It can actually keep fire on the ground, so it isn't climbing in the trees, which can be a good thing because you get fires in the crowns and the canopies and you can't do much with that. You've got to try to get it knocked down.

So wind can move a fire rapidly on ground fuels. But one of the main things, the negative things that is tied with wind is you'll get embers lofted by the convection column and the wind, depending on the speed, will deposit those a distance from your fire. So because of that lofting, we call it spotting, you can have spotting occur in front of a fire to a distance that can be actually pretty amazing. Last year we had fires jump the Columbia River up there in the Chelan area which is -- it was a long ways across, pushing a mile.

Q. And then I think you touched on this, but maybe explain a little bit more about how topography can affect a wildfire.

A. Well, very specifically, on steep ground, there's always an opportunity where it's going to try to run up the hill. So if we've got -- if you're trying to fight fire in steep ground, it can move faster than our resources can physically get a trail around it. Because typically what we like to do is we like to start, anchor flank, hook the fire, and then extinguish the fire. So anchor, you find a good spot to start, usually it's back at the starting point of the fire if you can. You get a line around it or you knock it down and get a line around it as you go. Hook across the head of the fire

if, in fact, you can, and then finish your line and extinguish the fire.

So topography works against that, because there's a lot of times we can't move fast enough up the hill to accomplish that task of flanking it and then hooking it. You just -- we can't -- the fire is going to outrun you.

Q. So moving to the -- sort of the third leg of the triangle that you described, what -- how do fuels fit in? When we're talking about wildfires, what are the fuels?

A. So a fuel is anything that the wildfire is going to burn, including -- you know, having -- homes can be a fuel.

We have multiple fuel models that we evaluate across the state of Washington. Those fuel models -- or those fuels change through time. And so we're always evaluating what the risk of fire is out there on the landscape. So, again, those fuels are changed by the weather, by heat, by the wind, by the wind drying those fuels out.

Q. So when we refer to a fire season, is that when those things are most -- all those three elements are a problem?

A. As I mentioned, the last couple of fire

seasons -- this fire season is actually, you know, turning out to be a good -- a pretty good one so far for us. But the last couple of fire seasons, the typical fire season -- typically, again, the fire season is somewhere -- somewhere in the tail end of June. Usually we don't get any large fire growth until after the 4th of July, and then on into the, you know, first week in September.

Last couple of fire seasons, it started early. It started in May last year, and it went clear -- you know, clear into October. So that typical fire season is -- hopefully, it reverts back to normal, but I've said this to lots of folks, hope is not a plan, or it's a poor plan. And so we're looking at being prepared regardless of whether we're talking about May or we're talking about into October.

Q. Are there areas of Washington that are more susceptible to wildfires than others?

A. There are areas that are more susceptible, even though, depending on the fire season, there's areas that can be more destructive than others, including Western Washington. Western Washington, you know, there's a fire history in west -- on the west side of the Cascades as well as the east side of the Cascades. But it takes a special fire year to do that. Last year we actually

had fire in the Olympic National Park over on the west side of Olympic National Park, which we thought was going to give us issues. It ended up we held it in the park and it didn't get out of there. But typically what we're talking about is the very specific areas, east slopes of the Cascades. We've got areas down in the blues that have -- blue mountains in Southeast Washington that can be problematic. We've got areas in the North Central Washington, Chelan, Okanogan and Ferry County, that have a tremendous amount of fire load. We've got areas around Spokane that does also. A lot of that is tied to the fact that there's a large population base and an extremely dry environment there.

And then we've got the area down in the Columbia River Gorge that, for anybody that's lived in that area, knows that one of the factors you can always count on down there is that the wind's going to blow. And wind in the Gorge does a couple of things. It's both curing those fuels out there earlier than it typically does in other areas, because of the nature of what warm wind does, plus it's problematic in the amount of wind that you get there in regards to, you know, spotting potential, fire moving very quickly up those cliffs out of the gorge there and becomes very problematic very quickly.

Q. Let's talk a little bit more about the last couple of fire seasons. You mentioned that -- I believe you mentioned it was -- 2015 was the worst fire season on record. Can you talk about why that was?

A. So in 2015, in the state of Washington we had over a million acres that burned -- burned across the state across all jurisdictions, but a big part of that was fire on DNR-protected lands. We had fire -- not alongside communities. We had fire going through communities. We had a situation where we lost three firefighters. I, personally, spent time in -- at the Harborview burn center in Seattle with some of our firefighters that got caught up in that incident.

We had a situation where the fuel was available, the fuel -- fuel loading was there. We had a lot of dead fuel in Eastern Washington from -- some from forest health-related issues. We had -- you know, the weather was cooperative. It was warm. It was dry. And then we ended up with a lightning storm that came through, and it ignited a series of fires all at once and very quickly overwhelmed not just the Department of Natural Resources but interagency resources.

In the state of Washington we work really hard to work on -- at an interagency basis. So we coordinate our efforts both, again, local, state and federally.

Q. When did you have to start drawing on interagency resources?

A. Well, we do that all the time. But what happened this last season was that we actually -- we had to go international for resources. We had resources in from New Zealand, Australia. We've got agreements with British Columbia. We called on them pretty early, but then we reached out from there. It's just in about mid-August, we had 22 large fires going at the same time in the state of Washington, which is pretty much unheard of. We had -- at that peak in the state of Washington, we had somewhere just shy of 9,000 firefighters deployed on the landscape.

Q. What was -- if you have an idea at this time, and it may not have been long enough since those fires, but what were DNR's costs for fighting those fires?

A. So over -- overall, I believe we were in the -- trying to think. I've got the number exactly. We were in the 340-some-million-dollar range across all agencies. The Department of Natural Resources was in, I believe -- our number, which we're still tallying, is 137 million.

Q. Before 2015, when was the worst fire season?

A. Before 2015, it was 2014. So we had back-to-back worst fire seasons in state history.

Before the one -- the season before, 2014, it was very specifically to a short period of time. Folks here recognize the name Carlton Complex, which burned a tremendous amount of folks' homes in the Okanogan area. So that was the next worst.

Q. So I would like to turn and focus your attention on rail operations and their contribution to fires in Washington. In what ways do railroad operations contribute to wildfire ignition?

A. So the rail lines very specifically have a long, linear utility that through the years I've been involved with, we've had fires from multiple different reasons from rail lines. And I've worked with rail lines from an incident commander and also as an investigator for the agency with the different qualifications I've had. And we've worked with the rail lines tied to maintenance operations that were ongoing, whether we're talking about rail grinding, that type of activity, to failures of components on trains, brakes, bearings, et cetera, that have created heat and caused sparks to -- even carbon emissions from the engines that have caused issues.

Q. So in 2015, were there any of the wildfires that were ignited by rail operations?

A. There were. In 2015, I pulled some notes and we

had five fires that our investigators had identified as being started by rail or railroad. In 2014, we had two. 2013, we had six. Only one in 2012 and seven in 2011. Went back five years.

Q. Safe to say that it's an annual occurrence?

A. It is.

Q. Do you recall any wildfires where DNR incurred significant costs responding to a rail -- a wildfire ignited by rail operations?

A. I've been involved with several through the decades, but the one that comes to mind is in 2007 out of Spokane, where investigators actually ended up determining that it was, in fact, carbon emissions from an engine, and we had a bill of $460,000 that we submitted.

Q. So where was that fire; do you recall?

A. Just out of Spokane.

Q. And could you provide us a little background on how that fire spread.

A. Well, actually there were multiple fires along the rail line. It was -- appeared to be on a grade, and the carbon appeared to be coming out of the exhaust as the engine was pulling out of Spokane. So there was multiple starts. The wind was, in fact, blowing. Those starts started to burn together. We ended up with both

ground and aviation resources on it to suppress that. We did, in fact, lose one home in that effort.

Q. And how large did that fire get?

A. I think that was 360 acres.

Q. So you lost a home. Were there any other damages that you're aware of?

A. I can't recall whether there was any substantial timber loss in that one.

Q. Are you aware of any recent instances in which derailment in the area of the Columbia River Gorge led to ignition of a wildfire?

A. Well, we did have the one on the Oregon side in the Gorge in the Mosier area.

Q. Any others?

A. We had another one in -- a couple of years back in Wishram, and that was in '03.

Q. How would you describe the wildfire -- using your sort of three-sided -- or triangle, how would you describe the wildfire risk in the Columbia River Gorge?

A. Well, we've got several things working against us in the Gorge. Mother Nature very specifically. When it comes to the terrain, it can be extremely inaccessible. You've got access at the bottom, but as soon as the fire gets a little ways up the ridge, it's -- it is difficult to get a line around them.

We've got the wind, again, that it seems to always be blowing, whether it's blowing from the east or blowing from the west, it's blowing one direction or the other out there. So that becomes very problematic because a lot of times we're in the 30- to 40-mile-an-hour range with the wind, which is why we get the wind surfers out there kite boarding and all that. And it becomes problematic. You can't move fast enough to get in front of the fire. In a lot of cases, if we have fire in a community, and there's small communities over there, where we move from an offensive stance, meaning, again, trying to, you know, flank it and hook it, we end up in a defensive stance, which is we're out in front of it trying to do point protections, protecting structures, pretty quickly.

Q. So referring back to the fire in Wishram in two thousand -- did I say that correctly?

A. Wishram.

Q. Wishram?

A. Yes.

Q. Where is Wishram?

A. It is -- it's about ten miles upstream from The Dalles on the Washington side of the Columbia River.

Q. So about how far do you know is it from Mosier?

A. I actually didn't do the math on that. It isn't

very far. It's upstream, I believe.

Q. Okay. So what were the conditions in the Wishram fire? What happened in that fire?

A. So that was a derailment without -- I don't believe there was any oil cars involved in that -- and that -- the one issue there, it's on a bench right above the Columbia River, but the wind was blowing really hard. And so, again, that can be your friend or it can be -- wind can be your friend or wind can be your enemy. In this case it skirted the town of -- the town of Wishram, but it was moving really quickly. And it ended up moving -- it was 800 acres very quickly there, moving across that flat and moving up into the foothills.

Q. Do you know how big that fire got?

A. Eight-hundred acres, I believe.

Q. And do you know what the approach was to fighting that fire?

A. Again, they were trying to protect the structures out in front of the fire. It was an anchor and flank. So starting at the heel of the fire back to where it's a little cooler, starting from a road or some other thing that's going to help you anchor the back of the fire, and start running dozers around it and pinch it off. I believe they actually had some air support on that one also.

Q. And do you know what time of year that fire occurred?

A. That was mid-July, July 13th.

Q. So now I would like to turn your attention to the Mosier fire, maybe it would be useful to talk about that and the differences with the fire at Wishram.

A. You bet. So the Mosier fire wasn't a fire in my jurisdiction, but we have really good working relationships with our partners across the Columbia River, Oregon Department of Forestry, Oregon Fire Marshal's office over there. And because it was right across the border, we were notified from a dispatch perspective that that fire was ongoing in case they needed additional resources. They actually ended up with, I think, ten different fire districts -- wait a minute. No, they ended up with multiple fire districts that responded in mutual aid on that incident.

One of the differences on the Mosier fire from the Wishram fire was the fact that there was no wind, which was really unusual for the time of year that fire was ongoing. Because even though they had oil cars involved on that one and it was creating a column, they had no wind to loft embers out of the immediate area and move the fire into the community.

The local fire chief was pretty adamant that if

he had had wind, he would've had a lot more complexity involved in that incident; that he had -- he felt he would have lost homes if there had been wind versus what he had going on. They still had their hands full there, though, very specifically because, you know, they had to deal with the -- you know, the scale of the burning oil.

Q. So what is the typical approach when you have the ignition of a wildfire to response?

A. So typically we -- we try to, you know, hit -- move very quickly, stop a fire in an initial attack. We do what we call one foot in the black. So you heard me talk about anchor and flank. We do that from a position of one foot in the black, meaning that you're -- you're right there in the black, it's the safest place. So you're digging a line, you're knocking the fire down as you flank and try to hook the fire.

What's -- what is problematic about a fire with an oil tanker that's been -- actually is involved, is that there's -- and this is a conversation I had with the Oregon State Fire Marshal's office and what they did there in Mosier, is that they actually set up a safety zone around that fire to try to ensure that they didn't get folks too close to it, unsure of what was immediately going to happen.

And so that's -- that is problematic from our

basic stance of, you know, starting and anchoring one foot in the black because it allows that fire to have a larger footprint right from the start. So in that case there because they didn't have the wind blowing it, they were still successful.

Q. But if we talk about it in terms of your -- sort of your three legs of the risk for wildfire, what -- what was the fuel there that put -- created the wildfire risk?

A. Well, there was normal natural vegetation in the area of that fire. And then they had the introduction of the petroleum product in that. So that created a large convection column. If you look at the picture, you talk to the individuals that were there, there was a pretty good column put up there. So that convection column has a -- again, has the opportunity to loft embers and spot out in front of the fire, which is typical of any fire, but in the case with -- where you have that large heat signature there, it retains that heat for a longer period of time, doesn't allow you to knock that heat out in a way that's going to stop you from spot -- catching those spots -- or stopping those spotting from occurring. So you end up in a situation where it naturally is going to get larger.

And if you've got a spot where you can

physically hook it outside of that spotting zone, then you could, in fact, still be successful, but it's a situation where it's not your -- you can't do what you would naturally try to do.

Q. And could -- what was the topography there in Mosier; do you know?

A. Well, it was in the Gorge, so there's the flat down at the bottom, the community where -- that's down in that flat, and then it climbs, just like it does everywhere else in the Gorge. I believe they retained it right down there on the bottom.

Q. So is it safe to say of the three parts of your triangle, the fuels were there, the topography was there, the missing element was --

A. Didn't have the weather.

Q. What actions can DNR take to help reduce wildfire ignition risks?

A. We can do -- prevention is the big part, ensure that those starts don't happen to begin with. So with prevention, we have an educational component. That's working out in the communities to explain what the risky behavior physically is. There's a regulatory component and there's an enforcement component. So there's the basic legs that we work on to try to ensure that folks understand what their actions are going to do in regards

to wildland fire. You're not going to stop the lightning. Right. That's going to happen. Mother Nature is going to do that. It's what we can do in the human factor to reduce the number of potential starts.

Q. What are industrial fire precaution levels?

A. So our -- state of Washington, by state law, we have Department of Natural Resources is required to keep industrial fire precaution levels -- industrial fire precaution levels are in place to regulate activities out in the -- out in the forest land, very specifically. It's designed initially to be tied to logging operations, but it's also tied to road construction and any place where an operation has potential to spark or start -- start a fire on the landscape.

Q. And how do they work?

A. Well, we evaluate the current fire danger. We evaluate what the weather is currently doing, what it's projected to do. We look at current fire activity. We look at available resources, whether we have resources available to deploy on the landscape or whether they are currently tied up with other incidents, and we -- we end up with a -- there's a series of categories, that depending on the category we're in on a given day in a given zone and we've got the state broken up into zones of like fuel types, there's different activities that

are permitted or not permitted or different activities that we require some level of mitigation tied to reducing the overall potential impact of fire.

We actually have -- there's -- it's called fire season, or closed season, open season. So our closed season, meaning our restrictions are in place, start April 15th and that runs through October 15th.

Q. Now, you mentioned that railroad operations, at least on an annual basis, spark fires. Are railroad operations subject to the IFPLs?

A. They are not.

Q. Why not?

A. Well, state law is very specific on what we're allowed to regulate and that's not -- that's not on the list.

Q. Does the railroad voluntarily comply with IFPLs?

A. No.

Q. What would the response be if DNR wildland firefighters encountered a crude oil fire related to a derailment?

A. Well, I'll refer back to what I indicated we train them at, and that is to identify the hazard out there on the landscape. To be able to identify that we, in fact, have a hazmat situation and to back off, remove themselves from what they perceive -- initially perceive

as the hazard zone and then make contact with local fire districts that have the higher level of expertise.

Q. How would that response affect the risk that a crude oil fire would spread?

A. Well, depending on what's going on, again, back to the -- you know, the basics of, you know, fuel and weather and topography, it will respond accordingly.

If -- you know, if we can quickly work with our local partners to establish where it's safe to physically be, potentially we can get in there quickly and do something to suppress that fire. If the hazard zone is large and we have to pull our resources back from a safety perspective, then the fire is going to naturally expand based on those other conditions.

Q. How would you assess DNR's preparedness to combat wildfires related by -- to crude-by-rail derailments?

A. I would say it's pretty rudimentary at this point. Again, we aren't training our staff to be -- trying to suppress fires in or around a derailment such as this. And so it is just -- it is just the basics.

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

JUDGE NOBLE: Cross-examination?

MR. DERR: Thank you, Your Honor.

DERR / R. JOHNSON

CROSS-EXAMINATION

BY MR. DERR:

Q. Mr. Johnson, my name's Jay Derr. I'm one of the attorneys representing the applicant in this case and I have a few questions for you.

MR. DERR: But maybe, Your Honor, before I start questions, I have an EIS question and an exhibit question related to this witness. I -- the prefiled testimony relies on excerpts of the draft EIS and there are also DNR exhibits that I'm not sure have been admitted that are sections of the draft EIS. So I'm not sure if Mr. Pruit has been around for all of our EIS rulings to know how we do this.

JUDGE NOBLE: I saw that, and they are marked as admitted on my list.

MR. DERR: The DNR -- the excerpts of the EIS are marked as admitted?

JUDGE NOBLE: Yes. And they seem to be very short segments and basically fact-based, not critique-based, if you see the difference.

MR. DERR: So let me -- maybe to clarify. There are paragraphs of the prefile that are very short that reference the DEIS.

JUDGE NOBLE: Yes.

MR. DERR: There are then Exhibits 4511 and

4512?

JUDGE NOBLE: Right.

MR. DERR: But you show those as admitted?

JUDGE NOBLE: I do.

MR. DERR: Those are appendices to the draft EIS. I guess I missed those getting admitted.

MR. PRUIT: I believe 4511 is an appendices -- is the rail spill risk analysis, which the witness relies on in his prefiled direct, not as -- as you mention, not for the purpose of criticizing the DEIS but for factual information that assisted in the formulation of his opinion.

JUDGE NOBLE: That's my -- that's my impression of them too. I've been looking at them during his testimony and I saw that that was the case, that they had come out of the DEIS. But as I say, they have been admitted, according to my information, and I don't see anything in them that is in the nature --

MR. DERR: I can proceed with questions. I just -- I had a different note on the exhibits. But if you've got them admitted --

JUDGE NOBLE: That's what I have.

MR. PRUIT: That was my understanding as well.

JUDGE NOBLE: Check one more --

MR. DERR: I'll proceed.

JUDGE NOBLE: All right. Slipped by you.

MR. DERR: I must have missed -- in one of the laundry list sessions of admitting exhibits, I must have missed --

JUDGE NOBLE: I think that's the case. And while you're asking him questions, I'll just check my list.

MR. DERR: Maybe what I can do, I'll go to that question first.

BY MR. DERR:

Q. Mr. Johnson, in your prefiled testimony, there are a couple of paragraphs where you refer to sections of the draft EIS or perhaps quotes from the draft EIS. My question is simply, did you independently verify the accuracy of those statements in the DEIS or did you just lift them out of the DEIS?

JUDGE NOBLE: Excuse me, may I -- when I checked my actual list, I have the physical list, I see that they -- it doesn't mark them as admitted, but they were on my laptop as having been admitted. So they have not yet been admitted. You want to ask him questions about it for a while?

MR. DERR: So maybe we ought to flip the questioning back to Mr. Pruit --

JUDGE NOBLE: Yes.

MR. DERR: -- and let him see if -- establish the basis of what he did with them.

JUDGE NOBLE: So you are objecting to them? Do you want to look at them a little bit more?

MR. DERR: Well, I was about to ask my questions to deal with whether he appropriately relied on them, but if they haven't been admitted, that should probably be on DNR's clock, not my clock.

JUDGE NOBLE: I think my physical list is more reliable than an indication on the laptop, so they have not been admitted.

So, Mr. Pruit, do you want to establish a foundation for them?

MR. PRUIT: Well, I think the foundation is set forth in his direct -- prefiled direct. These are -- these are exhibits that he relied on, as I mentioned, for the purpose of forming his opinion. He relied on them as -- without criticizing the DEIS. Rather, he was relying on the facts provided by the rail spill risk analysis, for example, in forming his opinion. For example, in paragraph 8 of his prefiled direct, he relies on the -- Appendix E, which is the rail spill risk analysis, to -- for the proposition that the risk of fire will rise due to the daily occurrence

of rail traffic. There was an increased risk of catastrophic rail explosion at any point oil was transported across the state to the proposed facility. So generally he was relying on the facts in the rail spill risk analysis to help establish that opinion.

MR. DERR: So if I may, and I guess that was -- the nature of my question was, did he independently verify the facts as stated, or did he simply assume the draft EIS as drafted is correct. And maybe the answer is he simply assumed it was correct. But that's what I'm trying to establish. Because, for example, when I look at the sections of the draft EIS cited, they don't clearly contain the statements in his prefiled testimony. So I'm trying to understand the basis of his prefiled testimony.

JUDGE NOBLE: And you are questioning the appropriateness of him basing his prefiled testimony on exhibits?

MR. DERR: Well, or to establish his testimony is based on an assumption that the DEIS is correct, which is not an exhibit in this proceeding. We are not able to question the accuracy of the DEIS, as I understand, in these proceedings and yet the testimony is assuming it's correct and working from there. That's the issue I'm trying to understand to frame my

cross-examination.

JUDGE NOBLE: Okay. So, Mr. Pruit, and your argument is that he did rely on the facts that he found in the draft EIS?

MR. PRUIT: Those facts were part of what he used to formulate his opinion. He is not -- nowhere in the prefiled direct testimony is he criticizing the analysis that is in the rail spill risk analysis.

JUDGE NOBLE: And I think you've said that this -- these two exhibits, 4511 and 4512, been having trouble getting 4511 up, are part of appendices?

MR. PRUIT: 4511 is Appendix E from the DEIS, the rail spill risk analysis.

JUDGE NOBLE: I'm looking at 4511 and 4512 as being different, but I'm having --

MR. PRUIT: They are. 4512 is a different exhibit. That is a portion of Chapter 4 of the DEIS.

JUDGE NOBLE: Yes. So describe to me 4511. That's the one I'm having difficulty getting a picture of.

MR. PRUIT: That is the rail spill risk analysis.

MR. DERR: It's the entire appendix of the draft EIS, prepared by Dagmar Schmidt Etkin and David Hatzenbuhler, MainLine Management.

JUDGE NOBLE: And that's the document that he relied on in giving his testimony today, the appendix document?

MR. PRUIT: In part, yes. Part of -- that part of his -- that was one of the things that he reviewed in forming his opinion for his prefiled direct testimony.

JUDGE NOBLE: Here's what I'm going to do. I'm going to admit 4511, and I'm not going to admit 4512. Because you said that he relied on --

MR. PRUIT: That's correct, Your Honor. Thank you.

MR. DERR: Okay.

JUDGE NOBLE: Thank you.

BY MR. DERR:

Q. All right, Mr. Johnson. Sorry for the DEIS theater. It's an ongoing process in this proceeding.

First I wanted to ask you some questions about your testimony about the rail-caused fires that were also described in paragraph 6, I believe it was, of your prefiled testimony. First, I'm curious, are those -- that risk of wildfires caused by rail operations, are those specific to crude trains, or is that just related to operation of trains generally?

A. Where exactly are you referring in my prefiled?

Q. If you look in paragraph 6 of your prefile is probably the easiest place. I believe you testified to it as well, a 2007 incident, where there was a series of fires from a locomotive by --

A. Yeah, that was a specific -- specific train.

Q. Was that a crude train or that was just a freight train?

A. I believe that was a freight train, yes.

Q. And my -- and so are the risks of fires caused by operation of the train, are those risks unique to crude oil trains or are those simply a fact of life for operation of trains on those tracks generally?

A. So I guess I described multiple -- multiple ways why fires started from trains. I guess most of them are probably general. You know, the situation we had in Mosier, you know, I don't know exactly how that -- I haven't seen an investigation report tied to that one to know exactly how it started, other than there was, in fact, a fire.

Q. Yeah, and I want to come back to that sort of crude-specific incidence in a minute. But it sounds like your testimony is that the kinds of fires that may be caused by operation of the railroad equipment are the kinds of fires that may be caused by track maintenance, I think you mentioned grinding of the rails, that's a

function of rail traffic generally not unique to crude traffic; is that correct?

A. Correct.

Q. You also mentioned costs associated with that 2007 incident. Did you review the testimony of the BNSF witness from a week or so ago about that incident?

A. I'm not aware of that.

Q. Do you know whether those state costs you testified to were reimbursed by BNSF?

A. I do not know.

Q. I want to ask you about paragraph 8 of your prefiled testimony where you talk about the ongoing risk and that rising risk would increase traffic and a catastrophic explosion risk of a crude oil train. First I want to understand, did you independently verify the accuracy of those statements in the DEIS that you relied on?

A. I did not. I took the straight numbers out of there.

Q. Did you review the testimony of several witnesses, including a Mr. Hildebrand from the -- a witness for the City of Vancouver about the nature of fires in crude oil derailments?

A. That was during these proceedings?

Q. Yes.

A. I have not.

Q. So your characterization of them as a catastrophic explosion is not informed by the testimony of those experts in this proceeding?

A. Okay.

Q. Another question, you referred to a 2014 Washington State Emergency Management Division survey, which again I think was a reference to the DEIS. What is that document? Is that a document you reviewed to prepare your testimony?

A. That's all that is, yes.

Q. So is that a separate document from the DEIS or is that a statement in the DEIS?

A. Where exactly are you referencing?

Q. It's in -- you referred to Exhibit 51, page 685, paragraph 8 of your prefiled testimony.

A. Okay.

Q. Starting at line 23 on page 3.

A. Okay.

Q. "The 2014 survey conducted by the Washington State Emergency Management Division." My question is whether that's an independent document that you reviewed for your testimony or simply a statement out of the draft EIS?

A. A statement out of the draft.

Q. So that statement, and if I may, Your Honor, a little latitude, the statement from the draft EIS refers to a survey, and you'll find it at Section 4.6.4.3 where this quote that's in the prefiled testimony is contained, and if I may continue on, that survey was sent to 236 fire departments or districts across Washington with rail traffic in their jurisdictions and 14 percent responded.

So my question is, did you check with the other 86 percent before preparing your testimony?

A. I did not.

Q. So your statement about "most areas being ill-equipped" is simply based on a quote of the draft EIS statement?

A. It is.

Q. Paragraph 11 of your prefiled testimony refers to the need to provide an immediate response to the critical first hundred-minute window for an adequate response. Do you see that in your testimony?

A. In paragraph 11?

Q. Yeah. In paragraph 11, so it would be found on page 5, that last sentence of your prefiled testimony. "This is particularly crucial given the critical first 100-minute window for an adequate response."

Do you see that in your testimony?

A. Yes.

Q. So I'm curious, do you -- is that your independent judgment of what's critical for an adequate response, or is that simply a reference to a statement in the draft EIS?

A. That's from the draft EIS.

Q. And did you review the testimony again of Mr. Hildebrand and also Mr. Rhodes who testified that the measure of an adequate response is not necessarily attacking the fire in the first hundred minutes? Are you aware of that testimony?

A. I am not.

Q. I want to ask you a couple of questions about your -- sort of what DNR's role might be in a crude-by-rail incident. You described earlier you're primarily trained and staffed to deal with wildland fires; is that correct?

A. That is correct.

Q. And if there were a crude-by-rail derailment incident, would DNR personnel be expected to be on scene to attack the fire at the tank car?

A. No. We would have -- there would be a response. So there's -- we would get the dispatch, depending on how that dispatch came in, it may, in fact, not be as a rail car derailment; it could be as a smoke on -- you

know, on the hillside or -- and we would respond and send resources that direction. That's the concern that we have, is I get close to be able to identify really what's going on there.

Q. And would there, in your experience, typically be others who would also respond to that derailment incident?

A. If it's within a local jurisdiction, local fire district, yes, there would be.

Q. And you mentioned the Mosier incident. Was it your understanding that there were a variety of other responders that responded to that incident?

A. That is true.

Q. And are you aware of whether the rail responders responded to that incident?

A. I believe they were, yes.

Q. And is it reasonable to assume in an incident like that where multiple parties would respond, that the DNR responders would have certain functions and certain roles to play, the local jurisdiction responders would have certain roles to play and perhaps the rail responders would have certain roles to play in that incident?

A. Typically. There would be different roles, but ideally it would be tied up under a unified command

where there is somebody looking at the big picture while individuals in very specific levels of expertise are dealing with different pieces of it.

Q. And did you review the testimony of Chief Appleton from Mosier about how that worked in Mosier?

A. I did hear that it went well.

Q. He described a situation exactly that, where various parties responded a unified command, then identified roles for particular responders.

A. Correct.

Q. So in that situation, would it be necessary for your DNR wildland firefighters to be trained in attacking the tank car fire?

A. I don't believe that I want to have my folks attacking a -- the actual derailment site. It's being able to have the resources to respond to identify and trained to be able to say where we should or we should not be here on the landscape working with our partners out there, whether it's, you know, Burlington Northern plus the local fire districts, to be able to really identify where is it safe to fight these fires.

Q. And then in that situation or at that time, would you then be able to apply your firefighters, your resources, your aircraft, if necessary, to work on the wildland fire that might be associated with the

derailment? Is that how --

A. Yes. Under unified command, yes.

Q. Question about your staffing. Sounds like if I wrote this down correctly, you have about a hundred permanent staff. Was that staff that are in the wildland firefighting division of DNR?

A. They're spread out between our division and out in the regions. So we've got regional staff spread out across the state of Washington.

Q. And then I believe -- so there's about a hundred of those?

A. There is.

Q. And then I believe you -- the next group you called was the militia, about 700 of those; is that correct?

A. Yes, I believe in my testimony -- in the written it said 800. So that's breaking out the regular fire staff from the true militia, which are the -- they have jobs other than fire.

Q. But they're trained in wildland firefighting?

A. They are.

Q. And are those year-round full-time positions?

A. Yes. But again, not -- not firefighters. They're trained to respond based on their -- you know, the level of training and expertise, but they don't work

in fire year round.

Q. So if -- and then we have the last group, which I think you said was called seasonal?

A. Seasonal.

Q. Which is there for, sounds like, ideally you match the fire season with the ability to hire --

A. Ideally, yes.

Q. -- seasonal firefighters? So if you had a wildland fire off season, who would be available to respond? Would it be the permanent staff and the militia?

A. Yes.

Q. So that seven or 800 people would be available to respond in that circumstance?

A. Right.

Q. And one other question, if you ended up with a derailment that triggered a wildland fire but not in the fire season, let's say it was December, January, February, whenever it's -- our typical rainier season or snowier season is, would the risk of the wildland fire getting out of control be the same as it would be if it occurred in the summertime?

A. Of course not, yes. The fuels, the weather wouldn't dictate that there be as urgent a response as there would during higher fire danger. We'd still

evaluate what the needs are out there because when we get -- we get a response and we get a fire on the landscape, we're responsible to, at a minimum, evaluate whether an actual response is needed.

Q. And as you do your planning and staffing for wildland fires, you spoke of a couple of seasons of sounded like unfortunate or unusual or maybe a combination of both in the last couple of years. Do you typically do staffing planning based on those kinds of scenarios on a regular basis, or do you reach out to other resources to accommodate those unusually large events?

A. It's a combination. From a budgeting perspective, which dictates a lot of what kind of staffing we have, we use -- there's a rolling average that we're funded at. And so that really helps us understand what we can physically afford. Of course, with the 2015 type of fire season, we're not going to ever probably have the funding needed to fully staff to accomplish that. So we look at a level that we feel that we need to be able to be sustainable at and ensure that we keep those initial starts caught before they get large. And then when we get in these situations like we had the last couple years, it's pretty much an all hands on deck across multiple organizations and working

together to try to move resources to where they're needed.

Q. So is it fair to say it's pretty standard, at least in your profession or your industry, to plan for, I guess, a chosen level of risk or probability but not the absolute worst potential?

A. No, not the worst-case scenario, yes.

Q. And last, you mentioned, again, back to the rail maintenance activities and I think you called them industrial fire or something or another.

A. Industrial fire precaution levels.

Q. Thank you very much. You mentioned the railroad did not follow those. Are you familiar with -- I guess I should also say, did you review the testimony of the BNSF witness or not?

A. I have not.

Q. So are you familiar with what she described as BNSF's Pacific Northwest division wildfire plan?

A. I have not.

Q. And the protocols or procedures that are in place for the rail maintenance workers?

A. I have not seen them.

MR. DERR: Thank you. I have no further questions.

JUDGE NOBLE: Redirect, Mr. Pruit?

REDIRECT EXAMINATION

BY MR. PRUIT:

Q. Mr. Johnson, I would like to turn your attention to the -- ask you to recall the discussion of the hundred-minute window. What is -- what is the danger if you allow a fire to continue to burn from a wildland fire perspective?

A. So if you're talking very specifically about a large heat source, such as potentially a crude oil burn, again, it goes back to what we previously discussed about the potential for spotting embers coming out of that heat source and moving downwind to an area where you've got to deal with them.

Q. So if you have a situation like in Mosier where you have a fire that continues -- a hot fire that continues to burn for hours, is that a greater risk from a wildland perspective?

A. I would believe so. Of course, you know, the other factors are going to be in the mix as in Mosier where they didn't have the wind that was creating a huge issue for them. But if, in fact, you do have that wind, it's going to be a different -- a different situation.

Q. Turning to the Washington -- the 2014 Washington management survey. Was that a survey that DNR received? Did you -- were you surveyed -- your department

surveyed?

A. We were not.

Q. Are you -- do you know how -- the history -- how long a history we've had in Washington State of crude-by-rail trains?

A. I am not aware of how long that's been going on.

MR. PRUIT: I have no further questions.

JUDGE NOBLE: Council questions?

Mr. Rossman?

MR. ROSSMAN: Thank you for your testimony.

To what extent in deploying your resources or weather station do you station personnel to be able to respond to a fire caused by rail activity? Is that a serious consideration in how you deploy your resources?

THE WITNESS: It probably isn't one of our primary -- primary factors unless we've got a situation where there's been multiple incidences where we have, in fact, had rail fires in a given area. So then it's probably tying in, you know, the fuel conditions that are in that geographic area that are conducive to, you know, a spark, whether it's from a train or from other -- some other source. So in most cases we're probably looking at fuel conditions and the weather in a certain geographic area as far as how we deploy the resources on the landscape, not probably necessarily

because of a single cause -- a potential cause of ignition.

MR. ROSSMAN: Got it. And then turning to the 2007 fire with the cost figure of 460,000, does DNR sort of estimate costs of every fire it responds to?

THE WITNESS: We're mandated by law to recover costs where we can show negligence, and so that's where we were on that incident.

MR. ROSSMAN: So in terms of your ability to recover costs from a fire, if there was negligence, you would have some ability, at least under law, but if it was accidental and not negligent, you would have less ability?

THE WITNESS: Correct.

MR. ROSSMAN: All right.

THE WITNESS: We've got a -- we have investigators, we have -- that go out on every incident, very specifically where we have our larger incidents, evaluate exactly what the cause of the fire was. And then we, of course, track costs very carefully and then we -- where it's possible, we recover those costs back to the State.

MR. ROSSMAN: And then my last question, in previous testimony we've heard -- and I couldn't find an exact reference, but there's a guidebook or a handbook

that is sort of widely distributed to fire departments for dealing with hazardous materials. We heard testimony that it's on every fire engine and --

THE WITNESS: It is.

MR. ROSSMAN: That's something that's on your fire engines also?

THE WITNESS: I can tell you that we teach -- we teach it purely from an identification perspective to be able to identify placards, for example, from a distance so that we don't get our staff too close. I couldn't tell you that we actually have that. It's a colorful little handbook. We don't necessarily have it on every engine.

MR. ROSSMAN: Okay. And actually one more question, I'm sorry. Just sort of in relation to that incremental increased risk from the additional rail traffic, is that something you would think of any sort of operational need to do anything differently on your end or look for any mitigation for, or is it just something that there might be, you know, a slight incremental increase in when a fire was caused from that source rather than some other source?

THE WITNESS: So it's something -- so you can talk about the actual numbers of fires that are started on the landscape and then you can look at what

the potential impacts of a fire would be if, in fact, it does start.

So if we're just talking about increased rail traffic, it would probably be so incremental that we probably wouldn't adjust. I would really have to think about if we were talking about increased crude oil transport that if, in fact, we had one of those, even though it potentially is infrequent, if it's a situation that had a potential to be -- my word was catastrophic -- catastrophic from a wildland perspective, anyway, that we'd have to evaluate whether we did increase resources in a given area. And, again, we'd probably be looking at the fuel and the weather, et cetera, on when we place those there.

MR. ROSSMAN: Thanks very much.

JUDGE NOBLE: Any questions, to my left? To my right? Mr. Snodgrass?

MR. SNODGRASS: Good afternoon. I'll try and keep this brief given the hour. A couple of questions about normal rail operation-caused fires. I think you had cited looks like, if I added it up right, a little over 20 in the last five or six years, and you had mentioned that a number of those were from carbon emissions from the locomotives and it sounded also like, at least in the Spokane incident, was that a negligence

or was that some sort of accidental factor?

THE WITNESS: So we had -- I haven't spoken to the investigators on that and I, of course, wasn't on that incident. But looking at what was reported from our investigators on that, they excluded all the other potentials for that. There was a series of fires on this grade coming out of the -- out of the community there. They had, in fact, observed carbon coming out of engines. Whether or not it was that engine or not, and that's where they -- led them down the path of there was -- it was carbon very specifically from the engine.

MR. SNODGRASS: I guess what I'm getting at is sort of how frequent is that? Is that --

THE WITNESS: I don't see that as a very common cause.

MR. SNODGRASS: What was the cause of the Portland fire more recently?

THE WITNESS: Actually it was out of state. I don't know that either.

MR. SNODGRASS: Okay. You may not be the right witness for this. I just wondered to what extent if sparking is a cause of a normal operations-caused fire, to what extent you see that more on heavier trains or on curved track or with deceleration?

THE WITNESS: I mean, typically, we don't

see it on straight stretches. It's been on grades, where there's potentially additional friction. But I can tell you that we have done no in-depth analysis tied to, you know, when or where different types of rail fires are started.

MR. SNODGRASS: Okay. Just a couple of questions I guess about Wishram. You mentioned it, got into sort of the timing as the fire develops. You said it got up to 800 acres quickly.

THE WITNESS: Yes.

MR. SNODGRASS: How quickly?

THE WITNESS: Within the first burn period, so within just a few hours. When you have 30-some mile an hour winds in those light fuels, it's moving actually faster than you can keep it in front of you on foot.

MR. SNODGRASS: As first -- I don't know if you or another agency was first responders, but as --

THE WITNESS: It was local fire districts.

MR. SNODGRASS: As the first responders approached, I think you mentioned or maybe it was what DNR did, that you tried to save the adjacent structures; is that right?

THE WITNESS: They worked -- they did point protection in front of that fire. Again, it was a wind-driven fire and light fuels; it is very, very

quick. And I've had probably half a dozen fires in that same stretch and typically -- even though I wasn't on this one, typically what happens, when the wind's blowing during the day when the fire starts, as you hit the evening, the winds are dying down, humidity comes up and then you're able to, you know, get a hook on the head of the fire. So typically it's a one-burn period fire in that, unless it gets really engaged and moves up into the upland, up in the foothills.

MR. SNODGRASS: Is trying to save existing structures, is that strictly a function of water, or is there anything else you do --

THE WITNESS: No. Just to be -- instead of anchoring -- I talked about anchoring and flanking, just getting a trail around it, when fires are moving that quickly, you're not going to keep up along the side of it. Typically what you would do is you'd -- you'd try to do that, you try to have a flanking action, but at the same time, you'd send resources out where you have, you know, improvements at risk to ensure that you're prepared if a fire -- if that fire actually gets to that improvement.

MR. SNODGRASS: Right. One of the things we heard in earlier testimony in a little bit more urban context was the need to do an non-preventionist or

defensive fire.

THE WITNESS: Right.

MR. SNODGRASS: But at least as I understood it, a big part of the first responders and really continuous through the fire response, is hosing down if it's -- assuming the scenario of the derailed -- oil train derailment with fire, hosing down the -- whatever tanks are not on fire that are next to ones that are or close to ones that are. And so presumably that takes a good bit of water. So I'm just wondering if that -- how that changes you would approach a fire in a rural context?

THE WITNESS: So typically with the Department of Natural Resources, we're probably not going to be hosing down a tank. We'll be working with our partners out there to see how we can assist them, but probably not in that direct a method. It may be supporting them from a water perspective, but probably won't be in putting water actually on a tank.

MR. SNODGRASS: Is the availability of water for a rural fire -- I assume that's as quick as water tanks can get there, or is there --

THE WITNESS: It's -- we usually use tenders. So the movement of those tenders to that location and usually we're -- Department of Natural

Resources actually contracts that resource out. Local fire districts typically have that, especially rural fire districts have that in their stations, and so they're going to try to move that quickly. That's -- my understanding from the Mosier incident very specifically, that was one of the big issues, was getting the quantity of water that they needed there. So they had a lot of mutual aid from districts to get those -- get that water to there using your tenders.

MR. SNODGRASS: Okay. Lastly, in the Wishram incident at SR-14, was that shut down? For how long?

THE WITNESS: It was for a short period of time.

MR. SNODGRASS: Short period. Okay. Thank you.

JUDGE NOBLE: Other questions, to my right? Questions based on council questions?

MR. DERR: I have none, Your Honor.

MR. PRUIT: Me either.

JUDGE NOBLE: Mr. Johnson, thank you for your testimony today. You're excused as a witness.

I believe that completes today's witnesses, I think. Am I right?

MR. POTTER: Yes, Your Honor.

JUDGE NOBLE: So that leaves the one task for the day, as far as I know, to go over tomorrow's testimony and subject matters, witnesses for tomorrow.

MS. BOYLES: Yes, Your Honor. For tomorrow we have Mr. Jerry Johnson, who is a witness for the Columbia Waterfront, talking about the economic impacts of the terminal. He has prefiled testimony.

And I apologize, we tried to get all the Johnsons on the same day.

THE WITNESS: You're not going to get all of us.

MS. BOYLES: Second, we have Mr. Ernie Niemi. He is a rebuttal witness called to discuss secondary economic impacts and natural resource damage calculations. He is in rebuttal to the testimony of Mr. Schatzki, Ms. Hollingsed and Mr. Casey.

Third, we have Mr. Jared Smith. He is a fact witness with no prefiled testimony. He is the president of the International Longshore and Warehouse Union Local No. 4.

JUDGE NOBLE: He's a party?

MS. BOYLES: He is a party. We have on the phone at 1 p.m., Ms. Harvey, to answer council questions.

And then we have Dr. Ranajit Sahu who will

speak about air emissions, air permitting, greenhouse gas impacts. He has prefiled testimony and he is in rebuttal to the testimony of Mr. Hansen and Mr. Bayer.

JUDGE NOBLE: I didn't hear what you said about the witness Niemi, whether he has prefiled testimony?

MS. BOYLES: No, he does not.

JUDGE NOBLE: Anything else we need to do on or off the record before we adjourn for today?

MR. DERR: I don't think so, Your Honor.

JUDGE NOBLE: We're correcting the exhibit record with regard to those two exhibits, 4511 and 4512, to correctly reflect their admission status.

All right. Then we will be adjourned until tomorrow morning, June 20th, at 9:00. Thank you very much. We are off the record.

(Hearing adjourned at 5:22 p.m.)

C E R T I F I C A T E

STATE OF WASHINGTON)
) SS.
COUNTY OF THURSTON)

I, Micheal A. Johnson, Registered Diplomate Reporter and Certified Realtime Reporter, do hereby certify that the foregoing transcript is true and accurate to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF, I have hereunto set my hand and seal this 26th day of July, 2016.

MICHEAL A. JOHNSON, RDR, CRR