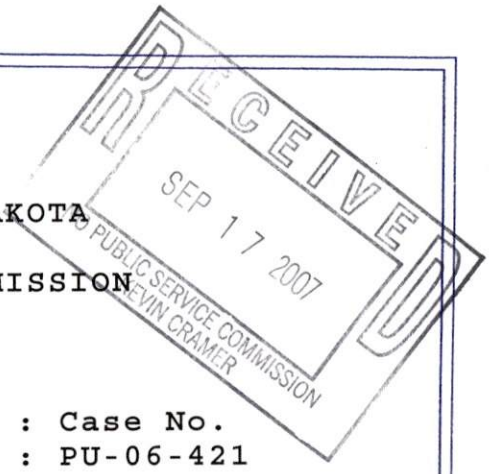


STATE OF NORTH DAKOTA

PUBLIC SERVICE COMMISSION

TransCanada Keystone Pipeline, LP, 30-Inch Oil Pipeline/ Cavalier to Sargent Counties Siting Application	:	Case No. PU-06-421

TRANSCRIPT OF

HEARING

(VOLUME II)

Taken At
State Capitol
Bismarck, North Dakota
September 5 & 6, 2007

BEFORE THE HON. AL WAHL
-- ADMINISTRATIVE LAW JUDGE --

EMINETH & ASSOCIATES
Court Reporters
BISMARCK, NORTH DAKOTA
(701) 255-3513

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(The following proceedings were continued on Thursday, the 6th day of September, 2007, commencing at 8:59 a.m.:)

JUDGE WAHL: The record will show that it is nine o'clock a.m., September 6th, 2007, for the continued hearing of an application for a waiver of procedures and time schedules and consolidated applications for a certificate of corridor compatibility and a route permit authorizing construction of approximately 218 miles of 30-inch crude oil pipeline and associated facilities, referred to as the Keystone Pipeline in Cavalier, Pembina, Walsh, Nelson, Steele, Barnes, Ransom, and Sargent Counties, North Dakota. This is PSC Case No. PU-06-421.

Mr. Kelsch, when you're ready.

MR. KELSCH: Thank you, Your Honor. I would like to call Heidi Tillquist to the stand.

JUDGE WAHL: Ms. Tillquist, as you have heard me advise previous witnesses, your testimony is required to be under oath and I'm required by law to advise you regarding perjury before administering the oath. Perjury is a false statement of material fact which you do not believe to be true, in other words, generally speaking, a

lie. In North Dakota perjury is punishable as a Class C felony by a fine up to $5,000, imprisonment for a period up to 5 years, or both.

(Witness sworn.)

JUDGE WAHL: Mr. Kelsch.

MR. KELSCH: Thank you, Your Honor.

HEIDI TILLQUIST,

having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELSCH:

Q. Ms. Tillquist, could you please state your name and your position with the Keystone Company?

A. My name is Heidi Tillquist. I'm employed as an environmental toxicologist and project manager with ENSR in Fort Collins, Colorado. ENSR is providing consulting services to TransCanada Keystone Pipeline with respect to the Keystone project.

Q. Could you give the Commission a general description of your experience and education relating to pipelines?

A. I have 17 years of experience working in environmental toxicology and risk assessment. I've worked on a number of pipeline projects, including

multiple crude oil refined products, which is gasoline, diesel, natural gas liquids condensate pipelines, and natural gas pipelines. I have conducted a number of risk assessments for a number of projects, including pipelines, oil and gas developments, and superfund sites. I've also written some reference texts, including a document evaluating the effects of crude oil on freshwater environments.

Q. I believe you have in front of you an exhibit that's been marked as T19. Could you please tell the Commission what that document is?

A. This is my resume.

MR. KELSCH: I would move to admit T19.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: No objection.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No objection.

JUDGE WAHL: Exhibit T19 is received.

Q. (MR. KELSCH CONTINUING) Does the Keystone application address the Public Service Commission's application guidelines for corridor compatibility?

A. Yes, it does.

Q. What portions of the corridor application are you responsible for?

A. I'm responsible for Sections D.2, C.2, Sections 6 and 7. Those are selection criteria for human health and safety and animal health and safety, respectively. Basically these are the risk assessment and environmental consequence analyses portion.

Q. Can you generally describe what a risk assessment and environmental analysis is?

A. Risk assessments are basically -- we evaluate the probability of an event, such as an oil spill; we determine if receptors, such as humans, animals, wildlife could be exposed, so we look at exposure routes; and then we analyze its potential consequences, such as an exceedance of a water quality criteria.

Q. Did Keystone do a spill analysis for the proposed pipeline?

A. A preliminary spill analysis was conducted for Keystone Pipeline. The spill frequency and volume analysis was conducted by DNV Energy, which is an independent firm. It's recognized as an industry expert looking at the spill frequency and volume assessments. DNV used information from a number of sources, including a national database that's controlled by PHMSA, which is under the

Department of Transportation, and then based on the results of DNV's spill frequency volume assessment we used that -- ENSR used that to conduct the environmental consequence portion of the risk assessment.

Q. What were the results of the spill analysis?

A. The project specific results provided by DNV were derived again from these historical data bases. They estimated the chance of a leak from the Keystone Pipeline to be no more than 7 to 11 years over the entire length of the pipeline, depending on the type of product and the throughput. Using that most frequent interval, that would equate to a spill of no more than once every 42 years in North Dakota.

Q. And that is using the most conservative, the once every seven year?

A. Correct.

Q. Is this spill frequency a conservative figure?

A. Yeah. By design the spill frequency and volume statistics are conservative, which means we try to overestimate risk since the intent of the assessment was for planning purposes.

Specifically, the objective of this document, the risk assessment, was threefold. We used it for providing information to the Department of State for the NEPA process. Basically we're trying to put sideboards on the possibility of spill; and it also provides a preliminary evaluation for the integrity management program and a preliminary step in our emergency response program.

Q. At the July hearings one of the members of the public commented or testified that there will definitely be a leak in the Keystone Pipeline. Is that true?

A. Statistical frequency shouldn't be interpreted as certainties that an event would occur. It's kind of like a car insurance agent that's going to tell you that you're going to have an accident once every ten years. As a good driver, you know, you're going to do everything you can to minimize the chance, and it's certainly not a given that you would have an accident. It's the same type of thing, these statistics.

Q. Discuss the probable size of a spill from the Keystone Pipeline.

A. For the risk assessment analysis DNV utilized data on the national database that had a

reporting criteria of 50 barrels or more. So by design this assessment overemphasized the chance of a larger spill. Again, that's done to put conservatism into the emergency response planning and our other objectives. If we look at actual spill data, it does confirm that this assessment is highly conservative. Since the U.S. Department of Transportation changed their reporting criteria in 2002 from 50 barrels to 5 barrels, the mean size of a pipeline spill is actually 12 barrels, which is equivalent to about 500 gallons. So if a spill were to occur based on the historical frequencies, it would suggest that our assessment actually is very conservative, that a spill would be small.

Q. As I understand it, you said the median spill would be 12 barrels or 500 gallons. Does that mean that there would be as many spills below that as above that?

A. Yeah. A median size, so 50 below, 50 above.

Q. In broad terms how susceptible are the aquifers along the proposed Keystone Pipeline project route to a crude oil spill?

A. In a broad sense looking at the entire Keystone Pipeline, the chance of a spill occurring

over an aquifer is low, and not all aquifers are equally susceptible to contamination. The majority of the aquifers along the pipeline, approximately 80 percent, are overlain by low permeability soils and confining materials that would inhibit the infiltration of crude oil to the aquifer. Additionally, most aquifers are more than 50 feet deep, so the majority of the aquifers crossed by the pipeline have low susceptibility to contamination, and again the chance of a spill occurring on the Keystone Pipeline where an aquifer was is very low.

Q. What if the oil would reach an aquifer, how much groundwater would be affected?

A. If a spill occurred and the oil penetrated into the soil and got to the aquifer, what happens is the crude oil forms a pool at the top of an aquifer. The crude oil, itself, is not going to be moving a lot, but what can happen is you're going to have constituents from within the crude oil, and these are what we call -- the ones we worry about are called BTEX, which is benzene, toluene, ethyl benzene, and xylene. These are highly soluble compounds in water and they tend to be the most toxic, so that's why we worry about these

compounds.

So you've got the crude oil floating, you've got dissolved constituents coming out. Now those dissolved constituents can move in a plume in the direction of groundwater flow. What we've done is we looked at a recent report which evaluated -- this was done by the EPA. It evaluated 500 sites with BTEX contamination, and what they found was that the contaminant plume of the BTEX front basically -- first of all, it doesn't move as fast as the groundwater. It tends to move a lot slower because of natural attenuation, which is basically microbes eating the hydrocarbon as it moves.

And the study found that of these 500 sites 75 percent of the cases that BTEX plume moved less than 250 feet from the actual source of the contamination, and in 80 percent of the cases the contamination plume was stable or decreasing in size.

So it's kind of a misconception a lot of people have that if a spill occurs, that the entire aquifer would be contaminated. Rather, actual studies show that if a spill does happen to reach an aquifer, that the extent of the contamination is actually quite small in area.

Q. At the July hearing there was a mention of a pipeline spill that happened in Bemidji, Minnesota. Did you have an opportunity since that hearing to investigate that spill?

A. Yeah. I actually went to Minnesota, visited with the USGS, who is conducting research at the site, and I also conducted a site visit at the Bemidji spill.

Q. What did you find out or what did that spill demonstrate?

A. Let me give you a little background about the spill. The spill occurred in 1979 near Bemidji, Minnesota. Approximately 10,600 barrels of crude oil were spilled. Most of the spill was cleaned up, but approximately 2500 barrels did remain. The groundwater in this area is extremely susceptible to contamination because the soils in the area are quite sandy, so they have high hydraulic capacity. It allows the crude oil to permeate into the ground and the groundwater is shallow. The groundwater ranges between 35 feet to -- actually to the ground surface. So it's a highly vulnerable aquifer. The USGS has been conducting research at this site to determine how crude oil actually affects that groundwater, and

basically what they have demonstrated or what they found was that this BTEX plume that we've talked about, it moved about five times slower than the groundwater movement. In 20 years that they've monitored that BTEX front, it had moved a total of 170 yards from the crude oil source. And again, the reason that that contamination movement was limited is, again, just natural attenuation, the microbes eating the hydrocarbons.

Q. So the crude oil in that case got into the aquifer, but the farthest it went was 170 -- or the BTEX, the farthest it went was 170 yards in 20 years?

A. Right. So the crude oil stays in one location and it's the BTEX that moves, and it was in a very limited area.

Q. Okay. At the public hearing there was also a comment that an oil spill would make the ground sterile forever. Is that true?

A. I'd like to at this point just show you some slides that I took -- some pictures I took of the site at my visit in July.

Q. I believe you have an exhibit marked as T20? Could you tell the Commission what those documents are? I think we'll go one at a time, but

they're all Exhibit T20.

A. Okay. The first photo is -- this is a picture of the Bemidji spill site. Here's the pipeline right-of-way, so there's actually multiple pipelines running down this corridor. The pipeline that ruptured was actually in this area. The spill occurred because of a longitudinal seam defect in the pipe, which was -- it was pipe that was built in the 1950s that was subject to this type of a problem. When it spilled, approximately 10,000 barrels were released. It formed a pool right here -- and I'll show you another picture of it -- but this is called the north pool, and then because it was a rupture, it actually sprayed out in this direction.

This area over here we'll see in a second. This is called the spray zone, and then from there the oil traversed over land. It followed terrain and came down 100 yards over here to a wetland area called the south pool. So we'll step through each of these. Just to give you a little background, so the spill occurred late -- or sorry. The spill occurred in 1979, and in 1980 they were cleaning up, and what they did is they removed all the topsoil from this area as part of their cleanup.

COMMISSIONER WEFALD: Could you repeat just again for me, is that barrels that you said or gallons?

THE WITNESS: Barrels.

COMMISSIONER WEFALD: So it was 10,000 --

THE WITNESS: Barrels. So 42,000 --

COMMISSIONER WEFALD: You said the medium-sized spill is 12 barrels, but this was 10,000 barrels.

THE WITNESS: It was huge.

COMMISSIONER WEFALD: Okay. Thank you.

THE WITNESS: So they stripped all the topsoil away, and they never -- except for one spot we'll talk about later -- they never replaced it. When we talk about did vegetation come back, if you're driving down, you can't tell any difference. The vegetation has come back and is virtually indistinguishable from the rest of the right-of-way.

Next photo. This is the spray zone, so what we saw before was the north pool. This is the spray zone. This is an overview of where the oil actually sprayed onto the area. For the most part in the spray zone, the vegetation is very comparable to the area surrounding it. However --

let's go to the next one -- there are some areas within that spray zone -- and this is about a 20-by-15 meter area -- where the soil has -- there's a hydrophobic crust that's been formed.

Basically the crude oil has formed a layer with the soil, and it basically repels water, so obviously not good for growing vegetation, plus the fact that there is no topsoil, and as you can see, this is basically like play sand. It's very sandy soil. If this was an actual -- well, if this was a site somewhere else where there was active remediation taking place, where they're actually trying to recover the soils, the topsoil would have been replaced and the soil would have been tilled to break up that crust. You can break it up just by walking across. It's kind of like if you spray water on the surface of sand, you know how it forms that little, tiny crust. It's the same thing with this crust, but you can just break it up real easily. Topsoil would have been added and then vegetation would have come in.

We can go to the next one. This is the north pool, so again -- so the oil would have been largely in this area, and again, if it weren't for all the wells that they have here, driving down the

road you would never distinguish this from any other part of the area.

Next photo. This is actually the only part of the area where they actually brought in topsoil again to remediate the area, and so this is the south pool. So the spray zone would have been over here and then the oil would have followed the terrain and come down here. With the replacement of topsoil, I mean, the vegetation here again looks like what the right-of-way looks like, and the wetland itself is extremely lush and viable.

So to kind of summarize it again, you know, the vegetation at Bemidji was largely reestablished despite the lack of topsoil and any active remediation at the site on the soil. There are some small areas where vegetation has not completely reestablished, and that's attributable both to the hydrophobic soils and to the lack of topsoil. Tillage and topsoil replacement would resolve that issue.

MR. KELSCH: Has Keystone evaluated the risk to the -- excuse me. I would like to offer the Bemidji photos, Exhibit T20.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: No objection.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No objection.

JUDGE WAHL: Exhibit T20 is received.

MR. KELSCH: Thank you.

Q. (MR. KELSCH CONTINUING) Ms. Tillquist, has Keystone evaluated the risk to the Fordville aquifer and particularly the slope of the terrain leading to that area from the pipeline?

A. Yes. We did conduct an evaluation of risk to the Fordville aquifer. The analysis included an evaluation of terrain, stream flow, overland transport, subsurface transport, combined with probability spill risk.

Q. Did you do an assessment that evaluated a hypothetical spill from the Keystone Pipeline and the effect it might have on the Fordville aquifer?

A. Let me -- let's bring up a map here.

Q. And I'll guess we'll show you exhibits marked as T21, a water flow map, and T22, aquifer travel time chart.

A. Just to orient everyone -- well, I'll wait till everybody gets this. All right. This is a portion of the map that everybody received. Just to orient everybody, the green line is the centerline. The aquifer -- the Fordville aquifer

is this blueish area, with the darker blue being the shallow portion of the aquifer, so it's subsurface, less than 50 feet, and it averages in this area 20 feet in depth. The greenish kind of area is actually the surficial portion, so it would be closer to the surface and actually touching the surface, and then the black dots here we see are the intake wells.

What we did as part of our risk assessment is to look at a variety of ways that a spill -- just like we talked about earlier -- how a spill could get to these -- to the Fordville aquifer, and we're going to look at subsurface transport, overland transport, dry channel, and flowing channels.

Q. You indicated the first way of -- potential way for crude oil to get to an aquifer would be by subsurface transport by groundwater. Could you please explain that?

A. Yes. So let me explain a little bit about the pipeline to you. So the pipeline is here. The margin of the Fordville aquifer at its closest point is about three linear miles away from the pipeline. The groundwater wells over here are six-and-a-half miles from the centerline. The

groundwater movement in the area is downstream. It's east, southeast, towards the aquifer. Again, we talked about the depth of groundwater being -- at this aquifer it's actually 0 to 30 feet and averages 20. The soils in the area are permeable with infiltration rates of .4 to 12.6 feet per day.

All right. So when we're looking at subsurface transport, which means the spill would need to occur, the oil would have to penetrate down into the soils, and then it would have to migrate to the aquifer as we -- we've been talking. Basically what would happen is the crude oil would infiltrate into the soils. It's not going to be the crude oil that would migrate, but it would be this BTEX contamination that would migrate towards the aquifer, and the BTEX contamination is going to move hundreds of feet, and we're talking about having to reach three miles to the margin of the aquifer and six-and-a-half miles to the drinking water wells. So as a risk assessor the subsurface transport was eliminated as a viable exposure route.

Q. Okay. The next possible way that a leak could get to the aquifer would be by overland transport. Could you describe how -- that process?

A. If a spill occurred, most spills would be contained within the pipeline trench or slightly adjacent to it. If you had a very large spill, it could come out of the trench and move, again, following terrain downhill, spreads laterally, and it gathers in pools -- it pools in depressions. Without -- in the absence of steep terrain and channels, basically the movement is limited to a few hundred feet to no more than a half mile, and basically that's because as the crude oil is moving, it starts to adhere to soils and vegetation, and so you have subsequently less and less oil to move along.

So what we did is -- you know, people had mentioned that there was a slope here, and so we wanted to look and see is the slope steep enough in this area that it could facilitate overland transport, and from the centerline of the pipeline to the aquifer -- again, it's three miles -- looking at the topographic lines in this area, it's a 60-meter drop on the map, which is equivalent to about 200 feet, which that calculates into a slope of 1.3 percent. So it's relatively flat. So it's not considered a steep slope and so it would not significantly enhance overland transport. So

overland transport then was eliminated as a viable exposure route.

Q. Ms. Tillquist, you're talking about the time it would take either to get underground or overland. If there was a leak, would there be any remediation measures by the company, as well, as part of their emergency response plan?

A. Yeah. In any of these instances if a spill occurred, it's going to take time for the material to be transported from the spill site to the aquifer, and in all of these cases you're going to have emergency response teams coming in and being able to contain and clean up the spill. Certainly, you know -- and we'll talk about it later, but there's time for the spill team to get there, and if it gets into the aquifer, certainly a lot of time before the water/BTEX front could even move sufficient distances, and you can conduct remediation in those time periods.

Q. Okay. The next method you talked about was a transport by dry channels. Could you describe what -- that process?

A. Let's -- well, okay. This -- in this area there are 23 intermittent streams and then you've got two perennials, the north branch of the Forest

River and the middle branch of the Forest River. Just looking at the intermittent channels, basically intermittent means they don't run -- they're not flowing all the time. So if a spill occurred and these channels were not flowing at the time, we'd look to try and determine whether a spill could go from the centerline and reach the aquifer.

Again, most spills are going to be small and it's going to take a very large spill to get out of the trench and then get to the stream channel and then begin moving downstream. Again, once it starts moving, it's going to be subject to adherence to the soils, to the vegetation. Movement down dry channels is typically -- well, it's no more than a half-mile, even with a large spill.

If we go to table one --

Q. Table 1 would be exhibit T22, I believe.

A. This is the bottom half of the chart, but I believe everybody else has the entire chart. The intermittent channel -- traveling down an intermittent channel, the shortest distance is at least 3.5 miles before it would reach the margin of the Fordville aquifer. So again, because traveling

down a dry stream channel would be a half-mile or less, the chance of a spill reaching the aquifer via a dry stream channel is highly improbable, and again, we eliminated it as a viable route.

Q. The last method of the crude oil in the event of a spill reaching the aquifer you indicated was by a flowing channel. Could you explain that process?

A. Crude oil movement is facilitated by the presence of water. So if it did get into a stream channel, it would be capable of moving further downstream than any other routes we've talked about. There would be some element of adherence to vegetation and soils, but that would be primarily along the margins of the stream, and the crude oil could move on downstream. So this is part of the analysis that we spent quite a bit of more time on, and we're going to talk based on the hydraulics of the Forest River. We're going to split this into two discussions, both on the gaining reach of the Forest River and in the losing reach of the Forest River.

On the gaining reach -- we're going to talk about the gaining reach first.

Q. Ms. Tillquist, could you describe for us

laypeople what's the difference between a gaining reach and a losing reach?

A. That would be important. A gaining stream reach is where water from -- as the Forest River is going across the aquifer, it's actually gaining water from the aquifer, so water is pushing from the aquifer into the river. A losing stream reach is basically where the stream's coming across the aquifer and water is actually going from the river into the aquifer, so that's a layman's description.

Q. In the gaining reach if there was crude oil in the river, would the crude oil get into the aquifer?

A. All right. So that's what we're going to -- what we evaluated, so let's talk about the gaining stream reach. So again, if a spill occurred, most spills would be small. You're going to have to have a large spill that's going to be capable of getting out of the pipeline trench and mobilizing itself to get into a stream channel. Once it's in the stream channel, it could be -- would have to have specific volume to move on downstream to get on down to the aquifer.

Q. You testified that it would have to be a large spill. Do you have any --

A. Thousands of barrels.

Q. Thousands?

A. Yeah. Let's go to Table 1, back to that one we looked at. Yeah. Okay. So this is the gaining stream reach. So we have 15 intermittent stream crossings, and the middle branch, which is a perennial, on these intermittent streams the closest -- this is the distance from the centerline to the margins, to the edge of the Fordville aquifer. The shortest distance is 4.7 miles, and we calculated a velocity -- stream velocity based on terrain. So that would -- at 4.7 the quickest it could get to the margin of the Fordville aquifer would be two-and-a-half hours, and then we looked at -- well, we'll come back to that as far as contributory pipeline segments.

The middle branch is 6.6 miles away from the margin of the Fordville aquifer, and it's going to take three-and-a-half hours to reach the margin of the Fordville aquifer.

Then we looked at -- based on the terrain and how far crude oil can move, we looked at a contributory pipeline segment, so how much of the pipeline, if it spilled here, could it reach? So looking at the contributory pipeline segment we

then calculated it a maximum occurrence interval -- and again, this is based on the most conservative spill estimate that we talked about earlier. So in total there is 3.4 miles of contributing pipe in that entire section, and we estimate a spill of no more than once every 4800 years.

Once we got through the -- this portion, then as a risk assessor, what we say is, okay, well, let's say the spill happened, it did get into -- you know, the spill happened, the spill was large enough that it got into the stream and it moved down to the Fordville aquifer, so you have this once in 4800-year event, what would happen? So you'd have to have this chain of events, and then if all of those occurred, again, you're in a gaining stream, so what you're going to have is you're going to have the crude oil floating along the surface. The dissolved constituents start dissolving from the crude oil and into the water. That's a time-dependent function, which again would allow emergency response teams time to get there, contain, and start cleaning up, but again, because it's a gaining stream reach, you've got oil and dissolved constituents kind of coming out, but it's a gaining stream reach, so all the water from the

aquifer would be coming out and pushing into the river. So there's no chance for the contaminants then to push down and get into the aquifer itself. Let's go back to the map.

Q. Ms. Tillquist, could you just again for me describe where on the map would be the tributaries or the rivers going into the gaining stream?

A. So right there, that one right above my -- it's hard to hold still -- that is the top portion of the river that is going into the gaining stream reach, all the way down to down here, and let me back up. The blue channels are actually viable channels. We had a hydrologist look at this and try to determine if the channels were capable of actually transporting the crude oil downstream. There was a few up here that were obstructed, so an oil spill would be stopped. So we're really looking at these blue channels.

So the gaining stream reach is from here on down, and then you can see it would come along -- in this area would follow the stream channel. Again, the dissolved constituents can't get out of the stream channel because the water's coming into the channel, and further you've got these groundwater wells up here, here's a stream

channel here. So there's no viable way of getting them from this area over to these actual intakes.

And we talked about emergency response being able to then contain and clean up. And so, I guess, in conclusion then, the chances of groundwater being adversely affected -- these wells being adversely affected by a spill occurring anywhere along this stream reach is highly improbable.

Q. Then you also talked about the losing stream reach, the northern portion of that north branch. Could you describe what would happen if there would be a spill in that area?

A. All right. This area -- so from here on down to right there all lead into the north branch of the Forest River, and again, that's a losing portion of that river. That's about 1.9 miles. There's eight intermittent streams in the north branch. Stepping through the same analysis, the spill size would have to be large. Most spills are not going to be capable of getting out and into these stream channels and getting downstream.

Because it would have to be large, again, it's going to trigger the leak detection capabilities of the Keystone Pipeline, they're

going to know about it, they're going to start instituting their emergency response, and Brian will be talking about that later today.

Going to table -- the top part of the table. So here's the losing stream reach. So we've got eight intermittent streams. The -- we've got distances to the pipeline, so the closest it would be is two hours before it would reach the margin of the aquifer, and in total there's 1.9 miles of pipe that could contribute to this event, and so using our spill -- the most conservative spill frequency, we estimate a spill of no more than once in 8300 years.

Q. Ms. Tillquist, maybe we should just go back a step. I know you talked about spill frequency, but how did you come up with the 90,900 or 30,300, the mathematical computation of that?

A. Okay. For the perennial stream reaches, so here's a perennial, it's simply taking the contributory pipeline segment distance and then calculating the frequency for that segment, because we're assuming in all cases that it's a flowing channel all year around, so it -- there's no modification of that factor. If it's an intermittent stream reach, intermittent meaning

obviously it's not flowing all the time, we're saying that half the time it's not going to be flowing, so if it's not flowing -- we've already went through the dry channel analysis -- it's not going to reach the aquifer. The other half of the time if it's flowing, it could, and then we take again the contributory pipeline segments and calculate the occurrence interval for it occurring and then we summarize that.

Q. So does that go back to your statement about that it would happen in North Dakota once every 42 years --

A. Though are all using the same statistics.

Q. -- and then dividing that up by 212 miles in North Dakota or I guess the actual -- once every 42 years over the whole 212 miles in North Dakota, then you would break that down to those smaller levels here. Is that --

A. That is correct.

Q. Okay. I'm sorry.

A. That's all right. So we talked about transit time taking at least two hours to reach it. Let's go back to the map. So it would take two hours minimum to get to the margin of the aquifer, and then it's five miles to get into the surficial

portion and ten miles to get to these wells.

Okay. So let's again step through -- let's assume that the spill occurs, that the spill is large enough to go -- to get to the channel, then to be transported downstream, the intermittent streams would have to be flowing. Now it actually reaches the aquifer. What happens? This is a losing stream reach. So what happens here is, again, water from the river is actually going into the aquifer. There was a study done, and five percent of the recharge of the aquifer, Fordville aquifer, actually comes from this Forest -- north branch of the Forest River. So a small fraction of the total recharge is actually from this, so it's actually going to help dilute any of these dissolved constituents that could into the aquifer.

If the spill came along, so it's going to be a stream channel. It's going to be flowing along the surface. Again, you're going to have crude oil coming along, the dissolved constituents are coming out in a time-dependent fashion allowing time for emergency response to get there. If the dissolved constituents got into the aquifer, because again it's a losing stream reach, you're in this channel. They've now got to go via

groundwater to subsurface transport. Now they've got to travel all this distance to get to the nearest wells. It's over a mile at the closest part.

So what we know about BTEX contamination, it moves hundreds of feet, not miles. So the chance of it -- all the events occurring, I mean, the spill occurring, the intermittent streams flowing, being a large spill, getting transported all the way downstream, then the dissolved constituents coming out of the water and getting into the aquifer in sufficient concentrations is highly improbable, and then the fact of trying to even reach these wells, it just won't happen. So again, it's a highly improbable event.

Q. Ms. Tillquist, do you have a conclusion concerning the risk of a spill reaching the aquifer and affecting the groundwater resources of the Fordville aquifer for the whole area?

A. Yeah. I guess so to summarize the whole Fordville aquifer risk, the chance of a spill occurring and then being capable of reaching the Fordville aquifer, itself, is no more -- looking at the table, the grand total is no more than once every 3200 years, and then any subsequent adverse

effects to these intakes, which is what we're trying to protect, is highly improbable.

Q. Yesterday there was a question, I believe, by Commissioner Wefald concerning shallow aquifers and basically what the definition of a shallow aquifer was -- or is, excuse me. What is the definition?

A. Typically a shallow aquifer is considered 50 feet or less.

Q. And then I think you mentioned a surficial aquifer. What's the --

A. That's an aquifer that's actually touching the surface.

Q. I would like to address your attention to Exhibit T9. It's the Fordville map. There was a question on that about the WHPA. I think the testimony was that stands for wellhead protection area. Do you know what that is or can you tell us about that wellhead protection area on T9? I think it's the Park River -- is that the Park River?

A. Yeah. There we go. So we're talking about this little wellhead protection area here, and there's also this high consequence area associated with it. These are associated with surface water intakes for the Park River -- Town of

Park River. Talking with the Department of Health, the City of Park River no longer gets its water from surface water sources, so these are basically -- they were eliminated. The wellhead protection area is no longer -- it's a former wellhead protection area, so it's no longer valid.

Q. So on the map both that -- I guess -- I don't know if it's the orange or --

A. It's reddish.

Q. -- reddish, and the blue area would technically not be a current --

A. Yeah. The Department of Transportation still identifies it as a high consequence area, that's the blue part, so it's listed, but as an operator you can sit there and say, well, the purpose of the HCA was to protect that surface water intake. Since the surface water intake is no longer being used, the purpose of HCA is invalid and it should be eliminated as an HCA.

MR. KELSCH: I would move to admit Exhibits T21 and T22.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: No objection.

JUDGE WAHL: Mr. Binek.

MR. BINEK: No objection.

JUDGE WAHL: Exhibits T21 and T22 are each received.

MR. KELSCH: I have no further questions, Your Honor.

JUDGE WAHL: Mr. Delaney.

MR. DELANEY: Your Honor, I don't believe the -- and maybe you can correct me if I'm wrong -- that this DNV frequency volume study has been made part of the record, and if it hasn't -- this is the study that Ms. Tillquist has been referring to -- I'd like to make that an exhibit.

JUDGE WAHL: I have marked for identification Appendix A, Frequency - Volume Study of Keystone Pipeline, Exhibit I1. Mr. Kelsch?

MR. KELSCH: No objection.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No objection.

JUDGE WAHL: Exhibit I1 is received.

CROSS-EXAMINATION

BY MR. DELANEY:

Q. Before we get into that exhibit in great detail, Ms. Tillquist, I guess I want to get back down to some basics. I want to talk about this crude oil that's actually going through this pipeline and what is actually contained within

that, specifically pollutants. What types of pollutants are in this crude oil?

A. Crude oil consists of a multitude of various hydrocarbons, aromatic hydrocarbons being typically the ones we worry about, the BTEX compounds again. It contains aliphatic compounds, which are long-chain hydrocarbons, PAH's, polyaromatic hydrocarbons, and trace elements.

Q. Are there any heavy metals within the crude oil?

A. That would be the last one, the heavy elements. Yeah.

Q. Okay. And what would those be?

A. It contains a variety of trace elements, the most common being nickel and vanadium. Those are present in the parts-per-million range. There's other compounds that are present.

Q. Okay. What about -- and I think you had mentioned benzene, as well, is in this.

A. Mm-hmm.

Q. Now do you have any idea -- do you have any idea at what point these elements and heavy metals that are in this crude oil are toxic to humans? Have you done any analysis on that?

A. Yeah. Let me take it in two steps. As

far as the trace metals are concerned, they can be toxic -- depends on the metal itself -- but parts per billion, parts per million range, but in crude oil these are chelated. They're complexed with the crude oil itself. So they lack bioavailability. There can be some mobility, but when a crude oil spills, they would prefer to be with the hydrocarbons they're bound with. Benzene, itself, is a -- present at -- it's less -- I want to say it's .15 percent in the -- in the most highest concentration. It has a maximum contaminant -- it's a drinking water standard of .005 parts per million, that's 5 parts per billion, but again it's -- it tends to be -- it is water soluble, but it tends to prefer to be in the crude oil and not -- it will solubilize into the water column over time, so it take a while.

Q. And you talked about this -- I am a layperson, so bear with me here -- this VTEX. It that --

A. BTEX, with a B.

Q. Oh, B?

A. Benzene, toluene, ethyl benzene, xylene.

Q. Okay. And that's actually what will move in the water, but the crude oil typically does not

move. Did I understand your --

A. The crude oil typically stays in one place, and it's these dissolved constituents -- and in reality, they've looked at crude oil and they try to solubilize these BTEX compounds, but really it's the benzene that we need to worry about.

Q. And the benzene, is that in the BTEX that --

A. That's the B part of BTEX.

Q. Okay. All right. So that is actually what moves in the groundwater?

A. Yes.

Q. And why is it that the crude oil does move in surface water flow but does not move in groundwater flow?

A. It's -- the crude oil tends to form a pool at the top of an aquifer. It's -- the groundwater -- I mean, if you think of the aquifer like this, it's going to go to the highest spot, it's going to float to the surface. So the crude oil stays in one place, and it's the dissolved constituents that get out and actually are mobilized by the groundwater.

Q. And why is it that it stays in one place? Because it's actually touching the top of the

aquifer; is that what you're saying?

A. Because it's floating.

Q. Okay. So it floats in the groundwater, and I would assume it floats in the surface water, as well.

A. Mm-hmm.

Q. So I guess I'm still a little unclear as to why it wouldn't move in the groundwater. It's floating in both circumstances, but you're saying it moves in the surface water but does not move in the groundwater.

A. Well, if you think of an aquifer, it's not usually -- you're going to have pores within the soil. So typically the oil is going to be confined by the soils and the materials around it, and it's going to be these dissolved constituents that have a lot more mobility that can get out and then move. The crude oil tends to adhere to those soils and things.

Q. Okay. And is it in every circumstance that the crude oil would not move in an aquifer?

A. It has limited mobility. Yeah.

Q. So it's more limited, but the crude oil could still move somewhat. It's just more restricted in the groundwater.

A. Yeah. I mean, again, crude oil is going to adhere to soil particles. It has a high affinity to soil. So now you're trying to get oil moving through the interstices of soil. It's hard for oil to move great distances that way.

Q. Now I've taken some time to review the DNV consulting report that you have in front of you. I believe it's marked as I1, and it states in there that the likelihood of a leak greater than 50 barrels anywhere along the line is essentially once in seven years. And so are you getting this once in every 42 years figure by just looking at North Dakota? This is actually looking at the entire line?

A. Yeah. If you look at my testimony, it said the chance of a spill along the entire pipeline is no more than once every 7 to 11 years. That's the entire length.

Q. And that's for a leak greater than 50 barrels. That's what we're talking about specifically?

A. That was what the estimates are based on, is they're trying to calculate it. So it's basically any size spill, but the analysis was based on a database that used 50 barrels or more,

again trying to be conservative.

Q. Okay. Now, I think I'm -- there's 42 gallons in a barrel; is that right?

A. Yes.

Q. Now these spills that this DNV consulting report, Exhibit I1, talks about, they've categorized them into three different kinds, small, medium and large, and these small leaks, I understand, are the most common; is that right?

A. Most spills are -- tend to be small, yes.

Q. And I believe it says 53.5 percent of the spills would be from small holes in this report. Would you agree with that?

A. That's their assessment. I don't know where you're looking at, but that's --

Q. I'm looking in the executive summary, first page, the fifth paragraph down.

A. Yeah. They're saying that 53 percent would be from small holes.

Q. Okay. And your opinion that you've given today is based in large part off of this risk assessment that DNV Consulting did; is that correct?

A. My assessment is based partially on that, plus all of my experience doing this in other

places, too.

Q. And these numbers in these charts in T22 are derived from this frequency volume study?

A. The frequency and -- yeah, the frequency numbers are based on the DNV assessment.

Q. Okay. What can you tell me about the draindown procedure that is discussed in the consulting report at I1?

A. I'll tell you what I know about it, but again, DNV did this report, they're the experts, but basically the draindown is how much -- based on terrain, how much of the oil would drain -- if a rupture -- or spill were to occur, how much volume would spill out based on terrain.

Q. Okay. So basically after the pipeline was shut down once a leak was detected, how much more would drain out of the pipe?

A. Yeah.

Q. Okay. And that wasn't accounted for in this report at all, was it?

A. I don't recall. I -- let me go back to the table of contents here.

MR. KELSCH: Are you referring to a certain portion of the exhibit?

JUDGE WAHL: Yeah. If you know that, Mr.

Delaney --

MR. DELANEY: I don't know. I don't know the portion. I'm asking.

JUDGE WAHL: All right. That's fair enough.

THE WITNESS: It's my belief, but I can't find it in here immediately, but I do believe they looked at draindown volumes, but I'm not seeing it, so I can't confirm or deny that.

Q. (MR. DELANEY CONTINUING) And this report talks about once a leak starts, there's four phases, leak detection, mainline shutdown, leak isolation, and stoppage of flow from the pipe, and it says "if possible." I'm referring to page three under Section 3.0, methodology. Can you tell me about some of the protections there are on this pipeline for detecting leaks?

A. I will defer all questions about leak detection to Brian Thomas.

Q. Okay. But you have reviewed this frequency volume study, too?

A. Yes.

Q. Okay. So are you -- you don't know anything about the SCADA system or whatever other cathodic protections are --

A. My expertise is with the environmental toxicology and risk assessment, the environmental consequences portion of it. They were the experts that did the analysis, and any questions about, again, the operations and leak detection capabilities would come from Mr. Brian Thomas.

Q. Would you agree with me that how much oil spills out of the pipeline, if there is indeed a leak, depends in large part upon detection and how soon the leak is detected and stopped?

A. I think that's fair to say. Again, I'm not going to be the expert in that, but, yes, to the best of my knowledge.

Q. So when you analyzed the potential risk to the environment, you basically took the volumes from this DNV report and just relied on their study. You didn't participate in this and you have no expertise when -- as to detection, the amount or volume of oil that could come out of the pipeline; is that correct?

A. I was involved with the production of this. We talked about it and how things would -- how this interacted with the environmental consequences, but as far as how they did the analysis, the actual methodology, that's DNV's

expertise. They're industry experts in this.

Q. Now, I believe there were four different things you talked about, surface transport, subsurface, ground transport, dry channel transport, and flowing channel transport. Did I cover them all there?

A. Subsurface transport, overland flow, which is just over without a channel, dry channel, and flowing water. Yes. Four channels.

Q. And I believe Mr. Koski was on the stand and I had asked him this: This western reroute by the Fordville aquifer, it goes across, I believe, 80 streams versus 29 where the route is currently sitting, and he said that a lot of these -- I'm sorry. The current route has 80 extremes. And he testified that a lot of these extremes are intermittent, most of them, and so they'd fall under this dry channel category, correct, if they're intermittent flowing extremes?

A. Intermittent means -- yeah, when they're not flowing, they fall under the dry channel scenario. When they would be flowing, they'd be than under the flowing stream scenario.

Q. Okay. In this flowing channel chart that you have here, T22, my understanding is you didn't

consider dry channels in this.

A. No. That's not quite right. We looked at all the channels that were available, and then we said if they were flowing at the time, we evaluated the risk associated with that, and that's -- those are on here, and then we said if they're not flowing, then they -- the risk wasn't added into it. There was no risk from them at that time.

Q. And what time was that that you actually -- when you say they weren't flowing at that time, what time are you talking about?

A. What we did for this analysis is we just said an intermittent stream flows 50 percent of the time. So half the time it's going to be flowing, half the time it would be a dry channel.

Q. Okay. So when you -- in this column here contributory pipeline segment, does that take into account all 80 channels or all 80 streams?

A. It accounts for all the channels that could contribute into the Fordville aquifer. It's not -- what Mr. Koski, I believe, was looking at was all the stream channels that would be crossed by that entire reroute. What this analysis looks at is any channels that could actually reach the Fordville. So it's -- you know, we're looking at

again that 12-mile -- 10-mile reach high, not that whole length of the reroute.

Q. And so the answer is no, it didn't consider all 80 streams that are crossed?

A. That's right. Because they don't lead to the Fordville aquifer.

Q. Okay. And how many of these streams do lead to the Fordville aquifer?

A. All the ones on here.

Q. Okay.

JUDGE WAHL: Referring to Exhibit --

THE WITNESS: Sorry. Reading to Exhibit T22.

Q. (MR. DELANEY CONTINUING) Okay. The losing stream reaches, if I understand your testimony correctly, that reach actually recharges the aquifer.

A. It contributes to the recharge. It contributes five percent or less to the recharge of the Fordville aquifer.

Q. Okay. Now I want to get back to the overland flow. These streams -- this contributory pipeline segment, this mileage that's calculated -- I'm referring again to T22. I believe you have a total there in the losing stream reach of 1.9

miles. Can you tell me a little bit about how you came to 1.9 miles?

A. We looked at the terrain around each of these stream crossings and then we looked at how far oil would move to get into these stream channels. So again, you'd have to have a large spill that would be capable of getting out of the trench, mobilizing across overland flow, and then reaching into that channel. So we're saying that this segment, this two-tenths of a mile for a small, little channel, is -- based on the terrain, that's how far the oil could get from the pipeline to this.

Q. Okay. So you did consider areas outside the banks of the channel when you --

A. Yes, we did.

Q. So you looked at the terrain and you took into account all of the topography and what distance the oil could potentially travel?

A. Correct.

Q. Would you agree with me that the western reroute -- I'm assuming you looked at it. Did you look at the western reroute?

A. I know about it broadly, yes.

Q. Okay. Would you agree with me that with

the western reroute, if it were used, there would be less of a chance of oil ever reaching the Fordville aquifer or any contaminants, for that matter?

A. There is -- if the western reroute was selected, there is an incremental change in the risk. You would have less probability of a spill reaching the Fordville aquifer. You still have some of the perennial reaches that would still reach it. You would decrease the risk slightly.

Q. Okay. So do you have any opinion at all as to whether or not these leaks would be detected within the amount of time you have on your chart in T22, where you have flowing channel and you have two hours, three hours, two-and-a-half hours. Do you have any opinion as to whether it would be detected?

A. Yeah. Well, basically again, a small leak is not going to be able to get out of the stream -- or get into the stream channel. It's going to have to be a sizeable spill. We're talking again thousands of barrels in order for it to get out of the pipeline trench, start mobilizing across the ground, get into the channel, and then again get downstream in sufficient volumes to cause any sort

of adverse effects downstream. That size of a spill would be capable of being detected. So it would again trigger the emergency response.

Q. Okay. What do you base your testimony on that it would be capable of being detected?

A. Based on discussions with our -- Brian Thomas with leak detection.

Q. So Brian's the one I should be talking to, though, about leak detection and response.

A. Correct.

Q. What do you consider a small spill? And I'd ask you to phrase it in terms of percent, percent of volume, if you could, coming out of the pipeline.

A. I would have a difficult time doing that. I think we quantified small spills based on frequencies of how it's distributed. Basically a small spill is usually 150 barrels or less. Thousands of barrels -- getting into thousands of barrels is a medium spill, and 10,000 barrels is a large spill, and the frequency of each of those events happening is asymptotic. It just drops down dramatically with each incremental size you go up.

Q. In reviewing the Exhibit I1 that I've given you, it states that spills under 1.5 percent

wouldn't be detected by the SCADA system that's in place and it would take up to potentially 90 days to detect a leak under one-and-a-half percent, and I can even -- I can refer you to the actual section within it. Referring to the chart on the bottom of page 19, my concern is you just testified that you don't need to worry about these small spills because they don't have the capability of getting into these channels, but when we're talking about 435,000 barrels of oil going through the pipeline every day and you're talking about one percent, that's seemingly a lot of oil to me. And so I'm just wondering what your basis is for saying that these small spills wouldn't result in contamination of these channels?

A. Well, I guess you'll have to -- in some respects you need to talk to Mr. Brian Thomas about leak detection, but in this analysis what they did is they used less than one-and-a-half percent not being detected in 90 days. I think Mr. Thomas will talk about it in more detail, but basically this was an extremely conservative assumption. To try to again estimate -- to put sideboards on the risk assessment, spills of less than 1.5 percent are going to be detected more quickly than 90 days, but

again, it's putting sideboards on the analysis.

Q. And what do you base that on, that they're going to be detected in less than 90 days?

A. I'll refer that to Brian Thomas.

Q. So you have no basis to testify to that?

A. It's my discussions with Brian Thomas.

Q. Okay. So that's Brian Thomas's opinion, not yours?

A. Right. It's his expertise. Yes.

Q. Are you aware of whether Keystone or anyone at Keystone has obtained a permit from the U.S. Department of Interior or the U.S. Fish & Wildlife under the Endangered Species Act?

A. No, I am not aware of that.

MR. DELANEY: I don't have any more questions.

JUDGE WAHL: Mr. Binek.

CROSS-EXAMINATION

BY MR. BINEK:

Q. I think that most of my questions are going to relate to leak detection. I guess the only question I would have would be regarding your testimony about the western reroute. You had indicated that if the western reroute was chosen, the risk would be decreased -- the risk of oil

reaching the Fordville aquifer would be decreased slightly. The western reroute moves the pipeline a considerable distance further away from the aquifer, so I guess I'm a little bit confused by this statement of slightly decreased. It would seem to me that moving it a considerable distance away from the aquifer would more than slightly decrease the chance of oil reaching the aquifer.

A. Risk is a function of -- part of what we look at is transit time. There's still the perennial stream reaches that I think still are crossed by the western alternative, so you still have routes. When we look at whether the oil could still reach downstream, it still has a potential to reach the aquifer. So when we're calculating the frequencies of a spill occurring and possibly getting downstream, that's what we're looking at. Certainly having the pipeline further away would allow longer time for emergency response personnel to get there, but again, regardless of whether the route is where it's at or if it's moved western, there wasn't really any way for the oil -- the contaminants within the oil to traverse the distance to get to those intakes. So we're kind of -- we're talking about an event reaching the

aquifer, but the chance of it actually affecting those wells was highly improbable. So regardless if you increase the distance or not, you're still not going to affect those groundwater wells.

Q. The groundwater wells in the aquifer, are these the only wells in that aquifer?

A. I don't think I can answer that for certain. Those are the public water wells that were identified.

Q. Okay. Like for water sources for municipalities?

A. Yes.

Q. But there may be private persons who have wells into the aquifer that aren't accounted for?

A. Yeah. I don't have that information for you.

MR. BINEK: Okay. That's all that I have.

JUDGE WAHL: Commissioners. Commissioner Cramer.

COMMISSIONER CRAMER: Thank you.

EXAMINATION

BY COMMISSIONER CRAMER:

Q. Ms. Tillquist, thanks. I don't have anything real specific. I think, like Mr. Binek, the information I'm most interested in is the

monitoring and we'll wait for that, but tapping into your experience apart from this report, are you familiar with how many miles of pipeline currently traverse North Dakota, for example, and how many spills there may have been over the course of the decades that North Dakota has had oil pipelines under the ground?

A. I know we've pulled up those numbers. I don't have them off the top of my head.

COMMISSIONER CRAMER: I would be interested in those perhaps as a late-filed exhibit if somebody has that.

JUDGE WAHL: Mr. Kelsch, assuming that information is available --

MR. KELSCH: T34.

JUDGE WAHL: -- it is T34.

MR. KELSCH: So it would be the number of pipeline miles and spills in --

COMMISSIONER CRAMER: North Dakota, the history.

COMMISSIONER WEFALD: How many years?

THE WITNESS: We can pull it up on the database.

COMMISSIONER CRAMER: As long as there have been oil wells.

JUDGE WAHL: Available data.

COMMISSIONER CRAMER: Available data, yeah. I would say that, you know, barrels per day would be relevant, as well, realizing that we are comparing some 6- and 8- and 10-inch pipelines to 30-inch.

Q. (COMMISSIONER CRAMER CONTINUING) Let me ask you this then, tapping into your experience, what's the worst oil spill with which you're familiar and what would be some environmental characteristics of that spill and consequences?

A. Well, now we're -- well, the worst one I can think of it would be the Valdez -- the Exxon Valdez, but now we're talking a marine environment and completely different scenario.

Q. I guess my question would be that would be similar to North Dakota.

A. Okay. So let me ask you the question again. What is the -- go ahead and ask me.

Q. What is the worst oil spill from a pipeline in continental United States with which you're familiar and the characteristics of it in terms of its environmental impact, cleanup opportunity and capacity and outcomes?

A. I can think of a few. There was the

Colonial oil spill. I'm just trying to think of the actual outcomes. I guess I'm not able to speak to that directly. I do know some of the spills that I've worked on. I'll talk about one that was a refined product, which would have, you know, probably 20 to 50 times the BTEX concentrations that we're talking about when this oil spilled and moved downstream. There was localized fish kills and there was water quality impacts at the immediate site, but when they looked downstream and we monitored that, there was -- the downstream -- we didn't see any exceedances of water quality criteria further downstream. We were concerned about people eating fish, so we took fish samples. What we found was there was initial intake of these compounds, but then they quickly dissipated. So the effects they can have with a spill tend to be localized based on the way it moves in the environment, and then, again depending on the situation, the effects can be pretty transient.

Q. Okay. Thanks. I just have one other question that's more out of curiosity as you've been talking. Do you consider bio fuels to be hydrocarbons?

A. Bio fuels being ethanol and --

Q. Yes.

A. No. They're not a -- no.

COMMISSIONER CRAMER: Thank you. I have nothing further.

JUDGE WAHL: Commissioner Wefald.

EXAMINATION

BY COMMISSIONER WEFALD:

Q. Ramona Klein of Oriska, North Dakota, at the public hearing was talking about how she had found on the TransCanada website the statistic 576 spills have occurred in the last five years, and so what were the size of those spills?

A. I'll defer that to Meera Kothari, who is with TransCanada, and can speak directly to those.

Q. All right. Thank you. And then I just would like to go through some of the different pages of the maps that were given to the Commission, just so that I can make sure that I have your expert input, not only on the Fordville aquifer but on the other aquifers that this appears to me to be crossing, as well. I looked on map 1 of 10, and it appears on map 1 that there are a number of public water system GPS points very close -- well, it's hard for me to say how far that is, but they're in proximity -- close proximity to

the pipeline, and there's also an aquifer -- a shallow aquifer that this is immediately traversing over that would connect to those public water system points. Can you speak to that? We've had a detailed explanation of the Fordville, but what about the one in the map 1 out of 10?

A. I'll answer that in two ways. First of all, we will be doing the same type of analysis that we've done at Fordville as this process evolves. We'll be going through and doing this for the entire route. The water intakes that are present on this aquifer are downstream. The green -- the thin, green line around the centerline is a half-mile buffer, so you can see that those intakes are a mile-and-a-half maybe away from the centerline. So again, the spill would have to occur in that very narrow band of that aquifer. Then it would have to be transported by again the dissolved constituents, the BTEX would have to get mobilized, and then get over to these intakes. It's unlikely to transfer that far, and again, if a spill occurred, there are obviously going to be -- they'll be cleaning it up and it will allow time for the intakes to be shut off, and they can do monitoring over time to make sure that it never

does get into those groundwater wells.

Q. Who is using those aquifers? Are you familiar with that since you have the people?

A. I would assume that that is associated with the City of Walhalla, but that's my assumption.

Q. Okay. So Walhalla. All right. And then on map 2 of 10, I also note that very close to the pipeline, even closer than on map 1, is this -- this isn't -- map 3, I believe, is the Fordville, so map 2 is very near and there's also a public water system. Whose public water system -- it looks to me like maybe less than a mile because it's right on -- it's a half a mile away. It's on the corridor -- it's on the corridor boundary.

A. I can't tell you whose groundwater well that would be. I would assume it's one of the communities in close proximity.

Q. All right. And you're going to be doing water analysis of that?

A. What we'll be doing is we'll be looking at risk along the entire pipeline and looking at transit times and coordinating with the emergency response teams and try and figure out if these can be affected.

Q. But you're not going to look specifically at this public water intake? It's just going to be a risk along the whole pipeline for each one of these?

A. Yeah. And again, Brian Thomas can speak to these, but when they did the detailed emergency response planning, they break the pipeline into very small segments and they look at risk and transport along all those segments. So, yes, that would be captured in one small segment.

Q. But that has not yet been done?

A. No. This is very early on in the process, and that would all be done before the --

Q. But I thought the pipeline is going to be started to be built next spring.

A. Yeah. And it would be part of the emergency response plan that will be coming out -- I'm not sure when that's coming out, but that would be part of that. So it would be done as part of that emergency response plan. It's not that far away.

Q. All right. And then on -- map 3 we've already covered in some detail, so I won't go over that one. Map 4 doesn't appear to have any public water systems or aquifers. Map 5 has a -- doesn't

appear to have any. It has a public water intake system near the top, number 1302.

A. Looks like that's associated with the Town of Sharon.

Q. Sharon. Okay.

A. I'm just flipping back and forth trying to pick out the closest town.

Q. All right. And then going to map 6, there is a public water system -- it looks like that's connected with the water -- I don't know -- that isn't connected with an aquifer, so that one is -- it's a little farther away. It's hard for me to evaluate because it's not connected with a shallow aquifer.

A. Yeah. That's -- I think that's a town -- associated with the Town of Sibley.

Q. But on that one it immediately flows over a shallow aquifer in that area, the --

A. Are we on map 6?

Q. Map 6. And then on --

A. Those intakes I do know are off the river. It's in a shallow aquifer, but it's --

Q. Mm-hmm. And map 7, those are somewhat more distant from the pipeline and don't appear to be connected -- those public water intake spots do

not -- there's one that connects with an aquifer, but it's off to the west.

A. Yeah. That's associated with Valley City.

Q. That's Valley City?

A. Mm-hmm.

Q. All right. And then on 8 there's a public -- there's two public water systems that are fairly near the pipeline. It's on map 8. Do you know which cities those are connected with?

A. This one might be associated -- again flipping between the maps -- might be associated with the Little Yellowstone Park. I'm not sure if that's a public intake as far as like a -- I'm not familiar -- is Little Yellowstone Park an actual park?

Q. It is.

A. Okay. So my guess is that's more of a -- you know, like the camping area may pull its water out of something like that, so that's considered transit --

Q. And then down to the south, is that maybe Fort Ransom? That's right in an aquifer that is near the pipeline, as well.

A. Again, probably -- I mean, it's still two-and-a-half miles maybe away from the thing. It

looks like that might be with Englevale.

Q. And the pipeline is on the other side of the watershed, but again that's another public water system. And then I don't believe there's any on -- lots of shallow aquifers that it's going over, but I didn't see public water systems that are immediately, you know, within the near area of those. So what you're telling us is the impact on those water systems has not yet been -- public water systems has not yet been done and studied in detail as this one has, Fordville. You've only picked the one.

A. Correct. We have not done a detailed analysis on all of those yet.

Q. And those may not be done until when? Just tell me again.

A. They would be done in conjunction with the emergency response plan, and I think they mentioned earlier when that was due, and I can't tell you offhand.

Q. Did the -- did the Health Department request that information prior to when this permit would be issued?

A. Request what information? I'm sorry.

Q. Did the Health Department request this

information prior to the permit being issued?

A. On Fordville?

Q. No. On these other water supplies, as well as Fordville?

A. I'm not aware of any requests that the public agency had made one way or the other. I can't speak to that.

Q. I'm looking on page five of the North Dakota State Health Department summary of what they've requested.

A. Page five of the application?

Q. Mm-hmm. They've only requested --

A. I don't have the same thing --

Q. -- information on hydrostatic testing and they have not requested anything on --

COMMISSIONER CLARK: Is it in the appendix?

COMMISSIONER WEFALD: I'm in the appendix, page five.

THE WITNESS: I'm sorry. Now you're asking about the Water Commission?

Q. (COMMISSIONER WEFALD CONTINUING) No. The State -- North Dakota State Health Department.

A. Oh, State Health Department, above it. Okay.

MR. KELSCH: You're on page five of where?

JUDGE WAHL: The appendix.

COMMISSIONER WEFALD: Of the appendix.

THE WITNESS: Again, I didn't have contact with them regarding that. They did call up requesting information on crude oil constituents and crude oil composition.

COMMISSIONER CLARK: I think it's under the route application, not the appendix. It's towards the back.

COMMISSIONER WEFALD: That's okay. I think that it looks to me like they requested water results from hydrostatic testing, which is different than what this testing would be --

THE WITNESS: Yes.

COMMISSIONER WEFALD: -- on impact on public water supply.

THE WITNESS: Yes.

COMMISSIONER WEFALD: Thank you for now. Thank you.

JUDGE WAHL: Commissioner Clark.

COMMISSIONER CLARK: Just a few questions.

EXAMINATION

BY COMMISSIONER CLARK:

Q. With regard to just a question on the

Bemidji site which you talked a little bit about. Although the vegetation is returned, is the land suitable for anything, I mean, as far as development? Could you plop a business down, residence, anything like that? I realize it appears to be mainly forest land, but --

A. It's a state forest, so it would be a little hard to develop it.

Q. In theory, though, could you develop it or would it be an area you'd want to avoid?

A. I don't think I have sufficient information to thoroughly address it. I certainly believe that the contamination such that it is is extremely localized. I don't have enough information to tell you whether you could build a house directly on the spray zone.

Q. Okay. Could you just describe the interaction you have had with, say, the Health Department?

A. Personally, myself, I was contacted by Jim Horner and he requested information on the composition of crude oil, what we were going to be transporting. So we talked about -- I sent him information that had been filed with the Department of State. So we talked about crude oil

composition. He wanted to know the BTEX concentrations, presence of other contaminants. We talked about the trace elements, things like that.

Q. Okay. And most of the issues that would arise because of the pipeline will be run through the Health Department; correct? The Water Commission, just so I understand, is primarily for any water that the pipeline, itself, may use, say in a pumping station or something like that. Are you --

A. You're getting beyond my expertise. I'm sorry.

Q. Okay. Have you had any interaction with the Water Commission then?

A. Not me personally, but certainly we could have. I'd have to defer to Scott Ellis or something.

Q. Yeah. And I'm just looking at the application. It appears that most of the issues would be with the Health Department. Just so I can clarify, when you talked about a shallow aquifer being less than 50 feet below the surface -- less than 50 feet, I think is what you said. Does that mean it's less than 50 feet below the surface, itself, or does that mean that -- I don't know --

that the reservoir itself is less than 50 feet? In coal mining we'd say the seam, but I don't think that's right.

A. My understanding is that means the depth to groundwater, so from the surface of the soil to the top of the aquifer would be less than 50 feet.

Q. Okay. Doesn't refer necessarily to the volume of the aquifer, itself.

A. Correct.

Q. In your analysis of the Fordville aquifer, how are downpour events figured in, significant rainfall, for example? I know we had one witness testify in Park River to, you know, every now and then you get a lot of rain at one time, maybe two, three inches, something like that. Is that figured into those calculations that you did as far as risk assessment, if a leak were to happen at the same time that a significant rainfall was happening?

A. I did not present those data, but we did look at that, and what it would do is it would accelerate the transit times. So it would -- the transit time instead of being four hours would be increased, the velocity would be -- of the stream would be increased, so the transit time would decrease.

Q. Does it increase the likelihood that some of the BTEX compounds or the cloud, I think you referred to, that that expands further than it would otherwise or is it mainly just a function of time?

A. It wouldn't accelerate -- I can't think of any reason it would accelerate the rate that the BTEX would come out. It could spread out the -- again, because you have longer transit time, so before emergency response got there, the oil could be spread over a larger area.

Q. Okay. Could you talk a little bit about the question -- I don't know if you were here -- that I had yesterday about prioritizing wetlands versus aquifers? Were you here for that question?

A. Yes, I was.

Q. I don't know if you need me to tee it up again or if you'd care to discuss it, but the idea being, I mean, sitting in our position if you're looking at a route that may take you a few miles further west and disturb a few more wetlands versus further east which puts you closer to an aquifer but according to your studies may be still far enough that you don't think it will affect the aquifer, I mean, how should we analyze and

prioritize that discussion?

A. I guess what I would say is that you're -- what you're doing is you're having to weigh and balance the chance of a spill event occurring and potentially if it could affect the Fordville aquifer versus these wetlands. To me as a risk assessor when I look at things, my job is to worry about resources, and when I sit there and I look at this, what I see is a known impact that will occur to these wetlands. You've got a longer surface disturbance, you're going to have these definite known impacts, and you're weighing and balancing that against the probability of an event occurring hypothetically -- you know, we're talking an event thousands of years on a conservative assumption, and then the chances of it actually getting to these public wells are, you know, highly improbable. So, again, you're weighing and balancing, and, you know, these are kind of valued decisions, but basically you have a hypothetical risk here versus a known impact over here.

Q. Is the wetland destroyed if it's gone through or -- and understanding that federal officials may have a different opinion of what constitutes a wetland than North Dakota farmers,

but once it's been reclaimed is it as functional as it was prior to that?

A. Yeah. Wetlands do tend to come back very well after construction. You will have additional surface disturbance just because of the length and all that, but, yeah, wetlands come back.

Q. So it's primarily the time during construction that would be the impact.

A. Yeah.

Q. We spent a lot of time talking about the aquifers. Will there be analysis done similar to this on the major waterways that are crossed, as well, Pembina and Sheyenne being the two that are crossed, and then potentially, I guess, Lake Ashtabula, which is part of the Sheyenne, but is a similar analysis like this planned for those --

A. Yes.

Q. -- where it gets close to those bodies?

A. Mm-hmm.

JUDGE WAHL: Your answer is yes?

THE WITNESS: Yes. Sorry. I'm nodding my head. Yes.

Q. (COMMISSIONER CLARK CONTINUING) But again, is that part of the emergency response or is that going to be part of -- the reason I ask, it

does seem odd to me to have it be part of an emergency response plan when it might be something that would be helpful for the Commission, itself, in siting the actual route. In the Fordville case we're talking about, okay, where do we put the line exactly and we've got the information, which is very helpful, but it appears we don't have that information in trying to make a route determination where it gets close to Sheyenne, Pembina, and Lake Ashtabula.

A. I guess one of the things -- we have done preliminary analyses along all of the pipeline. We've gone through and we've identified areas that are at higher risk than others. So we've done preliminary assessments. We have gone through and we've done -- we've looked at some of these areas. We have looked at Sheyenne and Lake -- Sheyenne River and Lake Ashtabula in more detail already. Pembina River we have not done in detail at this time, but it would be -- we've done this level of analysis and now we're going to be talking about a more detailed analysis.

Q. When you say you've got more -- somewhat greater level of analysis on Ashtabula and the Sheyenne crossing, is it to the detail of T22?

A. Yes.

Q. It is. Could that be made available to the Commission so that we can?

MR. KELSCH: We have an exhibit, if you'd like to -- we could enter that in.

COMMISSIONER WEFALD: Yes.

THE WITNESS: Do you want me to talk through it?

COMMISSIONER CLARK: Yeah. I think that would be helpful for those areas.

MR. KELSCH: I guess I would -- Todd, if you could give the witness Exhibits T22 and T23.

MR. KRANDA: 23 and 24.

MR. KELSCH: Excuse me. 23 and 24. I apologize.

JUDGE WAHL: Before we begin that, Commissioner Clark, I think we should recess for about ten minutes.

COMMISSIONER CLARK: That's a good idea.

JUDGE WAHL: Let's return at ten minutes to 11, please.

(Recess taken.)

JUDGE WAHL: We're back on the record. Mr. Kelsch, I wonder if it would be helpful to proceed with some questions and answers for

Commissioner Clark. You can -- if the witness can address it directly, that's acceptable, but to the extent it would be helpful with questions and answers, you should proceed.

MR. KELSCH: Okay. Thank you, Your Honor.

FURTHER DIRECT EXAMINATION

BY MR. KELSCH:

Q. Ms. Tillquist, you have in front of you two exhibits. They've been marked as Exhibits T23 and T24. Is this the -- I guess a similar analysis that you did to the Fordville aquifer for the Sheyenne River and Lake Ashtabula area?

A. Yes, it is.

Q. And this -- sort of generally, did you do the same sort of analysis of the subsurface transport and dry channel transport and flowing streams as you did in the Fordville area?

A. Yes, I did.

Q. And then the Exhibit T24, is that the table that you prepared similar to the one for the Fordville area?

A. Correct.

Q. Perhaps that may be the -- what would be the best way for you to explain that? Just to go immediately to the table or do you need to talk

about the transport matters, as well?

A. Give me a second to think about that.

Q. Okay.

A. Let's talk to the table and see where we go here.

Q. I'll have you put T24 up.

A. So again, we did the same type of a risk assessment for the Sheyenne River and Lake Ashtabula as we did for the Fordville.

Q. And perhaps I can ask a question. Would the subsurface -- would a leak reach the Sheyenne River or the Lake Ashtabula either by subsurface or overland transport?

A. Subsurface transport is not a viable route because it's over two-and-a-half miles away. Overland flow, the terrain until you actually get into the stream channel is actually very flat in the area. So, again, overland flow across this flat area isn't going to happen at the distances we're looking at. So, again, it's not a viable exposure route.

Q. How about the dry stream channels?

A. It's going to be similar to the Fordville analysis. When those stream channels are dry, the oil will not be transported significant distances,

and with the exception of one little intermittent stream, which is right at the Sheyenne River, all the other intermittent extremes are at least 1.6 miles away. So they would not -- in those cases they would not reach the Sheyenne River. For our analysis to be conservative, we did assume that that one stream that's right adjacent to the Sheyenne River could reach the river, just given its distance.

Q. What -- I guess what's the maximum occurrence or intervals and years that a spill might reach the river?

A. So taken in total, there's 12 intermittent channels and the Sheyenne River crossing itself. These are spread out over 70 miles. A lot of these channels are, I guess -- so 11 are intermittent. The overall pipe that could contribute to reaching the river is 2.8 miles leading to a total -- in total a risk of no more -- a spill reaching there no more than one spill in 5400 years.

Q. Do you need to explain anything on the maps, Exhibit -- excuse me, Exhibit T23? Perhaps you could -- since they are, I guess, exhibits, maybe we could put them up and you could generally describe them?

A. Yeah. I'm looking -- in general we're going to have the same type of analysis as Fordville. The only thing that I would add, I guess, on this is that there is a line outlined in red -- sorry, I'm hitting the back of your head. That is -- basically it forms a terrace. If a spill occurred up in this area, there's basically a little drainage out of this area. Basically, again, we had our hydrologist look at these stream channels that drain the area, and again, it's only the blue channels that we're going to look at as far as viable transport channels to get a spill down to the river. So that's that map. Go to the next one. There's three on that. There's -- I'll step through these here. There's a few channels here, just south of Sibley on the other side of Lake Ashtabula. The next one, this is going past Valley City. There's no viable channels there. The next map, right there is the actual crossing of the Sheyenne River, as well as there's a little, tiny intermittent stream that we go across. So again, we considered that to be getting there regardless. And then there is these channels right here. So again, we talked about the chance of a spill.

Q. Did you come up with any -- or after analyses what is the chance of adverse effects to public groundwater wells in the Sheyenne River?

A. We did look at -- we looked at groundwater wells. Let's go back to the first -- one more. There we go. There's wells -- intake wells, groundwater wells like this one here associated near Cooperstown, and we did look at the chance of if a spill occurred and it came downstream, again, would it be -- would it affect these groundwater wells? Our conclusion is basically just for the same reasons we talked about in detail with Fordville, that these groundwater wells are not going to be impacted. It's improbable that these groundwater wells -- the water quality of those wells would be impacted.

Q. Did you come up with a conclusion for the route in the Sheyenne River/Lake Ashtabula area as far as risk of a hypothetical spill to the Sheyenne River or Lake Ashtabula?

A. Could you rephrase your question? I'm not sure what you're asking.

Q. I guess did you come up with a conclusion concerning the risk to the Sheyenne River and Lake Ashtabula?

A. Yes. So based on the terrain of the area, there's only a limited number of areas where a spill could actually occur and get down to the Sheyenne River, itself. We talked about the spill probability estimated to be no more than once every 5400 years and then the -- so then the chance of adverse effects to these wells are -- is low.

Q. And on the map it does have the elevation. Did you --

A. Yeah. We did calculate the -- and I'm not seeing that in my notes here. Hang on. Basically I will say that from the pipeline, as you can see, all the way to the river, you can see there's a lot of contour lines right when it reaches the river, so it drops off there, but the intervening terrace is -- the slope there is zero. It's really flat. So again, overland transport or any of those other things, the oil would disperse laterally and pool in any sort of depression, but it's not going to flow downhill and reach the Sheyenne River, so it really has to be in these channels.

Q. And so the total risk on your chart on T24 again would be like once every 5400 years for all the potential areas?

A. That includes all of the channels that

could potentially reach the Sheyenne River, Lake Ashtabula.

Q. Now in the top of that chart it talks about maximum occurrence interval, years, any size spill. Is that -- I think your testimony in the Fordville area was that it would have to be quite a large spill, thousands or maybe 10,000s of barrels. Is this frequency taking into account that, I guess, likelihood of a large spill or is it just looking at any spill?

A. Again, we're trying to be conservative, so what we did was this is any size spill. So if -- what would need to happen again is a spill of thousands of barrels would need to occur. So now we're -- if you look at these frequencies, if you wanted to make your risk assessment more refined, now you would take the probability of a large spill occurring, so, you know, we're talking a few percent. So, you know, two percent times these numbers, you know, roughly add two zeroes and, you know, now we're talking nine million years, if I did my math in my head right. So now we are looking at the probability of a large spill getting into the channel and getting there. So again, it just -- the frequencies start multiplying against

themselves and just start getting bigger and bigger and bigger.

Q. So in this area, the Lake Ashtabula and the Sheyenne area, it would have to be a large spill, as well?

A. Yes.

MR. KELSCH: Okay. I don't have any other questions on that. I hope I've addressed it.

JUDGE WAHL: Mr. Delaney, why don't you cross-examine now specifically with regard to Ms. Tillquist's testimony concerning the McVille Aquifer.

MR. KELSCH: Your Honor, I would offer Exhibits T23 and T24.

JUDGE WAHL: Mr. Delaney, with regard to --

MR. DELANEY: I have no objection.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No objection.

JUDGE WAHL: Exhibits T23 and T24 are admitted. All right. Mr. Delaney, your cross-examination.

FURTHER CROSS-EXAMINATION

BY MR. DELANEY:

Q. Do you have a study, Ms. Tillquist, that

identifies the amount of oil that would be needed to actually reach the Sheyenne River or the Lake Ashtabula or the Fordville aquifer in these risk assessments you did?

A. The volume is based on professional experience as far as how much volume would be needed to get out of the trench and then be transported overland to get to the stream channel, itself. That's going to -- again, we're looking at soil adherence and vegetation adherence, so you're losing volume as you go, and then you've got to get it transported downstream in sufficient volumes to cause impacts. So again, we're looking at thousands of barrels.

Q. When you say "get out of the trench," you're referring to the pipeline trench?

A. The pipeline trench.

Q. Are these all of the risk assessments that you've done, the detailed risk assessments then, the Sheyenne River, Lake Ashtabula, and the Fordville aquifer?

A. For North Dakota to date, yes.

Q. Okay. So if I'm reading this correctly, out of the roughly 218 miles of pipeline in North Dakota, you've done a detailed risk assessment for

8.1 miles?

A. We've done a risk assessment along two of the highest consequence areas.

Q. And the high consequence to --

A. No, not high consequence areas as the DOT defined, but as a -- you know, from our public interest standpoint, this is what the Commission wanted to hear about.

Q. And as I'm sure you know, this pipeline is going to impact a number of private landowners and they have private wells on their property, and certainly they may consider their well a high risk, as well. Have you done any analysis on whether or not their private wells will be or localized groundwater will be impacted by a leak?

A. We have not looked at private wells per se.

Q. Okay. So you haven't looked at the possible contamination of localized groundwater along the pipeline, either?

A. We have not done a detailed assessment of that, other than what we've talked about today about how far the BTEX would move, and so we'd have to look at that in relationship to where those wells would be.

Q. Have you looked at the location of private wells along the line?

A. Not to my knowledge.

Q. So all of these wells that are identified on the maps submitted to the PSC just identify large public water wells or public water supplies?

A. That is correct.

Q. But they don't take into account any private water supplies along the line?

A. That is correct.

MR. DELANEY: Your Honor, do you want -- I had a couple follow-up questions about these pictures.

JUDGE WAHL: No. Let's just wait. Let's focus towards Commissioner Clark on this additional testimony. Anything further, Mr. Delaney?

MR. DELANEY: No, not on those exhibits.

JUDGE WAHL: Mr. Binek?

MR. BINEK: Yeah, I have one question.

FURTHER CROSS-EXAMINATION

BY MR. BINEK:

Q. Commissioner Wefald mentioned earlier the leaks or spills that have occurred on the TransCanada pipeline system over a period of years -- I think it was five years, I'm not sure.

It was 500-some spills, is my recollection. Do you know with regard to those spills what was the maximum occurrence interval of spills on pipelines where those particular spills occurred? Were they similar to the estimates for this pipeline?

A. I won't go into detail because I'll let Meera Kothari spoke to that, but I do know those spills were not only pipeline spills, but they were equipment spills. So if a truck was leaking oil from a gasket, that was considered a spill. So a lot of these 500 spills are incorporated into that. I believe that the -- now I'm speaking off memory here -- but I believe it was like one spill was actually on a pipeline, and again, I'll have to let Meera speak to that. So these are not -- these weren't pipeline spills necessarily. This was any spill associated with any TransCanada equipment. So it's really not a pipeline spill record.

Q. Okay. So you're saying that over this -- with a five-year period, there's only one actual pipeline spill or pipeline leak?

A. I'll let Meera Kothari speak exactly to the actual number because I don't want to get the wrong number in the record, but the majority of the spills are all from the construction equipment.

Q. But getting back to the question I had, are the maximum occurrence intervals on the pipeline where this one spill occurred or however many spills occurred, were the maximum occurrence intervals similar to what you've estimated for this pipeline?

A. If you're asking is the spill frequency associated with that spill record, -- is that pipeline frequency the same, I don't -- I guess what I would answer is that it's not a pipeline -- a crude oil pipeline that leaked, I believe. I don't think there was -- again, I'm not going to speak to it. I don't believe Keystone -- or TransCanada at this time owns a crude oil pipeline. So those would be other vehicle instances, and I'm not sure if the spill was natural gas or what. I'm not sure. This is beyond my expertise. I'm sorry.

Q. All right. So you can't answer my question.

A. It's Meera Kothari's.

MR. BINEK: Okay. Thank you. I have nothing further.

JUDGE WAHL: Commissioner Clark, back to you, I think, is where we left off.

CONTINUED EXAMINATION

BY COMMISSIONER CLARK:

Q. Just a couple of questions. On the T24 exhibit, explain the statistics behind why there wouldn't be a difference in the maximum occurrence interval with each of those scenarios, for example, a five-point -- understanding that the flowing channels are a little different on each one. But let's take two that are the same, the 6.4 mile distance and a 5.6 mile distance with a similar flowing channel, why wouldn't there be a difference in the maximum occurrence interval?

A. The occurrence interval has to do with the length of pipe that could affect that stream channel. So in each case we're looking at two-tenths of a mile. The column you were looking at is the distance it would have to travel downstream. So the spill frequency is independent of the event.

Q. Okay. It's not to be interpreted that -- okay. You don't combine the two and say it's more likely to reach the stream, do you?

A. (Shakes head.)

JUDGE WAHL: Your answer is no?

THE WITNESS: No. Sorry. Thank you.

Q. (COMMISSIONER CLARK CONTINUING) What role does the relatively heavy viscosity of the oil itself play in these calculations?

A. In these calculations none. We have not done anything to incorporate the viscosity of the oil into this assessment. It would affect how fast and how far the oil would penetrate into the soils, but we have not -- none of the numbers that are sitting in front of you are impacted by that.

Q. Why would that be? Just from a -- sitting as a layman you would think, gosh, you know, a stream that's 1.6 miles distance to the Sheyenne or Lake Ashtabula, if you put something that's relatively fast flowing in there, why would it -- why wouldn't it be more likely to reach it than something that's really heavy, sort of molasses-like?

A. I guess a risk assessment we can make it as simple or as complicated as we want, and what we're trying to do is trying to convey some information in a conservative fashion for everybody to evaluate. Certainly, I mean, we could have looked at the viscosity and transport times that way, we could have looked at evaporation rates of the crude oil. You can become more and more

complicated trying to get, you know -- you know, narrow down your analysis. It becomes harder to explain, and, you know, you're adding a bunch of information that's -- it's making the -- we're trying to use conservative assumptions for the analysis.

COMMISSIONER CLARK: Okay. That's all I've got.

JUDGE WAHL: Any further questions from the Commissioners?

COMMISSIONER WEFALD: No.

JUDGE WAHL: Commissioner Cramer.

FURTHER EXAMINATION

BY COMMISSIONER CRAMER:

Q. And you might not be the right person to ask this, but perhaps you can tell me who is. Going along the lines of what Commissioner Clark just asked you about, one of the things I've noticed that is not evidenced is the oil itself, and this oil, it's my understanding, is different, but what I'd like to know, if you know, is after it's all processed and all the things are done to it before it gets on the pipeline and then, you know, moved along the pipeline, what is the viscosity relative to, say, sweet crude oil from,

you know, northwestern North Dakota, something like that, which I think, although I realize it would complicate the formula for risk assessment, is quite relevant in terms of our understanding of its likelihood of flowing downhill, to make it real simple.

A. I will let Brian Thomas talk about the viscosity of the oil.

COMMISSIONER CRAMER: All right. Thank you.

JUDGE WAHL: Anything further? Mr. Kelsch, followup now generally with regarding Ms. Tillquist's testimony.

MR. KELSCH: Thank you, Your Honor.

REDIRECT EXAMINATION

BY MR. KELSCH:

Q. Ms. Tillquist, I guess just one, I guess, follow-up question to Commissioner Clark's question on the viscosity of the oil. As I understand it, so the thicker the oil it would take longer perhaps to get there than you've estimated on your charts; is that a fair statement?

A. We're assuming that it was moving as fast as the water was. So a thicker oil, if it moves more slowly, would not be going as fast as what

we're suggesting here.

Q. Okay. The -- there were some questions by Mr. Delaney concerning -- I guess it was Exhibit I1, some work that was done by DNV. Is it common in your professional experience for a company like Keystone or yourself to rely on experts such as DNV and their research?

A. Yeah. It's very common to bring in experts to do this type of analysis.

Q. Is DNV a recognized expert in the area of preparing frequency and volume studies?

A. Yes, they are.

Q. Do federal agencies commonly rely on risk assessments based on frequency, volume studies prepared by experts such as DNV?

A. Yes.

Q. Now, in the -- in response to some questions regarding the Fordville aquifer and I guess there's been some talk about the western reroute, is it fair to call that a reroute?

A. The reroute -- the western alternative is simply a concept at this point. It's not been refined into an actual route.

Q. What goes into actually making something a route or what would the -- if you know, what would

the company have to do?

A. They would have to look at -- you know, basically going back to Mr. Koski's testimony, they're going to be looking at constraints and opportunities in trying to route the pipeline as opportunistically as they can, you know, trying to look at stream crossings and how they cross that stream and road crossings and overrides and things like that. So there's a lot of work that has to go in to refine a preliminary conceptual route into the actual route, itself.

Q. There was a question concerning if the route would be moved to the west to this route concept, what -- would it affect the ability or -- of the crude oil to get into the Fordville aquifer, and there was some talk about -- I think you've mentioned incremental effect. Can you define that or can you at least describe your opinion concerning the overall impact on the aquifer of the current route versus this route concept to the west?

A. It would again incrementally increase, but we're talking about an event that's highly improbable to begin with. We're talking about increasing transit times. So it would make an

improbable event slightly less improbable, but again, the route where it's at is safe. It doesn't pose a significant threat to the Fordville aquifer, so moving it's not going to significantly change your overall assessment.

Q. Would -- so it would make it more improbable if you moved it or slightly more improbable or is that a fair -- I don't mean to put words in your mouth.

A. It would -- again, it would -- it would incrementally -- it would be a very small, small increment of a change that, again, it's -- you're not significantly affecting the pipe. It's safe where it is. If you move it, it's not significantly safer. It's still safe.

Q. Is it -- there's been some questions concerning placing the pipeline over top of an aquifer or crossing rivers. Do pipelines cross aquifers and rivers?

A. Yeah. Quite a bit, yes. It's routinely done.

Q. Okay. Now, you got into some discussion about -- and I think you referenced as part of the emergency response plan that when they cross some of these areas, the company will be factoring that

into play. Is that a common process in pipeline routes and, I guess, the whole process of the pipeline?

A. Yes, that is. It's part of this kind of evolving process of evaluating the emergency response. So, yeah, this is the way it's done.

Q. So then you would look at, well, what are the risks to this and then Mr. Thomas, I guess, would look at, well, what do we need to do to protect these resources?

A. Yes. So we kind of work in tandem. We'll be looking at the risk to it and then we'll work in tandem with him and try to kind of optimize where emergency response will occur and how quickly it will get there.

Q. Before it gets to that more on a global scale, do you look at, I guess, the overall general risks when you're actually routing the pipeline?

A. Yeah. It's when we do our initial -- even our conceptual route at the very beginning where, again Mr. Koski was talking, we look at constraints and places of opportunity. So we try to avoid these constraint areas when possible but still meeting the project objectives, and so as we progress from concept to route refinement and we go

further and further along, we're accounting for that the entire process.

Q. And I guess just perhaps to summarize, in both the -- and maybe you can refer to the exhibits. I think you still probably have them in front of you. The Fordville one first, what is the chance of a spill in that area over -- a spill occurrence, I guess I should say.

A. The maximum spill occurrence interval that we calculated -- again for any size spill, we calculated that it was no more than once every 3200 years.

Q. And that's combining the two -- the gaining reach and the losing reach?

A. That is correct.

Q. So if you're looking at just what -- the gaining reach has no -- would have no impact on the reservoir?

A. Correct.

Q. So that the --

A. So just in the losing reach the risk would be once every 8300 years.

Q. And then again, I think your testimony was that that would be any type of a size spill, not just the --

A. Correct.

Q. -- not just a large spill that could potentially get there.

A. That is correct.

Q. And then, of course, you've got the other factors of viscosity of oil and other things that will make that number less than that.

A. You would then factor in a large size spill and multiply that by another factor of hundred and viscosity of oil, so there are a number of factors that would increase that level.

Q. Looking in your position as an expert in risk assessment, are these risks that we've talked about here in the Fordville and as you've talked about in the Sheyenne and Ashtabula area, are those in -- or in constructing pipelines are those acceptable risks or acceptable minimal risks?

A. Those are considered -- based on my experience, those risks are low and would be quite acceptable for, you know -- say if this was a BLM pipeline, they would be going, yeah, this is an acceptable risk and off we go.

Q. BLM would be?

A. I'm sorry. Bureau of Land Management.

MR. KELSCH: Okay. Thank you. I have no

further questions.

JUDGE WAHL: Mr. Delaney, followup?

MR. DELANEY: Yes.

RECROSS-EXAMINATION

BY MR. DELANEY:

Q. On T22 and T24, the last column, it says "maximum occurrence interval." Why is the word "maximum" there? Where isn't it just occurrence interval or minimal occurrence interval?

A. A maximum occurrence interval -- the way it's phrased, it's the maximum number of times it would occur within that time period. So we're looking at no more than once in 90,000 years.

Q. Okay.

A. A minimum occurrence interval would be zero.

Q. On these pictures -- I wanted to follow up on some of these pictures of the Bemidji spill. I think it's T20. When were these pictures taken in relationship to when the spill occurred?

A. The spill occurred in 1979. The pictures were taken July 30th of this year.

Q. And so what type of -- for this spill, since you -- you're relatively familiar with the spill, are you not?

A. I've been there, I spoke with the GS.

Q. What type of remediation was done in this area? Was there excavation, dirt taken out? Can you describe the remediation process?

A. Yeah. What they did is they stripped the topsoil. That topsoil was taken away and burned. There was no topsoil put on the site except again for that wetland area. There has been based on discussions with the USGS, Geoff Delin, the lead researcher, said there's been no active remediation on the soils and vegetation. As far as -- well, yeah. So --

Q. Okay. At the other public hearings or during the public comment there was a number of concerns about water contamination. It was a big concern for people, and with these private wells located along the route, if there were contamination of the groundwater, which I understand you didn't specifically assess, what would be -- what type of remediation would have to occur then?

A. I'll defer remediation activities to Brian Thomas.

Q. Okay. Are you aware of any mandates or regulations that dictate how far a pipeline needs

to be away from a well, a private well?

A. I'm not sure -- I'm not sure of any regulations. I can't speak to that.

Q. Okay. So as far as you know, there could be a well within 200 feet of the pipeline?

A. I don't have the expertise to answer your question.

Q. I believe you had testified you don't know where private wells are located along the route. That's correct?

A. I believe there's databases to look at that. I personally did not look at that.

Q. You didn't look at that?

A. No.

MR. DELANEY: Okay. I think that's all I have.

JUDGE WAHL: Mr. Binek?

MR. BINEK: I have no questions.

JUDGE WAHL: Any further questions from the Commission?

COMMISSIONER WEFALD: I have a question. How many more witnesses do we have and --

JUDGE WAHL: I can't answer that. Mr. Kelsch.

MR. KELSCH: I have Meera Kothari and

Brian Thomas and then a short recall of Mr. Cowling to answer the question about where the pipeline is coming into the state.

COMMISSIONER WEFALD: What I'm concerned about is, is there still one witness for the intervenors?

JUDGE WAHL: I don't know that.

MR. DELANEY: I've got two people here under subpoena, both from the North Dakota Department of Health. I'm not sure until I get at least one of them up on the stand whether all of my questions will be answered. I understand there's different duties between these two individuals, and I don't know exactly what was done.

COMMISSIONER WEFALD: I just wondered, since the Commission has been dealing with these water issues, whether it might be helpful to have one of those witnesses taken out of order and so that we could ensure that we have adequate time for the intervenors' witness.

JUDGE WAHL: I'm reluctant to do that. I don't generally like to take witnesses out of order.

COMMISSIONER WEFALD: So what will happen if we get to five o'clock and they haven't had a

chance to have their witnesses on? We go till ten o'clock then?

JUDGE WAHL: Keep going. Unless we want to continue tomorrow, but my plan is to finish today.

MR. KELSCH: And I believe that Ms. Tillquist is the longest witness we have.

MR. DELANEY: I didn't have any more questions.

JUDGE WAHL: No further questions from the Commission?

COMMISSIONER WEFALD: No, no.

JUDGE WAHL: Mr. Kelsch.

MR. KELSCH: I would call Meera Kothari to the stand.

JUDGE WAHL: Ms. Kothari, as you have heard me advise previous witnesses, your testimony is required to be under oath and I'm required by law to advise you regarding perjury before administering the oath. Perjury is a false statement of material fact which you do not believe to be true, in other words, generally speaking, a lie. In North Dakota perjury is a Class C felony punishable by a fine up to $5,000, imprisonment for a period of up to 5 years, or both.

(Witness sworn.)

JUDGE WAHL: Mr. Kelsch.

MR. KELSCH: Thank you, Your Honor.

MEERA KOTHARI,

having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELSCH:

Q. Ms. Kothari, could you please state your name for the record?

A. Meera Kothari.

Q. And what is your position with Keystone?

A. I'm a professional engineer with TransCanada, and my primary responsibilities with Keystone are the pipeline design and the integrity management for the project.

Q. Could you please describe your experience with pipelines?

A. My experience is over ten years in the oil and gas industry, six of which primarily focus on the design, construction technologies, and integrity management of liquid natural gas pipelines in North and South America.

Q. Ms. Kothari, I'm showing you what's been marked as T25. Please try to speak up and into the

microphone so everybody can hear you. I'm showing you what's been marked as T25. Could you tell the Commission what that document is?

A. This is my resume.

MR. KELSCH: Okay. I would move to admit T25.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: No objection.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No objection.

JUDGE WAHL: Exhibit T25 is received.

Q. (MR. KELSCH CONTINUING) Ms. Kothari, does Keystone's application comply with the PSC guidelines for corridor compatibility?

A. Yes.

Q. What is the first section of the corridor permit application that you are responsible for?

A. I'm responsible for Section D.2.d.i, location and design. Specifically ensuring the pipeline is designed, constructed, and operated in accordance with the Department of Transportation Pipeline and Hazardous Material Safety Administration regulation at 49 CFR 195, and the American Society of Mechanical Engineer Standard B-31.4, Pipeline Transportation Systems of Liquid

Hydrocarbons.

Q. What is the second section of the corridor permit application that you are responsible for?

A. I'm also responsible for Section D.2.c.ii.6, selection criteria, human health and safety, specifically ensuring the pipeline is designed, constructed, and operated in accordance with 49 CFR 195, and the development of the pipeline integrity management plan.

Q. What sections of the route permit application are you responsible for?

A. I am responsible for Section B.2, specifically the use of technologies of pipeline materials and construction techniques.

Q. Do you adopt these portions of the applications that you're responsible for as your testimony today?

A. Yes, I do.

Q. At the public hearing and today and yesterday there have been some questions about a TransCanada website that reported that there were 576 spills in the last six years. Can you explain the context of the -- that posted spill information?

A. Yes. The TransCanada website is our

corporate social responsibility website. TransCanada reports and posts all spills, as well as any environmental noncompliance events, as part of this social responsibility report that is posted on the website. TransCanada sets industry-leading targets that provide a focus to monitor and improve our programs and continually improve the performance of the company.

As part of this effort TransCanada tracks any spill of any size or type, any near spill even though they are cleaned up with no net impact to the environment. We include things such as third-party spills affecting TransCanada property or work for TransCanada. Most of these spills are of a nature that they do not require to be reported to federal regulators.

Q. Can you tell me specifically about the 576 spills that were posted on this website?

A. Yes. First of all, the reporting requirement here in the United States is five barrels that would constitute a reportable spill. So with that in mind, nearly 80 percent of the reported spills were due to construction equipment related leaks of hydraulic oil, lube oil, glycol, and fuels typically of low volume, less than 1.3

gallons. Most importantly, none of these 576 spills represented an operational pipeline leak.

The internal incident management process at TransCanada defines several different categories of spills. A minor spill is a spill or release onsite that poses no adverse effect to the environment or impact neither to a water body nor groundwater. The spill may or may not be reportable to a regulatory agency.

A serious spill is a spill or release onsite or offsite of the right-of-way that poses an adverse effect to the environment but no impact to a water body nor to groundwater but reportable to a regulatory agency.

A major spill is a spill or release onsite or offsite of the right-of-way that poses an adverse effect to the environment, including an impact to a water body or to groundwater and reportable to a regulatory agency.

And, lastly, a critical spill is an emergency response where containment or cleanup is required. It is a spill that is onsite or offsite of the right-of-way that poses an adverse effect to the environment, including impact to water body or groundwater, and reportable to a regulatory agency

invoking the emergency response procedure.

Now under this spill classification guide I'll categorize the 576 spills. 523 of these spills were classified as minor according to the definition for minor.

Q. What time period did these spills take place?

A. This is the six years between 2000 and 2005. 28 were classified as serious, four spills were classified as major, and in all four major spills less than 20 gallons of total was spilled during that event, and one spill was classified as critical where 100 gallons was spilled.

Q. Okay. And the four major spills, just so it's clear, the total of all four spills was 20 gallons?

A. That's right.

Q. Were there any near misses?

A. Yes. Our reporting criteria also captures near spills, which are spills that could have occurred but didn't.

Q. So included in that 576 --

A. There were 20 that were classified as near spills.

Q. Also, there was some testimony at the

public hearing concerning some 183 noncompliance events that were on this social responsibility website. Could you explain what those are and what that entails?

A. Sure. The noncompliance environmental reports were typically administrative in nature or self-reporting on noncompliance with TransCanada procedures during construction activities. None of these noncompliance reports resulted in any danger to the pipeline integrity or substantive pipeline operations problems.

Q. Okay. Has TransCanada Keystone adopted safeguards and measures to protect against threats to the integrity of the Keystone Pipeline?

A. Yes. Keystone conducted a pipeline threat analysis as part of the requirements for the NEPA process. Using pipeline industry published lists under ASME B31.8.f and the Pipeline Hazardous Materials and Safety Administration guidelines we determined applicable threats to the Keystone Pipeline and then developed safeguards as part of the design, construction, and operations to protect against these potential threats.

Q. What are the potential threats to the pipeline?

A. So in no order in particular, manufacturing defects, which are flaws in the seam of the pipe created during the pipe manufacturing process; construction damage, which are flaws such as dents, cracks, nicks in the coating, which are the result of transport or construction; corrosion, which could be the broad category, and the two categories underneath are the internal and external corrosion that are defects that develop over time during the operations of the pipeline; mechanical damage, which is contact with the pipeline; and hydraulic event, which is an overpressure of the pipeline.

Q. What safeguards have been developed and put in place by Keystone specifically for this pipeline to mitigate manufacturing defects?

A. For manufacturing defects we have several safeguards in place. TransCanada qualifies all the mills in which the pipe is procured from. In addition to the qualification of the mills, we also qualify the steel manufacturers to which the mills obtain the steel to make the pipe. These mills and steel suppliers are qualified using a formal qualification process that is consistent with the ISO standards. In addition, we have third-party

surveillance placed at the mills to ensure that the mills are carrying out the documented procedures that they use to fabricate the pipe.

Q. What is an ISO standard?

A. It's an industry and an international standard to which quality control is managed in the pipeline industry. Secondly, the pipe is engineered with stringent chemistry for compounds such as carbon equivalents, and what this does is it ensures weldability of the pipeline during construction. Each batch of pipe that is produced is mechanically tested to prove its strength, fracture control, and fracture propagation property. The pipe in the mill is hydrostatically tested again to ensure that any seam defects fail during the hydrostatic test in the mill. The pipe seams are additionally inspected using ultrasonic instruments and also inspected visually and through manual instruments, as well. Each piece of pipe is traceable and has documentation to support its origin, what time frame it was produced in, which production schedule it came from.

In addition, when we apply the coating in the mill, the coating plant also has the same quality control procedures as the mill, and so we

do have third-party surveillance at the coating plants, as well. The coating is visually examined for any damage prior to shipping, and our specifications are followed by the mill; otherwise the pipe is rejected.

Q. Okay. Are there certain tolerances for roundness and wall thickness?

A. Yes. Our specifications at TransCanada do monitor for out of rhymeness and nominal wall thickness. This is also in accordance with the API standards, American Petroleum Institute standards for steel fabrication.

Q. What safeguards are put in place by Keystone specifically for the pipeline to guard against construction damage?

A. So as mentioned before, construction damage consists of dents, cracks, and nicks in the coating which are a result of transport and construction. Keystone will follow the guidelines of API 5.L and 5.L.W., which are the transportation guidelines for overland and barging over water. For the construction damage, itself, in terms of safeguards, the pipeline is examined selectively once offloaded from railcars to the stockpile using the ultrasonic techniques. So this is to ensure

that no damage has been sustained to the seam welds during transportation. The pipe welds, which are joined in the field, either through a manual or an automated process are non-destructively inspected. 100 percent of the girth weld is inspected during this particular procedure.

The coating is repaired prior to lowering into the ditch. We use a device that will indicate where there is a defect in the coating and that defect is patched up prior to lowering into the ditch. The pipeline is once again hydrostatically tested once placed into the ditch to ensure that no girth welds or seam welds have developed any sort of cracking as a result of the welding process. Any pipe that is failed under that hydrostatically-tested procedure is removed and replaced with new pipe, and the pipeline is once again re-hydrostatically tested.

And, lastly, to check for dents and ovalities in the pipeline once all the construction has taken place, we run an in-line inspection tool called a caliper tool which basically checks the pipeline from the inside to determine if it has any dents or ovalities.

Q. Is that often referred to as a caliper

pig?

A. Yes, that's right.

Q. What safeguards are in place for the Keystone Pipeline to mitigate corrosion damage?

A. So there's two categories of corrosion, internal and external corrosion. To mitigate the external corrosion the pipeline is coated with a corrosion protection coating called fusion bond epoxy. This is a two-part coating which is powder and liquid that is fused to the pipeline at the coating plant. In addition to the fusion bond epoxy, the pipeline has a cathodic protection system which is installed during construction of the pipeline. This cathodic protection system impresses current onto the pipeline to protect it from any corrosion in the event that any coating is damaged and not able to be repaired or missed during the repair process during construction.

On the internal corrosion mitigation side Keystone in its rules and regulations has a tariff with respect to the amount of solid and water that is acceptable in the crude, itself. Our tariff is .5 percent. Typical industry standards are one percent for the solid and water tariff.

Secondly, the Keystone Pipeline is

designed to transport the crude in turbulent flow. So what this means is we ensure that the crude is moving at a velocity to which water dropout is minimal, so there is no stagnant water remaining in the pipeline. If, however, we -- we believe that there could be some stagnant water in the pipeline, we also use cleaning tools during the life of the pipeline and periodically inspect the pipeline to push out any standing water that would remain trapped at low points in the pipeline.

And, lastly, to mitigate both against internal and external corrosion we use smart tools, which are in-line inspection tools outfitted with sensors that can detect metal loss both on the internal and the external wall. These metal loss tools are run periodically as per code requirements and the data is analyzed, and specific locations where we believe that there may be an issue with the integrity of the pipeline, we'd go out and excavate and repair.

Q. What is TransCanada's experience with the pipe coating and corrosion protections that are going to be used in the Keystone Pipeline project?

A. So the fusion bond epoxy coating that I spoke of earlier, TransCanada pioneered this

coating. The coating has been in operation for over 28 years now, and through in-line inspection and verification digs there's been no evidence of corrosion integrity concerns. Since 1980 since the implementation of this coating there have been no leaks on this type of pipeline using the fusion bond epoxy coating system coupled with the cathodic protection.

Q. And perhaps you mentioned it, but have there been occasions where you have dug up and looked at the pipe to determine if there was corrosion?

A. Yes. That's how we determine the performance of the coating. Over the 28 years that we have had this coating installed in the ground, we have done various in-line inspections on these pipelines and gone out to correlate the tool reported feature to what's actually in the ground and been able to determine through field validation that there's no corrosion occurring at those locations.

Q. Now is that something that you -- the company plans to do on the Keystone Pipeline here, too, is periodically go out and dig and check to see how the coating is working?

A. That's right. Keystone as part of its integrity management program has slated an in-line inspection with a smart tool to be performed within three years of operation. Following the three years of operation, Keystone would perform in-line inspections as per the 49 CFR 195 code requirements.

Q. What safeguards are in place specifically for this pipeline to mitigate mechanical damage?

A. So mechanical damage is contact with the pipeline, and this contact could result of first-party excavation, TransCanada performing maintenance activities, or it could be a third-party activity with an external utility or another third party coming in contact with our pipeline. There are several safeguards against mechanical damage. First of all, the steel is a high-strength carbon steel that is engineered with puncture resistance. Second, our pipeline is to be buried at four feet, which drastically reduces the likelihood of contact with the pipeline.

In addition, during the operations phase of the pipeline, TransCanada Keystone will be conducting air control as per code requirements, which is 26 times a year, not to exceed three

weeks. So these flyovers will be patrolling and monitoring for third-party activity. If evidence is found of third-party activity, historically we perform a forensic-type analysis in terms of being able to determine what type of excavator could have contacted the pipe. If warranted, we would go out and excavate if there was suspicion that there was some contact with the pipeline.

We also participate in the state One-Call program. Our marker signs all carry the 811 number with respect to One-Call, and as part of our public awareness program in accordance with RP 11-62, which is the API recommended practice for public awareness, Keystone will have an integrated public awareness program that will annually and over the course of the pipeline contact key stakeholders on the pipeline, such as landowners, emergency response personnel, local governments and other agencies to continually update and make those stakeholders aware of the pipeline's existence.

Q. You mentioned signs. Those signs are placed along the pipeline route?

A. That's right. We are required to place marker signs along the pipeline. Typically at road crossings and in other areas where there are a

potential for high activity, markers signs are placed at closer intervals.

Q. What safeguards are in place specifically for the Keystone Pipeline to mitigate against hydraulic damage?

A. There's two safeguards that are in place for the overpressure protection of the pipeline, and that is the SCADA system, the supervisory control acquisition and data system, which control the valves and it also brings back pressure, temperature, and other data into the control center. The second is operator training, and Mr. Thomas can speak more to control center and operators, but as part of a protection for a hydraulic event, all operators are trained.

Q. Is there an automatic shutoff if the pressure would get up to the maximum level?

A. That's right. That's part of the control systems of the pipeline, and Mr. Thomas can speak more to that.

Q. There has been a question -- I think you were here -- a question regarding valve designs. Mr. Cowling indicated that you were the person to talk to about the valves on the system and the design of the valves. What mainline valves and

other check valves are proposed for the Keystone Pipeline through North Dakota?

A. In North Dakota we have 13 mainline valves of which ten are automated and three are manual. In addition, there are four check valves along the length of the pipeline in North Dakota. All pipeline valves will be installed below ground and have stem extensions and hand wheels aboveground. Valves will be placed in accessible locations close to roads to minimize placements in fields where practicable. As I mentioned before, SCADA equipment will be installed at the automatic valve sites to relay pressure and temperature data, as well as the position of the valve, and to be able to close the valve from a remote location.

The check valves basically prevent backflow in the event of a loss of pressure in the pipeline. So there is a detection mechanism with the check valve that would have it closed in the event of a pressure loss. These check valves are installed downstream of river crossings in locations where the rivers are 100 feet wide at the high water mark in accordance with 49 CFR 195, and also TransCanada installs these valves in other areas that require additional protection.

Q. Are you aware, is there a check valve in the area of the Fordville aquifer area? And perhaps I could show you Exhibit T21 and we could perhaps even put that up. Is there a check valve in this area, and if so, where is it on the -- I guess you could reference the milepost marker.

A. Sure. So the check valve in the area of the Fordville aquifer, I believe as Ms. Tillquist had mentioned before, there were two divisions, a losing stream reach and a gaining stream reach, and the check valve is placed just upstream of the losing stream reach, and I believe that's milepost -- in and around milepost 49 or so.

Q. Thank you. You may continue.

A. So the mainline valve spacing in the placement, as I mentioned before, as per code we are required to place valves at major river crossings and also areas where we feel we require additional protection of those sensitive areas. Mainline valves are also placed at each pump station. Automated valves are also placed, depending on elevation profile, at certain areas, as well, and the check valves are used. So I've got some examples in North Dakota where we've got with respect to specific sensitive areas if you'd

like me to --

Q. Yeah. What are those?

A. Sure. So with respect to the major rivers it would be the Pembina, the Tongue, the Sheyenne, and the Lone Tree Lake where we have the upstream valves that are automated and the downstream check valves in those locations.

We mentioned the Lankin Fordville aquifer yeah. There's an additional aquifer that was identified as part of the assessment in Sargent County, and that aquifer, as well, has an automated valve placed in near proximity to that.

Lastly, we also place valves for operational purposes. In the event that we want to do maintenance on the pipeline, it's more practical and flexible to have smaller sections of pipe. So between the third -- second and the third pump station we have an additional automated valve to further shorten that section of pipe from an operational perspective.

Q. And the purpose of these valves and manual valves, check valves, block valves, would be to if they're -- in the event of a leak would be to limit the amount of --

A. That's right.

Q. -- of crude that would escape?

A. Yeah. The check valve closes virtually instantaneously at a detection of a pressure loss. The automated block valves would close within three minutes of an emergency shutdown.

MR. KELSCH: I have no further questions, Your Honor.

JUDGE WAHL: Let's recess for lunch.

(Noon recess taken.)

JUDGE WAHL: Mr. Kelsch, you're ready?

MR. KELSCH: I've finished my questions.

JUDGE WAHL: I understand.

MR. KELSCH: Excuse me. I'm sorry. Yes.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: Yes.

JUDGE WAHL: Mr. Binek has advised me that he may be a little late and has authorized me to proceed without him. Ms. Kothari, your testimony continues under oath and subject to penalties of perjury, of course.

THE WITNESS: Yes.

JUDGE WAHL: Mr. Delaney.

CROSS-EXAMINATION

BY MR. DELANEY:

Q. Good afternoon, Ms. Kothari. Am I

pronouncing that right, Kothari?

A. Yeah.

Q. How many miles of pipeline is Keystone currently operating?

A. Keystone?

Q. The TransCanada Keystone Company, the one that's putting in the Keystone project?

A. We currently operate no miles of pipeline.

Q. Okay. So these 576 spills, did that -- that took into account no operational pipeline?

A. The 576 spills over the six years represents the number of spills attributed to TransCanada Pipeline, the company, so that takes into account our power business and our natural gas pipeline business.

Q. Okay. So does TransCanada currently operate any natural gas pipelines?

A. Yes. TransCanada Pipeline operates 36,500 miles of natural gas pipeline.

Q. Okay. And do they operate any crude oil pipelines?

A. Currently we do not operate any crude oil pipelines.

Q. And those 576 leaks was just dealing with crude oil leaks, is that correct, or did that also

take into account natural gas?

A. No. The 576 spills only takes into account spills as a result of construction-related equipment or any leaks that occurred at any of our power facilities.

Q. Okay. So you don't have any statistics -- well, obviously you don't have any statistics on crude oil pipeline leaks operated by TransCanada because that information just isn't available because TransCanada has never operated a crude oil pipeline?

A. That's not entirely true. As Mr. Cowling pointed out in yesterday's testimony, TransCanada owned and operated two crude oil pipelines in the 1990s, the OCENSA Pipeline and the Express/Platte Pipeline.

Q. Okay. And that was in the 1990s, you said?

A. That's right.

Q. Do you know for exactly what time periods those were operated?

A. I don't have that information with me.

Q. Do you have any information as to leaks in those particular pipelines during the periods of operation under TransCanada?

A. I have information with respect to the Express/Platte Pipeline with respect to pipeline leaks. I do not have any information on the OCENSA Pipeline.

Q. And what information do you have on the Express Pipeline?

A. The Platte Pipeline had one failure in 1996 related to a corrosion cause at station piping in Salisbury, Missouri, and that information is filed with the Department of Transportation.

Q. And that was a reported -- a reportable leak?

A. That's right.

Q. You talked about the difference between a reportable leak and a non-reportable leak. And what's the threshold for that, for something to be reportable?

A. The threshold just changed recently to five barrels. It was previously 50 barrels.

Q. And so in 1996 was it 50 barrels?

A. I believe so.

Q. Okay. Do you have any information regarding leaks less than 50 barrels during the operation of that particular pipeline?

A. No. I just have the information that is

available on the Pipeline Materials and Hazardous Safety Administration website.

Q. How many -- did TransCanada build those pipelines?

A. TransCanada was part-owner in a joint venture to build the Express Pipeline and to subsequently upgrade the Platte Pipeline to deliver volumes from the Express Pipeline.

Q. Okay. Were those pipelines built in the same manner that the current project will be built in?

A. I suppose so. I wasn't involved in that project.

Q. Okay. In this one pipe failure that occurred in 1996, how many barrels did actually leak in that failure?

A. I don't have that information with me.

Q. Okay. I don't know if you have it up there on the witness stand, but Exhibit I1 was the DNV Consulting report.

A. No, I don't have it up here.

Q. You don't. And I know I've been told to talk to Brian Andrews about this report and I intend to do so, but the reason I want to ask you a question about it is because on the second page of

that exhibit you'll see client reference, and it has your name, Meera Kothari.

A. That's right.

Q. Why is your name on this report?

A. I was the engineer who made contact with DNV to commission the report.

Q. Okay. So you were the contact person at TransCanada --

A. That's right.

Q. -- for this report. So you would have been responsible for giving DNV all the needed information to put together this report?

A. That's right.

Q. Okay. So DNV had all of the information regarding mitigation efforts, cathodic protection, the SCADA system, the size of pipe, those types of things?

A. For the design at the time the report was performed.

Q. Okay. Was there anything that they don't have that you think would modify their findings in any way?

A. The risk assessment process is a constant evolution, and as the pipeline design evolves into detail design things can be refined, so --

Q. How familiar are you with this report? Have you taken some time to review it?

A. Yes.

Q. Okay. Now I understand corrosion is the most frequent type of leak; is that accurate?

A. Corrosion is one of the most frequent based on the DOT statistical database.

Q. And I guess I'm referring specifically to this report. According to this, what is the most common type of cause?

A. So this report took into account statistical information from the DOT database, so that would include statistical failures on corrosion, third-party damage, and whatever else pipeline companies would report into the Department of Transportation as causes to pipeline failures.

Q. Okay. So just very simply, what is the most common type of cause for pipeline failures?

A. Third-party damage.

Q. Third-party damage. And then what's the next type?

A. Corrosion.

Q. Corrosion. And I think this report touches on it, but when there's third-party damage, typically you're able to respond and identify the

leak fairly quickly because a person will call when they see damage occur and they see oil leaking.

A. Typically.

Q. But for corrosion, it's a different story because it's -- that takes some time to identify; would that be a fair statement?

A. Through the appropriate inspection methods you would be able to detect corrosion initiation very early on.

Q. What are those methods?

A. So as I stated previously, corrosion can be detected through in-line inspection technology, and that's where we run internal inspection tools in the pipeline to measure the wall thickness of the pipeline.

Q. Okay. Is that that intelligent pigging that you do?

A. That's right.

Q. And I believe this report says you do that once every three years.

A. I'm not sure that the report states the frequency.

Q. Do you know how often Keystone plans to do this -- this internal inspection?

A. Yes. As stated, the first inspection will

take place within the first three years of operation and the subsequent inspections as per DOT regulations.

Q. And what do the DOT regulations say about internal inspection?

A. Once every five years. So the first inspection would be performed in year three and the subsequent inspection in year five.

Q. So, yes, certainly this internal detection would be able to detect some corrosion, but you're only doing this every few years, every couple years at best.

A. That's not entirely true. So at TransCanada we perform the in-line inspection and then we take the inspection data and apply growth rate modeling as per industry research, industry standards, and our own experience with corrosion and apply growth rates to those corrosion defects identified by the tool and then create a maintenance program annually to mitigate proactively any corrosion defects that are surpassing a safety threshold.

Q. Okay. And explain to me exactly how this internal inspection that will occur once every three years or once every five years will allow you

to detect a small leak after the small leak occurs?

A. The inspection -- that's not the purpose of this.

Q. It's sort of, I suppose, a preemptive attempt to mitigate any corrosion that's started, is the purpose of this internal inspection?

A. This is a tool in the suite of tools that pipeline companies use to manage the integrity of their pipelines.

Q. Okay. And so if a small leak were to occur in the pipeline, what is going to allow Keystone to detect this?

A. Any leak detection questions should be addressed by Brian Thomas.

Q. Okay. Are you familiar with the SCADA system that's going to be used?

A. Generally.

Q. Generally. Okay. Is there -- are there leaks small enough that they will go undetected by the SCADA system?

A. Again, the details would have to go to Brian.

Q. Okay. Were you involved in any of the permitting processes?

A. Just from a technical perspective.

Q. What permitting processes were you involved in?

A. So preparation of any technical specification-related data for the application.

Q. Oh, for this application?

A. That's right.

Q. Okay. I see in this DNV report that leaks can be caused by vehicle impact, and I'm referring to page four. It's got a list of different factors, and there's sudden vehicle impact, and it's possible that if there's a very large transport vehicle I suspect going over the line, there's a potential that there would be some impact.

A. So this specific threat is related to an aboveground system, so a vehicle impact for aboveground facilities.

Q. And there are no aboveground facilities in this pipeline?

A. The aboveground facilities would constitute the pump stations.

Q. The pump stations?

A. Yes, and the valves.

Q. And those will be fenced off, I presume?

A. Fenced off, that's right.

Q. A lot of the land that this pipeline is going through is agricultural land, and if it's going to be buried four feet and people are running very heavy tractors and agricultural equipment over it and maybe sometimes even when it's wet out, is there a risk there of impacting the pipeline with heavy farm equipment, and I guess would maybe even weather play a role, too, if it was operated when the ground was moist?

A. So normal farming practices would not impact the pipeline. The pipeline is designed inherently to manage any sort of stresses with equipment crossing over the pipeline.

Q. So is it your testimony that you can't harm or impact the pipeline through farming practices?

A. There would be a very low likelihood if there were some extenuating circumstance.

Q. Such as?

A. You know, if a piece of equipment could potentially get stuck. There has been instances in the past where we've had equipment contact the pipe, but that's been very rare circumstance.

Q. Okay. And in those circumstances was there actually oil leaking from the pipe?

A. No.

Q. No. Okay. If oil were to leak from the pipe because of farm equipment or equipment contact with it, who's responsible for the damage?

A. Keystone is responsible for the damage.

Q. Okay. So you can't fathom any type of circumstance where somebody would be out there tending to their field where a farmer would be held responsible?

MR. KELSCH: Your Honor, I would object. I think this is getting into a legal area. Certainly it's beyond the scope of any direct examination. I'm not sure this witness is the person to answer --

JUDGE WAHL: Mr. Delaney, I'm more inclined to suggest it's speculative at best. The objection is sustained.

MR. DELANEY: I think all the other questions I have deal with leak detection, so I have no more questions for you.

JUDGE WAHL: Mr. Binek.

MR. BINEK: I think I just have one question.

JUDGE WAHL: Every time a lawyer says that, it's a lie. Lawyers shouldn't say that. Go

ahead, Mr. Binek.

MR. BINEK: I said "I think."

COMMISSIONER CRAMER: One at a time.

COMMISSIONER CLARK: Commissioners can but never lawyers.

CROSS-EXAMINATION

BY MR. BINEK:

Q. You commented earlier about the closing of the automatic valves and you said that they automatically close when there's a pressure loss. What kind of a pressure loss triggers the closure of these valves -- of the check valves or any valve for that matter?

A. So there would have to be a threshold set forth with respect to the control philosophy in terms of being able to have that check valve close. Again, you'd have to speak with Brian with respect to the control philosophies.

MR. BINEK: I have no further questions.

JUDGE WAHL: You do, but you're not going to ask it. Commissioners. Commissioner Cramer.

EXAMINATION

BY COMMISSIONER CRAMER:

Q. Do check valves ever malfunction?

A. They have been known to malfunction, but

in all the years of operation with the TransCanada system there hasn't been any malfunction of check valves.

Q. I hate to beat this to death, but every time I think it's clear it becomes more confusing. Back to your website, just so that I understand -- and I've looked at it many times and it was offered as an exhibit, I think maybe a late-filed exhibit, but if I am a -- if I'm a third-party vendor operating my North Dakota manufactured Bobcat out on a TransCanada pipeline and I have a hydraulic hose break and a gallon of fluid spills on the ground, that gets put on your website as a leak?

A. If you were working for us as part of a maintenance activity, yes, it would be a third-party incident.

Q. Is this a normal reporting technique for pipelines or for construction companies in general?

A. No. It's part of our own internal reporting criteria because we belong to some sustainability indexes. Again, it's part of our corporate responsibility that we've taken it upon ourselves to report and have full disclosure with respect to leaks.

Q. Okay. This is a -- maybe an opinion

question, but do you think that that kind of reporting on a website tends to alarm people more than it does to give them assurances? Is that possible?

A. It's possible, but again, I'm not in charge of the corporate responsibilities.

COMMISSIONER CRAMER: I understand. I have nothing else. Thanks.

JUDGE WAHL: Commissioner Wefald.

EXAMINATION

BY COMMISSIONER WEFALD:

Q. Where is the monitoring done for the pipeline section that is in North Dakota? Where are the people who are going to be watching the computers?

A. The control center is located in Calgary, Canada.

COMMISSIONER WEFALD: Calgary. All right. And then I'm going to ask for a late-filed exhibit, and that has to do with -- today I went to lunch to a picnic given by the Bismarck Convention & Visitors Bureau, and I sat with Merle Paaverud and I sat with a woman who works with the North Dakota Parks & Recreation, and I just visited that we were having the pipeline hearing today, and the woman

from North Dakota Parks & Recreation in our short conversation said that she had sent five letters regarding concerns and issues they had with the crossing of the Pembina River, and I realize that we haven't seen those -- the Commission hasn't had a chance to see those. So I would like to ask for a late-filed exhibit that would include all correspondence with state agencies that are on the list 69-06-01-05 and 69-06-04-01, Section 3, be submitted to the Commission.

JUDGE WAHL: 69-06-01-05 and 69-06-04.1?

COMMISSIONER WEFALD: I think it's dash-01 again, Section 3.

JUDGE WAHL: 01.3.

COMMISSIONER WEFALD: And that would be all state agencies. I'm -- I think there's federal agencies listed on there, as well. I'll let them work out their issues through the Federal Government, but the state agencies I'd like to know -- have a copy of correspondence so we can review concerns.

JUDGE WAHL: T35 for the record, Mr. Kelsch.

MR. KELSCH: Okay. Thank you, Your Honor.

JUDGE WAHL: Anything further,

Commissioner Wefald?

COMMISSIONER WEFALD: No. Thank you.

JUDGE WAHL: Any further questions from the Commission? Commissioner Clark.

COMMISSIONER CLARK: Yeah, very briefly.

EXAMINATION

BY COMMISSIONER CLARK:

Q. The flyover that you had mentioned that takes place -- it sounds like about once every two weeks, something like that -- is that in perpetuity or is it just during the start-up phase?

A. It's for the life of the pipeline. It's part of the operations.

Q. Okay. And is it the whole pipeline route that's aerially inspected?

A. That's right.

Q. What type of plane does that, do you know, by any chance? I mean, and at what altitude?

A. You can either use a helicopter or a fixed-wing, small aircraft.

Q. So it's at a fairly low --

A. Yeah. You have to be able to see the right-of-way and pick up on any issues.

Q. Just a quick question about -- you'd mentioned one of the valves that's approximately at

mile marker 49 on T21 --

A. That's right.

Q. -- that exhibit. Could you lead me through -- why would it be installed right about in that area as opposed to a little further north of there?

A. And so this is the general vicinity of where it would be located. The final placement is not set. There still needs to be a field verification that it's placed in the appropriate location whereby it would be preventing backflow in the event of a failure within this vicinity. So the area has been marked as requiring some additional protection using a check valve.

Q. Okay. And so the check valve is just to protect against this backflow that you have talked about?

A. That's right.

Q. Okay. That makes sense. Are there other valves that -- where it would be stopped to prevent -- I don't know -- whatever the opposite of backflow is -- the forward progress of the oil itself.

A. Yeah.

Q. How close to that particular aquifer would

that be installed?

A. It would basically be the block valves, and those would be located -- I don't seem to have that page with me -- essentially on the upstream location of the river, so as we mentioned the Pembina and the Sheyenne River, the Tongue River, Long Lake, and in addition there is, I believe, one between pump station number two and pump station number three.

Q. Would it make any sense to install one of those right near the losing portion of that aquifer?

A. We can certainly look into that.

Q. I mean, I don't know if it is or not.

A. I haven't had a chance to look in detail with respect to the analysis that Ms. Tillquist presented, but if it makes sense in terms of limiting a spill volume, then an engineer assessment could be performed to determine that.

Q. And I don't know if this is a question that's properly directed at you or not. If not, defer it, but in your studies of the engineering of the transmission of oil, where do pipelines rank as far as kind of the safety of transporting a product like this via other mechanisms, which I suppose

would be what, rail --

A. Truck.

Q. -- and truck?

A. It's the safest method of transporting crude oil. To transport something like 435,000 barrels you need about 7,000 trucks coming across wherever to transport that oil, so --

Q. And it would be similar for tankers, rail tankers?

A. I'm not sure specifically the number, but it's certainly a significant more amount of infrastructure required.

COMMISSIONER CLARK: Okay. Thanks. That's all I have.

JUDGE WAHL: Anything further from the Commission? Followup, Mr. Kelsch?

COMMISSIONER CRAMER: Tom's microphone is unplugged.

MR. KELSCH: Thank you. I have no further questions.

JUDGE WAHL: Mr. Delaney, followup?

MR. DELANEY: I have no further questions.

JUDGE WAHL: Mr. Binek?

MR. BINEK: I have no questions.

JUDGE WAHL: All right. Thank you very

much. Mr. Kelsch, when you're ready.

MR. KELSCH: Yes. I would call Brian Thomas to the stand.

JUDGE WAHL: Mr. Thomas, as you have heard me advise previous witnesses, your testimony is required to be under oath and I'm required by law to advise you regarding perjury before administering the oath. Perjury is a false statement of material fact which you do not believe to be true, in other words, generally speaking, a lie. In North Dakota perjury is a Class C felony punishable by a fine up to $5,000, imprisonment for a period of up to 5 years, or both.

(Witness sworn.)

JUDGE WAHL: Mr. Kelsch.

BRIAN THOMAS,

having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELSCH:

Q. Mr. Thomas, could you state your name and position with Keystone for the record?

A. My name is Brian Thomas. I'm a registered professional engineer in the Province of Alberta. My position with Keystone is coordinator of oil

movements, and I have approximately 27 years of experience in the technical operations and management areas of pipeline and facilities development. I'm the president of BRIWEST Energy, and I'm currently engaged in providing consulting services to Keystone.

Q. What is your area of responsibility with respect to the Keystone project?

A. My responsibilities for the Keystone project include the areas of oil movements and operations. More specifically, oil movements includes the operations control center, the associated systems, along with the scheduling and the oil accounting functions. In the area of operations I'm responsible for the development or further development of Keystone's emergency response plan.

Q. Mr. Thomas, I think you have in front of you Exhibit T26. Could you tell the Commission what that document is?

A. This is a copy of my personal resume.

MR. KELSCH: I would move to admit T26.

MR. DELANEY: No objection.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No objection.

JUDGE WAHL: Exhibit T26 is received.

Q. (MR. KELSCH CONTINUING) Mr. Thomas, is it your understanding that Keystone's application is complete and compliant with the PSC guidelines for corridor compatibility?

A. Yes, it is.

Q. What areas of the application for Keystone for the corridor compatibility are you responsible for?

A. Section D.2.c.ii.6, which is the selection criteria associated with the impact on human health and safety. I'm responsible for the portion of this section that addresses the U.S. Department of Transportation pipeline and safety regulations, including the requirement to develop an emergency response plan.

Q. What sections of the route permit application are you responsible for?

A. Two sections, the first being Section B.2, which addresses the effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects. Along with Keystone witness, Meera Kothari, I'm responsible for the portion of this section which addresses Keystone's use of proven

technologies designed to minimize adverse environmental impacts and the U.S. Department of Transportation pipeline safety regulations.

Q. What is the second section that you're responsible for in the permit application?

A. The second section is Section B.11, which addresses the federal agencies consulted to identify issues. I'm responsible for the portion of this section that addresses Keystone's consultation with the U.S. Department of Transportation and the requirements under 49 CFR part 194 to develop an emergency response or a spill response plan.

Q. Mr. Thomas, do you adopt these portions of the applications that you've indicated that you're responsible for as part of your testimony today?

A. Yes, I do.

Q. Concerning the leak detection system -- I guess before we get into specifically detection thresholds, could you briefly describe Keystone's, I guess, system to remotely monitor and control its pipeline?

A. Yes, I can. Keystone will utilize what we call a SCADA system. SCADA stands for supervisory control and data acquisition. And the SCADA system

is basically comprised of three components, the first being the equipment that's installed at pump stations and valve sites. That equipment, of course, needs to speak to the host system in the remote control center in Calgary. So the communication link is the other piece; and then the third and final piece is the host system that's installed at the operations control center in Calgary that allows the operator to remotely control and operate the pipeline.

Keystone intends to design the host systems in Calgary as a fully redundant system. So there will be one operating system while the other is a hot standby and can be utilized in the event there's any trouble with that primary system. Within this host system there are automatic systems which basically ensure that the line cannot be overpressured at any point.

There are also similar protective features with the local systems that are installed at the pump stations to ensure that in the event there's a communication failure, the local equipment will take over and ensure the line cannot be overpressured at any point, as well.

Q. Mr. Thomas, there have been a number of

comments at the public hearings and at these hearings this week that questioned Keystone's ability to detect leaks. Can you advise the Commission about Keystone's ability to detect leaks?

A. Yes. Keystone will have a number of what I call complementary leak detection systems available within the operations control center. The operations control center is, of course, manned on a 7-day-a-week, 24-hour-a-day basis, and these systems are overlapping in nature. The first system is really the operators monitoring the system. They're monitoring the pressure information that's coming back from these remote locations, the flow information that's coming back from these locations, and they're typically capable of detecting leaks very rapidly down to a level of approximately 25 to 30 percent of the pipeline flow rate.

Next we will utilize what I'll call a software-based system. Really what this is is a volume-balanced system, so there's an application that will be looking at the volume that's injected into the pipeline and likewise the volume that is being delivered out of the pipeline and basically

compare the two. This system is somewhat rudimentary, I'll say, in comparison to the next system, but it is capable of detecting leaks down to a limit of about five percent.

The next system is a sophisticated transient model that we refer to as our computational pipeline monitoring system or it's a model-based system. The way this system works is that it breaks the pipeline into smaller segments that are bounded by flow measurement equipment and it does really the same calculation, looks at the volume into the segment, the volume leaving the segment, and looks for any discrepancies, and it does this on a rapid -- you know, on a seconds basis, so to speak, and it adds up any discrepancies and then at a certain point it would trigger an alarm. In this case this system will be capable of detecting a leak down to about one-and-a-half to two percent of the pipeline flow.

The final system that is used to detect leaks is direct observation, and that would include the aerial patrols that have been mentioned, ground patrols, public and landowner awareness programs that are designed, of course, to encourage and facilitate the reporting of leaks and other events

that may suggest a threat of integrity to the pipeline -- an integrity threat.

Q. Now, Mr. Thomas, at the hearings in July there were some public members who testified about Keystone not being able to detect a leak of one-and-a-half percent or perhaps two percent for a period of 90 days and then multiplying that one-and-a-half or two percent times the total barrels per day and times 90 days and coming up with some large potential numbers and hundreds of thousands of barrels, maybe millions of gallons of a leak. Can Keystone detect leaks that would be smaller than that or will it take 90 days to detect a one-and-a-half or two percent leak in the line?

A. As stated and I believe as was indicated in the application, there is the -- a table within the document that indicates that it may take up to 90 days to detect these leaks that are below the leak detection threshold. That certainly wasn't intended to mean the leaks that are just slightly below this one-and-a-half, two percent range. Really, what that -- that was intended to really bookend what may occur, and those leaks that would, you know, take that period of time to detect would be very, very small. They would be something that

could be measured in drips per hour. Certainly leaks that were just below the threshold will be picked up much sooner than that 90 days.

Q. Would you say that estimate that was included in the application, and I believe it's also in the DNV study, was a conservative estimate?

A. Very much so. The -- this threshold -- I guess the other thing we have to consider when we talk about leak detection limits is the amount of time it takes to detect a leak. In this case, when we get down to our threshold of the one-and-a-half to two percent, we're estimating that it will take about 140 minutes for again this CPM system to pick up that leak. Leaks that are larger than that, of course, are picked up much sooner, but when you're talking about these leaks that are below this one-and-a-half, two percent threshold, they again are very much dependent upon site specific circumstances. They won't generate automatic alarms to the control center operators, but the control center operators will also monitor the volume balance system, they'll monitor the CPM system, and if they notice that there is a discrepancy, again not large enough to trigger an automatic alarm, they will take other actions to

verify that situation.

I guess what -- for example, the systems or the procedures that would be followed in a case like this would be to shut down the pipeline, call out a first responder, potentially conduct what we call shut-in pressure testing, and by that what I mean is that once we shut the pipeline down and isolate it into segments, we're able to monitor the pressures within each of those isolated segments and can determine much easier if one of those segments is losing pressure, that there may potentially be a leak in that segment and can direct our field response people to really review that area of the right-of-away for any potential leaks.

Q. In the event that Keystone suspects a leak or a leak is reported to the operation control center, how would Keystone respond?

A. Keystone's response to events such as that would be to immediately shut the pipeline down. That activity would take approximately seven minutes, and that is because there are two -- there would be two to three units running at each of Keystone's 39 pump stations. So we estimate it would take approximately seven minutes to shut

those down. Once the operating units have shut down, then the remote sectionalizing valves or isolation valves in the vicinity of the leak would be closed. That would take approximately three minutes to do that so that we would have the line shut down and section lines inside of about ten minutes, and that, of course, would limit any of the drain-off volume that I think was referred to here earlier from really increasing any of the spilled volume.

Q. Mr. Thomas, has Keystone prepared an emergency response plan for its pipeline system?

A. Keystone has not. TransCanada, let me mention, though, maintains a comprehensive incident management system which includes emergency response plans for all the facilities it operates. Keystone has filed a preliminary -- what I call a preliminary emergency response plan, and it was included under Appendix A of the application and I think under the file entitled July 6th supplemental filing.

Q. The -- I would like you to, I guess -- and I guess you have in front of you what's been marked as Exhibit T27. Is that the preliminary emergency response plan for the Keystone Pipeline?

A. Yes, it is.

Q. And could you walk -- well, first of all, how is the emergency response plan developed as far as what requirements will it be developed?

A. The requirements that liquid pipeline operators are required to follow for the development of these emergency response plans are prescribed under 49 CFR part 194, and it lays out in very prescriptive fashion the requirements for these plans.

Q. Mr. Thomas, I'd like you to kind of walk through the emergency response plan, Exhibit No. 27, just starting with page one, the core plan information summary.

A. Yes. Page one is the core plan information summary. Section 1.1 describes Keystone's address, which, of course, is a requirement under the code. It provides a description of the pipeline system and, as you can see, includes a drawing of the pipeline system. You can see there that we've divided up the pipeline into three response zones. Response zone one begins at the Canada/U.S. border. It proceeds down to a point just in the southern part of South Dakota, where response zones two and three then

pick up the balance of the system.

Following Section -- or on page two Keystone provides its 24-hour response or contact phone number. This, of course, is the number that would be posted on all of the right-of-way signs, the facility signs, and published within all of Keystone's public awareness materials.

Q. Is that type of information that would be given to property owners that the pipeline goes across?

A. Absolutely. As part of the public awareness program, this type of information is provided on an annual basis to landowners.

Q. Any other provisions in Section 1 that you'd like to address?

A. Well, there's just a couple of others that I'd like to highlight. On page two -- or excuse me, on page three, Section 1.2 is the area that will provide the MSDS information, and that is the material specification data sheets with respect to the commodity types that Keystone will transport.

The other -- and it's also on page three here -- item I'd like to highlight is, as you can see, there's a table there that basically identifies the response zone, this particular one

being response zone one, and it -- it indicates the number of -- and mileage of high consequence areas within each state in the response zone. So in this case you can see in North Dakota there are zero population areas, approximately seven miles or 6.96 lineal miles of drinking water, and 2.03 miles of other sensitive areas. The other sensitive areas cover rivers and areas of ecological resources.

Q. Then moving onto the Section 2 on page six, notification procedures. Could you briefly describe the notification procedures of the draft emergency response plan?

A. Yes, I can. As shown on the flow chart, we've basically described our emergency notification procedure. As you can see at the top of that chart, when an emergency call comes in, it for the most part would be directed to the emergency response line, but it is possible, as well, that the call could come into the regional office or the operations control center. So in any case once the emergency call comes in, it's directed to the emergency -- or the operations control center in Calgary, and basically their response is, first of all, to call out the first responder in the particular vicinity and to also

notify the regional EOC manager that is again located in the vicinity of the potential incident.

Q. Mr. Thomas, who would the first responder be?

A. The first responders are people that would be on call. They would either be Keystone employees or contract personnel that would be on call again 24 hours a day, 7 days a week, located at various points along the pipeline right-of-way.

Q. How do you determine where those people would be located?

A. Basically the way those people are located is typically dependent upon -- it goes back to these high-consequence areas, so that really they are typically based closer to these high-consequence areas such that you can achieve coverage of your entire right-of-way within a reasonable amount of time. Keystone in a -- what I'll call a non-high-consequence area estimates that we would have first responders onsite in under four hours.

Q. What about in the high-consequence area? Would it be less than that?

A. Yeah. In the high-consequence areas that's a part of the plan that we haven't yet

developed. Typically, you know, these plans can't be finalized until the routing is done, the design is done, and so on, so that situations in high-consequence areas -- and even for that matter along the balance of the right-of-way, I -- they haven't been finalized to this point. That would be done as part of our consultation with state, local, and federal authorities to ensure that we're going to be able to meet the requirements of each of those groups.

Q. But that could be expected to be less than four hours?

A. Absolutely. In high-consequence areas, absolutely.

Q. Okay. Continue with the notification requirements.

A. Okay. So once the first responder has been notified by the control center and likewise the regional EOC manager notified, if, in fact, this reported incident turns out to be a leak, then the emergency response plan is activated, and the way it -- the way it is activated is that we establish what we call a regional EOC or emergency response center, and the regional EOC is typically located at a district or field office. So it's

offsite typically of the leak. We also as part of the response organization establish an onsite command post, and this is a command post that is located right at the leak site. And then, finally, we also activate a corporate EOC in the Calgary office to assist with additional resources from that end.

Q. Any further comment on Section 2 or the next --

A. I did want to cover just very briefly -- I'll cover page seven. Page seven is just a checklist that we utilize to ensure that all contact information has been completed, and we have a checklist for the first responder to ensure that his duties are fulfilled, likewise for the regional EOC manager and similarly again for the emergency site manager.

Then again just quickly on page eight, we maintain a list of contacts, the first being Keystone contacts. Again, these folks are on call 24 by 7, so these lists are maintained and available to our list OCC operators, and then we, of course, have the other external agency contact information. So in the event of a leak we're required to call the national response center and

would likewise call any state or local agencies that are required. I believe that would cover Section 2.

Q. Then moving onto Section 3, spill detection and on-scene spill mitigation procedures, could you briefly walk us through that?

A. Yes, I can. And I'll just begin with page 11, and as stated here, the SCADA system will continuously monitor pipeline conditions and update information provided to the OCC operator. Data received from the SCADA system will be also dedicated to the leak detection system that I spoke of. This leak detection system, I think it's probably good to mention, is actually independent. It's an independent computer system, independent of the host SCADA system, and it is also backed up and is redundant in the form that there will be a hot standby available at all times.

Q. Are there power backups for these systems, too?

A. There are power backups for both of these systems. Keystone also maintains a secondary control center. We have one at a location in Calgary, again backed up with a generator for power, and we also have one at a secondary site

away from the Calgary control center that can be used in the event that the primary is unavailable.

So in the event -- again on page 11, in the event that notification is received with respect to a pipeline release, whether it's an employee-reported incident, one observed on a direct observation, or an abnormal condition observed by the operator, which again would be this pressure loss or something similar, or there's a leak detection system alarm, or, in fact, there's a third-party reported alarm, we have procedures that the OCC operators will follow to basically shut down the pipeline, isolate, and dispatch our first responders.

We will -- I guess that covers that page. I'd just like to move onto page 12. This area of the document that will be further developed is there to describe the various mitigation and clean-up techniques that can be used with respect to spills, be they on water, be they on land or in sensitive areas. I won't go through those in detail. You can see there's quite a number of those, all of which will be fully developed in the final document.

Q. I notice under Section 3.3 it talks about

equipment for response activities. Do you have a typical list of equipment that Keystone would use and deploy out along the line for emergency response?

A. Yes, I do, and I'll just go through that briefly, and this is a typical list, I'll say. It would be adjusted as necessary to suit the site-specific circumstances. So the -- kind of the more general list would include pickup trucks, one-ton trucks and vans, vacuum trucks, work and safety boats, containment boom, the skimmers that are used with the containment boom, pumps, hoses, fittings and valves, generators along with extension cords, air compressors, floodlights, communication equipment, including cell phones, two-way radios and satellite phones, containment tanks and rubber bladders, and expendable supplies including absorbent booms and pads, a variety of assorted power and hand tools, shovels, maneuver forks, sledgehammers, rakes, handsaws, wire cutters, cable cutters, pliers, chain saws, and so on. There would also be the personal protective equipment, the PPE, that would include rubber gloves, chest and hip waders, H2S, O2, and LEL detection equipment, along with windsocks, signage, air

horns, megaphones, fluorescent safety vests, and so on.

There would also be additional equipment available, including helicopters, fixed-wing aircraft, ATVs, snowmobiles, backhoes, dump trucks, watercraft, bulldozers and front-end loaders, dependent upon site specific needs.

Q. And again, those would all be part of the final emergency response plan that would be in place before any operation of the pipeline?

A. That's correct. This plan would be in place, submitted to PHMSA, our regulator, prior to our actually beginning or commencing line fill of the pipeline, and it would be reviewed by them and they in turn would advise us if they had any comments or concerns.

Q. Moving onto Section 4 on page 14, response activities. Could you briefly describe that?

A. Yes, I can. And I'll maybe begin on page 15. What this section describes is, for the most part, the job duties of each of our positions so that you can see the two EOCs that I referred to earlier, the regional EOC has a number of role assignments, and I'll just quickly go through them. There's, of course, the manager, a media contact,

communications contact, a documentation person, security, an environmental/technical resource, a mobilization resource, an evacuation leader, and admin support person.

The roles on the right-hand side of the page are the roles that are utilized within the site EOC, and as you can see there, there's an emergency site manager, documentation resource, a site security resource, an environmental/technical resource, a resource mobilization person, as well as media, safety, and staging personnel.

Q. And it looks like the next number of pages basically go in and define what the roles of each of those persons would be; is that --

A. That's correct. So that each person understands exactly what their role and responsibility is, and this information, of course, is providing -- provided with the training that is done of these individuals.

COMMISSIONER WEFALD: Mr. Hearing Officer, are we going to be going through the whole booklet -- that's what I'm wondering -- the whole book, page by page?

MR. KELSCH: I think we're pretty much almost done.

COMMISSIONER WEFALD: Okay.

MR. KELSCH: There's a couple just short ones.

COMMISSIONER WEFALD: Thank you. Because this is all written down in the book. He's just basically reading from the document that's been presented to the Commission.

Q. (MR. KELSCH CONTINUING) I'll just -- Mr. Thomas, is there anything else in this that you would like to comment on specifically?

A. I think very quickly I'll just cover two more points, the first one being on page 24, just to describe how Keystone's emergency response organization would fit in with a larger response organization that would involve potentially the federal on-scene commander so that we have a plan in place that allows us to actually do a unified command structure and integrate with basically federal folks, as well as other local and state agencies.

And then, finally, I'll just maybe quickly mention on page 30, just to provide some information quickly on the training that is done, the Table 14 that you see there is the requirements for training. It's a triennial cycle, which is

three years, so that we do do a notification, an exercise or a drill of our qualified individuals 12 times in that three-year period. We have tabletop team exercises that are done once a year. We do an employment and equipment deployment exercise once a year, and we also do at least one unannounced exercise every year to ensure that people are ready to go, so to speak.

MR. KELSCH: Thank you, Mr. Thomas. I would move to admit T27.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: No objection.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No objection.

JUDGE WAHL: Exhibit T27 is received.

Q. (MR. KELSCH CONTINUING) Mr. Thomas, there was testimony at the --

MR. DELANEY: I'm sorry. I don't think I've received T27 -- or both -- I have two T26's. Is T27 the --

MR. KELSCH: It's the emergency response plan.

MR. DELANEY: Okay. I have no objection to T27.

Q. (MR. KELSCH CONTINUING) Mr. Thomas, there

was some testimony at the hearing in July by the public about what happens if there's a leak in an area where there aren't decent roads or there would be bad weather, snow or rain, muddy fields. Can the emergency response people get out to the site?

A. Yes, they can. Responders would be dispatched from multiple locations and would have access to alternative means of transportation if weather conditions or other conditions were to limit access. These alternative means would include fixed-wing aircraft, helicopters, boats and other watercraft, along with all-terrain vehicles and snowmobiles, if necessary.

Q. How would Keystone decide to staff for the ERP plan?

A. Keystone would utilize a combination of company, contract, and other resources in executing its response plan. The location of these resources will be determined as Keystone completes its plan, but it will obviously be based at various locations along the length of the pipeline.

Q. One of the questions earlier today had to do with a private well, if there would be a leak in the area of a private well. What is Keystone's emergency response plan dealing with a leak that

might affect a private individual's well?

A. In the event that a leak were to affect a private individual's well, Keystone would, first of all, find an alternate source for that individual. Then, I guess, in consultation with other state and federal authorities would develop a mitigation plan to mitigate that well, if it were decided, all the while maintaining this alternate supply, and only when the former well was in a state that was acceptable would it be utilized again for drinking water.

Q. There was also a question about a leak on the Express/Platte leak that TransCanada was a part-owner in in, I believe, 1996. Are you familiar with that leak?

A. Just to the extent that I've been advised that the volume of the leak was 220 barrels and there was no effect to human services or habitat.

Q. Do you know, was this an older pipeline or newer? Do you have any information on that?

A. To my knowledge, yes, this was definitely an older pipeline system.

MR. KELSCH: I have no further questions.

JUDGE WAHL: Mr. Delaney.

CROSS-EXAMINATION

BY MR. DELANEY:

Q. Mr. Thomas, how long into the future are you going to be involved with this project? I mean, will you be overseeing the carrying out of the emergency response plan well into the future, or is your involvement just putting together the plan and then you're through?

A. My involvement, I anticipate, would carry through into the operation of the facility, as well.

Q. Okay. Have you had any involvement with other pipelines in the carrying out of emergency response plans in your experience?

A. I'm sorry. Could you rephrase that?

Q. Have you in your years of experience been involved with the carrying out of other emergency response plans?

A. Yes, I have.

Q. And have you in your experience during the carrying out of your emergency response plans had to respond to any leaks?

A. Yes, I have.

Q. How many?

A. I believe it would be three.

Q. Okay. And were these TransCanada pipelines or --

A. No, they were not.

Q. And how were those particular leaks detected, if you recall?

A. Well, I do recall one was actually detected by the operations control center. To be honest, I don't recall how the other two were actually detected.

Q. Okay. I think you should have it up there, the DNV frequency volume report. Do you have that up there, Exhibit I1? I think the last witness had it up on the stand.

JUDGE WAHL: Yes.

THE WITNESS: Yes, I do. I1?

Q. (MR. DELANEY CONTINUING) Yes, that's right. Are you familiar with that report?

A. I'm somewhat familiar with this report.

Q. Okay. And in looking at this report, DNV analyzed leak detection and the time it was going to take to detect leaks and the amount of potential volume that could occur -- or could spill from the pipe. Let's, I guess, start on -- if you could turn to page 18 of that report. Now, it says near the top, the second sentence under section 5.0, The

quantity of material released during a spill is dependent upon the following parameters, and it lists out a number of parameters, the first being, Time until the leak is detected, verified and pipeline isolated, and I want to break this down into each of these steps. First detection. For leaks that are under this threshold amount of 1.5 or 2 percent, how exactly are those detected? If the volume sensors and the computer sensors you have in place can't detect leaks that small, how is it that they are actually detected?

A. Well, each one, I guess, would be different, and it is dependent upon site-specific circumstances. If the leak is close to that threshold, it would be picked up through the control center and the operators observing these volume balance systems and be detected relatively quickly. If it's, you know, something that is measured again in the drips-per-hour range, it could take, in fact, much longer.

Q. Well, and I guess I understood your testimony to say that the -- these volume measurements aren't going to detect a very small leak, leaks less than one-and-a-half percent. Is that incorrect? Am I not understanding you

correctly?

A. Well, it's -- we're not going to generate automatic alarms to the control center operators on leaks that are smaller than that.

Q. Okay. So, I guess, let's use an example, like a one percent leak. How -- is the computer system going to detect that?

A. It could.

Q. So it could not, as well?

A. It could not, as well. Yes.

Q. And so if you had a one percent leak, you're then -- and the computer system can't pick up on it, which I guess is a possibility, you're relying upon, I would suspect, these aerial flights and any ground patrols that you would have?

A. More direct observation methods.

Q. Okay. So when you say -- and I'll refer you now to page 19 and there's a chart at the bottom, and this is again in Exhibit I1. Table 5.2. It says leaks less than 1.5 percent, which is this threshold we've been talking about, would take 90 days to detect -- detect and verify. Now, you testified that that's overly conservative, and I guess my question is how do you know that? When leaks are very site specific, you're relying upon

people out there, ground patrols potentially. How is it that you know 90 days is too conservative?

A. Well, I guess, you know, as has been mentioned, we are going to be doing these aerial patrols approximately every two weeks, and it would certainly be my experience and expectation that, you know, anything in the range of that one-and-a-half percent leak would be first picked up by that aerial patrol.

Q. What types of things would the aerial patrol see if there was, let's say, a one percent leak? What are they looking for when they're flying over?

A. When they're flying over, they would be looking for various things, but a leak of that size you would see liquid on the ground.

Q. Well, I understood Ms. Tillquist's testimony earlier that for a leak to actually get up out of the trench, it's going to take -- and I don't remember if she said over a thousand barrels or if it was a thousand gallons, but it would take a very, very significant leak for it to get up out of the trench. So if you're flying over, what is it that you're going to see and how soon are you going to see it, I guess?

A. Well, I think that it's certainly been my experience that, you know, these leaks that are small in nature will come to the surface just due to the fact that the -- the dirt that has been placed over top of the pipeline hasn't been compacted to the same degree as the virgin ground on either side. So what will happen is that these small leaks -- they won't leave the right-of-way, but they will migrate to the surface just because they follow the path of least resistance.

Q. Okay. So the oil will actually rise up to the surface.

A. Well, it will potentially, you know, run -- dependent upon the topography and elevation, it will potentially follow the trench to a point which it does, yes, migrate to the surface.

Q. And you said in your experience with these small leaks -- I had asked you about your experience in responding to leaks, and you said you'd only been -- responded to three different leaks, one of which was detected by a computerized system and the other two you didn't remember how it was they were detected. Detection being my concern, what experience do you have with small leaks and how they are detected?

A. My experience with the small leaks was not as a result of being physically onsite. My experience in that area was more while I was in a position within the operations control center.

Q. Okay. So you don't have any personal experience whatsoever with actual visual detection of a small leak?

A. I have experience in having spoken with personnel that were onsite. I wasn't physically on the leak site myself.

Q. And this was one of these three leaks that we talked about before?

A. No. The three leaks that we talked about before I was physically onsite.

Q. And what types of things did these people see?

A. Basically --

Q. Just oil on the surface?

A. Oil on the surface which was basically -- you know, excavate at that location and follow that basically back one direction or the other to the actual leak, itself.

Q. And do you have any idea or have you studied at all how much oil it would take to leak out of the pipeline before it would rise to the

surface? And I understand it's site-specific, but have you done any analysis whatsoever?

A. No, I haven't.

Q. So could it potentially be a -- and I hate using the word "significant" because everybody's got a different definition of significant, but could it potentially be a large leak before it would get to the surface, obviously depending on conditions? Is there that possibility?

A. There is a possibility.

Q. I would suspect that the oil could potentially, depending on site circumstances, move laterally or not even rise to the surface. Is that possible in your experience?

A. No, not laterally typically. Again, it would typically follow the ditch line.

Q. Okay. So it could move along the trench, though, and not actually rise up to the surface?

A. Yes, it can.

Q. I mean, so any leak under one-and-a-half percent, you're relying upon a whole bunch of factors that really haven't been analyzed by DNV or TransCanada for that matter; is that fair to say? We don't know exactly how long it will take?

A. We haven't quantified a time because,

again, it is dependent upon these site-specific circumstances.

Q. So could it take more than 90 days to detect a leak, a small leak, say a one percent leak?

A. Could you rephrase that?

Q. Could it take more than 90 days to detect a leak that's one percent?

A. That, you know, certainly wouldn't be my experience, no, that it would take more than 90 days to detect a one percent leak.

Q. And what is your experience with one percent leaks?

A. A leak in that range, it would be my experience, is most likely either picked up with an aerial patrol or it would be observed most typically by a landowner or resident that notices an odor.

Q. An odor, you said?

A. Correct.

Q. Well, let's talk about your experience with one percent leaks. How long did they take to detect?

A. I've never really categorized them in that sort of a fashion to be able to provide an answer.

Q. Well, you just testified that in your experience it's been less than 90 days to detect a one percent leak. So how long did it take? All you know is it was less than 90 days, but you're not sure how long?

A. Yes.

Q. Okay.

A. Much less.

Q. And when we're talking one percent, we're talking one percent of the entire volume going through the pipe when they use percentages in this report?

A. That's right.

Q. And it's 435,000 barrels per day that's going through?

A. That's correct.

Q. Isn't it true that this study -- I believe it was Ms. Kothari said that it is possible for check valves to -- or valves to malfunction. Has that been your experience?

A. I would say not. Valves are tested twice per year, and, no, it wouldn't be my experience that valves fail as a result of the testing that's done.

Q. Okay. So you've never -- in your

experience a valve has never failed?

A. Well, I -- a valve has never failed -- I have never had a sectionalizing valve fail. No.

Q. And you're distinguishing that kind of valve from what?

A. From one that might be in a station plantsite or terminal.

Q. Okay. Once a leak is detected on the pipe, what's the process then? Once it's detected by a person, how soon does it take to shut off the flow of oil?

A. That would take the ten minutes that I referred to earlier.

Q. Okay. So this detection and verification -- what's the difference between the detection and verification time? So if there is a flyover and they notice oil coming out of the ground or they notice maybe some dead plant life or some oil, what then is the process? Do they call somebody to go out there and do an onsite verification?

A. No. In that case, as I referred to in the preliminary emergency response plan, the patrol center follows the same procedure, which would be to execute a line shutdown and close isolation

valves.

Q. This study -- are you aware of whether this study makes any assumptions as to valve closures? The study I'm referring to is I1, the frequency volume. Does it make any assumptions about valves and whether they're going to function or not?

A. It's my understanding that this study incorporates the shutdown timing that we've just been discussing and that the valves do close.

Q. Okay. And I actually found it. I think page 20 under the table there it says that this study assumes all valves close on demand and there's a zero percent failure rate. And is it your experience that the most common type of leak is a corrosion leak, I guess, other than third-party caused leaks? Has it been your experience that corrosion is the most typical cause?

A. Well, I -- I guess I've been involved in pipeline systems that were much older, entirely different construction techniques, entirely different protective features in terms of the coating and cathodic protection systems, and I think it would probably be fair to say that those older systems did see a higher percentage of

corrosion-related leaks. I don't believe, though, that that can be compared to pipeline systems of today.

Q. Do you know what information DNV was using when they put together this frequency volume report?

A. It was my understanding that they were using the PHMSA or the DOT data.

Q. Okay. And is that data reliable, in your experience?

A. Yes. It's based on incidents reported by pipeline operators.

Q. Okay. These first responders in North Dakota, do you not know where they're going to be as you sit here today exactly? Do you know exact locations?

A. No, we don't. We have to complete the final design, know the routing such that those determinations can be made.

Q. Okay. And other than the flyovers, what type of -- other than the flyovers and members of the public or landowners, do you have ground crews that will go out and walk the right-of-way and look for leaks?

A. We would in certain sensitive areas do

things such as that.

Q. What would a sensitive area be?

A. Typically areas that you would actually do foot patrol on are more likely to be with respect to populated areas, but, again, as we develop these plans, I think it's important to note that they're developed with local agencies, state agencies, such that we take input and ensure that we achieve satisfaction with those regulators, as well.

Q. Okay. And from my understanding of where this pipeline's going in North Dakota and based on your definition of sensitive areas as being a developed area, are you aware as we sit here of any sensitive areas in North Dakota?

A. We've identified, you know, certain sensitive areas to this point, but again, that will be reviewed as part of the further development of our emergency response plan.

Q. Okay. And are landowners -- landowners aren't expected to go out and inspect the right-of-way on any type of regular basis, are they? They have no obligation to do so, do they?

A. No, they are not.

Q. And my understanding is this is -- the pipeline in North Dakota is out in a very rural

area and is going to be going through primarily agricultural land; is that right?

A. That would be my understanding.

Q. And they are allowed to crop the land, crop the right-of-way; right?

A. Absolutely.

Q. How is -- will that impede in any way the ability to visually inspect one of these smaller leaks, less than one-and-a-half percent?

A. Not typically.

Q. Why is that?

A. Well, it -- you know, again, if there's liquid on the surface, typically that's visible from these low-altitude aerial patrols.

Q. Even with six-foot corn, six-foot tall corn on the right-of-way?

A. On -- yes. It can be seen.

Q. And that obviously assumes that the oil has risen up to the top?

A. Yes, it does.

Q. At what point would somebody smell the oil? Does it have to rise to the top before they would smell it?

A. Yes, it has to rise to the surface typically before you can smell it, or the vapors

do.

Q. In terms of remediation for groundwater contamination, you touched on a few of the remediation steps you would take, one of them being that you would find them a new water source; is that right?

A. Yes, absolutely. If there's a need to find an alternate supply, that is certainly Keystone's responsibility and would be undertaken.

Q. What remediation efforts would be taken for a landowner who drank a toxic amount of a chemical?

A. I think that the potential for that to happen is extremely remote in that if there were a leak and a need at all to monitor the well, that would be undertaken. If there was any potential that oil had gotten into the well, we would certainly work with the landowner and ensure there was an alternate supply provided.

Q. You mentioned that that possibility would be remote. I had asked Ms. Tillquist when she was on the stand whether she had done any detailed assessment of risk for contamination of localized groundwater in private wells and she said she had not. Have you done such an analysis that you're

basing your testimony on?

A. No. My -- what I'm basing it on is that typically, you know, once a leak is discovered, you obviously know where that leak is and you know the proximity to any of these drinking water sources.

Q. Well, but not if it gets into the drinking water source before it's discovered; right?

A. Well, in that case, if it's in the drinking water source before it's discovered, that would be true.

Q. Okay. So upon what did you base your testimony that the risk of contamination of drinking water would be low?

A. I guess I base that on the fact that the risk of a leak is low.

Q. Okay. And you're referring to this DNV Consulting report?

A. As well as Ms. Tillquist's statistics.

Q. You heard Ms. Tillquist testify she had not done a detailed analysis or risk assessment regarding contamination of local groundwater or private wells?

A. Yes, I did.

Q. Okay. Have you been involved in any permitting process that TransCanada has

undertook --

A. No.

Q. -- other than the permit that we're here today for to the PSC?

A. I've been involved to some degree with a similar process in South Dakota.

Q. Okay. Is there going to be any reliance -- I believe Mr. Cowling testified that there would be some reliance on local resources, such as police and fire. Will there be some reliance on those types of resources?

A. Not what I would term a reliance, per se. Typically, the -- well, let me just back up because Keystone as part of its emergency response plan will ensure that all the equipment, resources in terms of manpower are available to deal with leaks. The typical case for emergency responders, they may be utilized to initially secure the scene and protect public safety, and so on, but there would be no reliance on them to perform duties other than that.

Q. Okay. So they'd be responsible for securing the scene, primarily?

A. If requested, yes.

MR. DELANEY: Okay. I have no other

questions.

JUDGE WAHL: Mr. Binek.

MR. BINEK: Thank you.

CROSS-EXAMINATION

BY MR. BINEK:

Q. You mentioned that these smaller leaks that can't be picked up by the computer system, one way that they can be noticed is by odor. So that would be a -- is that after the liquid has risen to the surface or while it's -- there is no visible sign on the surface?

A. That would typically be once the liquid has risen to the surface.

Q. Have you explored the use of vapor detectors along the line?

A. We've, you know, I guess, looked at some of those systems, not so much a vapor detection but actually alternate methods of leak detection. There really isn't a reasonable system that can be used so much for the vapors, themselves, because it's an odor more so than -- detection equipment is usually designed to pick up things like LEL, meaning lower explosive limit, or hydrogen sulfide gas and typically can't be used so much for leak detection purposes.

Q. I guess in response to my question, though, have you -- you talked about what -- what you know about these vapor detection systems, but have you or has TransCanada actually tested them to see if they work or how well they work?

A. We have not tested them to that level for an application such as you describe.

Q. Well, don't you think that that would be a good idea?

A. Well, I can say that that is certainly not a practice that is used by the pipeline industry.

Q. Well, the reason I'm asking this is I had a conversation with an individual with the South Dakota Public Utilities Commission, and he advised me that there was a spill of some sort in the Sioux Falls area and that -- he wasn't with the Public Utility Commission at that time, he was with another organization, state agency, but that they required the company to put in vapor detectors, and so that's the reason I'm asking, and I went on the Internet and looked and I see there's some information about vapor detectors on the Internet. Now I don't know anything about them, but it just seems to me that since odor is one of the things that you say can detect a leak, it would seem to me

that it makes sense to look into whether some kind of a vapor or odor detection system might be available to be used especially in some of these sensitive areas like the Fordville aquifer area. So that's the reason I'm asking the question.

A. No. I -- I understand now. I am aware of the system you speak of. It's just -- I don't define that as a vapor system in that basically my understanding of the way that system functions is it's actually a small pipe that's placed underneath the buried pipeline, and then basically air is blown through that smaller pipe and then vapors -- if they detect any hydrocarbons as they come out the end, would indicate a leak in that section, and certainly those systems are something that as Keystone further develops its design would consider. Those as well as there are other systems that do work in a similar fashion being buried underneath the pipeline.

Q. Well, would you be willing to commit to the Commission that you would look into and study the possibility of utilizing a system like that or some type of system for leak detection other than just relying on spotting oil after it comes to the surface?

A. I believe we could certainly undertake to do that. Those applications are again intended for, you know, relatively short segments of pipeline and would be applicable to, you know, sensitive areas.

Q. Well, and then the concern we have is with some sensitive areas here. What would you define as a short segment?

A. Something probably -- well, no more than two miles in length.

Q. At this pipeline alone, the Fordville aquifer, I don't remember the distance, but I think it's more than that. So are you saying you wouldn't look at something like that for that area?

A. No. I think you could. It's -- my reference there was, you know, to the length of system -- to the length that really one could utilize a system such as that would be, you know, in the range of that two miles you'd have to install multiple systems if you wanted to do further distances.

Q. And you're -- at this point are you committing that you will -- that Keystone will look into these types of systems and evaluate them?

A. Certainly.

MR. BINEK: Could there be a report submitted to the Commission regarding those studies? I guess I would ask that one be submitted as a late-filed exhibit.

JUDGE WAHL: T36 for the record, Mr. Kelsch, a report re -- I'm a little unclear -- if --

MR. BINEK: Leak detection system maybe.

JUDGE WAHL: Well, Mr. Thomas, you distinguish -- you say you don't classify this as vapor detection. Can you give me just a brief statement to identify the report that you're going to submit?

THE WITNESS: Could I call it an external leak detection system?

JUDGE WAHL: All right. So the exhibit will be, for identification, report regarding external leak detection systems. Anything further, Mr. Binek?

MR. BINEK: Yes.

Q. (MR. BINEK CONTINUING) What causes a check valve to close?

A. The valves that Keystone will use as check valves are what we call swing check valves. So they are basically a valve that is -- they're a

free-swinging plate basically that's on a hinge pin, so that when the flow is going, they're open, and then as soon as the pressure or flow stops, they in turn close immediately.

Q. And how much of a pressure decline or flow decline has to occur before they'll close?

A. In terms of pressure, it would just be ounces of pressure to close them.

Q. And can they be set for different levels of pressure to activate them or is it just one -- one pressure?

A. Yeah. Not typically. They're just -- again, they're free swinging, so any amount of pressure in the reverse direction closes them.

Q. So the flow has to stop completely. It isn't a reduction in pressure that causes them to activate. It's a complete discontinuance of the flow in one direction that will allow them to activate.

A. That's correct, yes.

Q. So they wouldn't work in a small leak situation.

A. In a -- sorry. Could you clarify?

Q. In a small leak situation, they would not activate, the check valve wouldn't activate.

A. Well, I guess it may depend on site-specific cases. If I look at an example where the pipeline has been shut down and again isolation valves closed in that line segment, if we had a check valve on the upstream side and then our gate valve or ball valve on the downstream side and the leak was in between, that check valve would, in fact, be closed.

Q. It only closes when the system is shut down.

A. Yes, yes.

Q. Who approves the emergency response plan?

A. PHMSA reviews the emergency response plans and advises if they have any issues that need to be changed, modified, corrected, et cetera.

COMMISSIONER WEFALD: Who is PHMSA?

THE WITNESS: It's the Pipeline Hazardous Materials & Safety Administration, and they're part of the DOT.

COMMISSIONER WEFALD: Okay. Thank you.

Q. (MR. BINEK CONTINUING) So I'm gathering they don't approve it. Is there anybody that approves the emergency response plan?

A. That you can take to be approved. I mean, my understanding is that there's certain, you know,

liabilities if they were to physically approve the plan, but their concurrence without any comments can take it to mean approval.

Q. And when did you say the emergency response plan will be submitted to them?

A. We would plan to submit the plan to PHMSA in the first quarter of 2009.

Q. And when is the pipeline to be operational?

A. It's intended to be complete in the third or fourth quarter of 2009, and at that time we would begin line fill, and only after line fill is completed would it begin operations. I guess the other reason to have it done, you know, in about that time frame is that that gives us, you know, virtually a one-year period to train our response personnel, familiarize folks with the plan, and so on, so that we would have all of that done before we begin line fill.

Q. I hate to come back to small leaks again, but you said that a leak at -- a one percent leak was the example used. You said that that may or may not be picked up by the computer.

A. The -- I guess it may or may not -- well, let me back up a step, because leaks under that

detection threshold again aren't going to generate automatic alarms so that there would be potentially a discrepancy in the volume-in, volume-out system that an operator is going to monitor that system and would potentially notice.

Q. Okay. It's not the computer that would notice it; it's the operator.

A. That's correct, in the leaks under -- there's no automatic alarm.

Q. Okay. To what level do you think that an operator could detect a leak based on volume in and volume out?

A. That actually -- we will set like a threshold for that such that there will be a policy in place whereby if this volume-in, volume-out system is reporting a discrepancy, there will be a procedure in place for the operators to undertake action, and that I can't advise you of the number at this point because those sorts of things have to be developed as you operate the system because they are dependent upon how you're able to tune your system and the accuracy of your instrumentation, and so on.

Q. Do you think it's likely to be below one percent?

A. The -- this threshold?

Q. Yes.

A. I guess it depends upon the time frame, but I would expect it would be below the one percent, yes, if I were to use, you know, 24 hours as a basis.

MR. BINEK: I have no further questions.

JUDGE WAHL: Let's be in recess until five minutes to three.

(Recess taken.)

JUDGE WAHL: All right. Questions from the Commission?

COMMISSIONER WEFALD: I have one.

JUDGE WAHL: Commissioner Wefald.

EXAMINATION

BY COMMISSIONER WEFALD:

Q. I just want to know if I'm calculating this correctly. At 435,000 barrels a day, a one percent leak would be 4,350 barrels per day?

A. That's correct.

Q. And then I think earlier this morning one of the witnesses testified that the spill in Minnesota was 10,000 barrels that were spilled. Do you remember hearing that?

A. I don't recall the numbers specifically.

I'm sorry.

Q. I wrote it down, so I'll just say it was 10,000 barrels that spilled in Minnesota. So that would be approximately two days that it would take at a one percent leak to have the effects of that spill in Minnesota, 10,000 barrels, if it was 4,350 barrels a day at a one percent leak?

A. The volumes, yes, are comparable.

Q. You could have those same effects?

A. Although, I don't believe from somewhat of a limited knowledge of the Bemidji incident that it was one of those leaks. If I recall, it was a seam-related issue that Ms. Tillquist testified to.

Q. But it could happen, whether it's a leak from a seam or from corrosion or from an excavation. If it was a one percent leak, it could cause that kind of damage in two days at a one percent leak from this pipeline?

A. It would cause like the same volume, yes.

COMMISSIONER WEFALD: Volume, yes. Thank you.

JUDGE WAHL: Any further questions?

COMMISSIONER WEFALD: No.

JUDGE WAHL: Commissioner Clark.

EXAMINATION

BY COMMISSIONER CLARK:

Q. I think that -- I don't recall if this was answered yet or not, so if it's been asked before, I apologize. I know there was some discussion of local government and to what degree they might be called upon for some sort of response measures, and I think you indicated that for the most part there would be others who would take care of that. Were they direct employees of TransCanada or are there folks that you contract with in the field that are third parties as part of the emergency response plan, the sort of first responders.

A. No. Absolutely, Keystone would contract with a number of companies to really be able to fulfill our resource requirements to support the emergency response plan.

Q. Are there companies that are out there that are in that specific business? I mean, I can't imagine -- it's sort of like Maytag repairmen most of the time; right?

A. I mean, there are in certain areas, yes, and where they're not available, Keystone will either look after those resources on its own or, you know, do something to set up relationships with

companies such that we can fulfill and are able to fulfill the requirements necessary of the emergency response plan.

Q. To the degree that any local response is required, sort of first response, is Keystone liable or do they reimburse for those expenses to the extent that you need a local sheriff's department to cordon off areas or things like that?

A. I think in those cases it would be very, very unusual, and Keystone as in many cases would be willing to, you know, work with those providers if there's anything that's, you know, really truly viewed to be abnormal, et cetera.

COMMISSIONER CLARK: Go ahead, Commissioner, if you wish to.

COMMISSIONER WEFALD: Yes. I have another question.

FURTHER EXAMINATION

BY COMMISSIONER WEFALD:

Q. And that is when Keystone -- it says eventually you're going to be pumping 591,000 barrels per day through the pipeline when it's connected with Oklahoma, et cetera. Are -- tell me, where are there other pipelines in the United States that are this size in capacity?

A. It's my understanding that --

Q. Crude oil pipelines?

A. -- the Enbridge system that passes through a piece of North Dakota actually has a number of pipelines, some of which would actually exceed the capacity of this pipeline.

Q. Is that all the pipelines in the corridor together or is that a single pipeline? That's what I'm wondering.

A. It's actually single pipelines within the corridor, so they have single pipelines within that corridor that exceed the capacity of Keystone.

COMMISSIONER WEFALD: Thank you.

FURTHER EXAMINATION

BY COMMISSIONER CLARK:

Q. And then just real quickly, the flyovers, are they third parties, as well, that are contracted to conduct those?

A. Yes, they will be.

Q. And then there was a -- there was a question about a private well, if a citizen was using it and it had been contaminated, how -- would a citizen know by smell or -- this might have been a question maybe better addressed to Ms. Tillquist -- but would they know at a toxic level

that it was contaminated by smell?

A. And I'm sorry. I can't -- that's not my area of expertise.

COMMISSIONER CLARK: Okay. Thanks. That's all I have.

JUDGE WAHL: Commissioner Cramer.

COMMISSIONER CRAMER: Sure.

EXAMINATION

BY COMMISSIONER CRAMER:

Q. The PHMSA requirements that -- the PHMSA requirements you have to meet, are they the same as the gas pipeline PHMSA requirements, the same code?

A. Like to some degree they are the same. The emergency response plan is entirely different. The CFR 49 -- or pardon me, 49 CFR 194 is just something that the liquid operators have to meet.

Q. Okay. And that gets right to my question because the burden on, say, sheriff's departments, ambulances, the first typical emergency first responders, it would seem to me, wouldn't be as stringent for an oil pipeline as it would be for a gas. I mean, the danger isn't as imminent if there's a leak detected; is that accurate?

A. That certainly would be my assessment and my experience. Yes.

Q. Given what -- given the environment we currently live in, has there been increased focus on large oil pipelines like this as potential terrorist targets and have there been appropriate responses in terms of emergency plans?

A. The -- not so much, to my knowledge, as a result of security-related issues, but there certainly have been -- homeland security has required pipeline operators to basically follow prescribed plans with respect to protective measures that are undertaken based upon the security threat level. That has certainly been recent.

COMMISSIONER CRAMER: Okay. And then besides that, I just -- to Commissioner Wefald's question, we actually have a docket in front of us for a 36-inch pipeline that will traverse North Dakota from Alberta, same soil source, that would have the capacity of about 900,000 barrels per day. I have nothing further.

JUDGE WAHL: Anything further from the Commission? Followup, Mr. Kelsch?

MR. KELSCH: Thank you, Your Honor.

REDIRECT EXAMINATION

BY MR. KELSCH:

Q. Mr. Thomas, will Keystone's -- or does Keystone's leak detection system meet or exceed the -- I guess it would be PHMSA regulations? Is that right?

A. It would be the two codes of federal regulations, 49 CFR 194 and 49 CFR 195, and, yes, Keystone's leak detection methodologies meet or exceed the requirements of those codes.

MR. KELSCH: I have no further questions.

JUDGE WAHL: Mr. Delaney.

MR. DELANEY: I have no other questions.

JUDGE WAHL: Mr. Binek.

MR. BINEK: Nothing further.

JUDGE WAHL: Any followup from the Commission?

COMMISSIONER WEFALD: No.

JUDGE WAHL: All right. Mr. Kelsch.

MR. KELSCH: Your Honor, I would like to recall Mr. Cowling to, I guess, address a couple questions that the Commission brought up.

JUDGE WAHL: Mr. Cowling. Mr. Cowling, you're obviously well aware, but I'm -- it's necessary for me to repeat the admonition that your

testimony continues under oath and subject to penalties of perjury.

MR. COWLING: Yes.

JUDGE WAHL: Mr. Kelsch.

MR. KELSCH: Thank you, Your Honor.

MIKE COWLING,

having been previously first duly sworn, was examined and testified further as follows:

FURTHER REDIRECT EXAMINATION

BY MR. KELSCH:

Q. Mr. Cowling, yesterday a question was raised by Commissioner Clark on why did the Keystone or why is Keystone proposing to come into the State of North Dakota where it is proposing the route to be. Can you respond to that pipeline location issue?

A. Yes, I can. Actually, earlier in the subsequent hearing where most of us were together and we discussed a little bit about routing through Mike Koski, as some background with regards to our scope of our project, it would have been mid 2003 where a group of oil producers started to talk to TransCanada about the use of an underutilized facility that TransCanada had on its gas side, and that actual concept actually worked its way into

the Keystone -- the Keystone project. Part of that project that you see in front of us today, one of the key features of that project is the utilization of the existing gas infrastructure project of which yesterday I suggested to you that application was approved by the National Energy Board in Canada earlier this year.

One of the key features of converting that pipeline is it's very economical to actually deliver crude oil from Alberta to markets in the United States and really creates an advantage to get that oil to market.

A couple things as we progressed the route. One of the -- there was two real main features as it relates to where we entered North Dakota. One is the conversion pipe itself and utilizing the conversion pipe, and the second is a control point that I think that Mr. Koski discussed on several occasions, and that control point being the Missouri River crossing, which is a significant crossing for us as we move into the U.S., and so as you line those two control points up, although we've had minor route refinements over the last -- over the last number of months, et cetera, that's what's really driving our route refinement process

and how we came up with the current route that we have today.

Q. Mr. Cowling, another issue that was raised yesterday was the possibility of the Commission requiring Keystone to move the pipeline route in the area of the Fordville aquifer approximately eight or eight-and-a-half miles to the west. If the Commission would choose to make that a requirement, notwithstanding some of the safety issues that were testified to this morning, what are the practical implications for Keystone's project and project schedule that would result from such a decision?

A. Well, I think, first of all, over the last couple days we've discussed what I would term route refinements based on public comment and review by Keystone, and I think we've gone through some of those -- what I would call route refinements over the last several days.

When we talk about the Fordville aquifer and we talk about shifting the pipe approximately eight miles west, I actually term that as a reroute, and today, although on the map that we've been reviewing, I think we've all been terming that as a reroute. It's really not a reroute. There

hasn't been any work done on that line on a map, and I would really call that a concept today.

And I think a couple things that we do need to be aware of, number one, is moving that route over by eight miles there would be a significant amount of work that would need to be required that I would suggest to you to reroute the pipe, and in Mr. Koski's testimony he went through the route selection process, and things that we would need to do would be we would need to do data collection on that 50 miles, we would need to develop an initial route, we would need to solicit -- solicitation of agency and public input on that route, further route refinement based on that input, filing of the revised route with the North Dakota Public Service Commission and the Department of State. We would estimate that this -- this work would probably take in the order of two to three months to complete the -- what we would call that route refinement and redefining our route eight miles west. So probably a two- to three-month time period.

Q. Mr. Cowling, would there have to be additional studies and surveys done of that, I guess, new proposed reroute or route?

A. Well, Keystone would be required to undertake a number of additional studies and surveys with respect to the area that would be impacted on that revised route. These would include cultural surveys, wetlands surveys, threatened endangered species surveys, civil surveys. We would -- we would have to undertake an update on our risk and consequence analysis that Ms. Tillquist went through with us this morning, and most likely we would have to rerun our hydraulics as we move through a design of the pipeline. The results of these studies and surveys would then have to be incorporated into the route and further route refinement would have to be considered. This work, at least in our opinion, would probably take -- would probably take in the order of three months.

Q. Now some of these studies would -- would they be able to be done during the winter or would they have to wait until the following spring?

A. Actually, the studies that we talk about as it relates to the studies and surveys as it relates to cultural surveys and some of the surveys that we do to support the environmental portion of our application would actually not be able to be

completed in the wintertime. Probably the earliest that we would be able to really start that work would be probably April of next year.

Q. Would Keystone have to go through additional right-of-way acquisition if -- for that 50-mile segment?

A. Shifting the route to the west eight miles essentially brings onto -- brings into Keystone approximately 50 miles of new pipeline right-of-way. Keystone would need to seek and work with landowners in what we would anticipate in the neighborhood of 145 new landowners that we would need to get engaged in the process. The process for seeking this additional right-of-way would require Keystone to prepare a line list, conduct title work, prepare property sketches, undertake appraisals, and pursue -- of course, pursue our easement acquisition program. We would estimate that this piece of work scope would probably take in the order of six months.

Q. Now we talked about some minor reroutes on Mr. Bures's land, Mr. Zacharias's property because of some cultural matters, but would such a -- I guess a 50-mile segment rerouted by eight miles, would that have an effect on the NEPA process?

A. I believe so. Keystone would be required to submit the reroute to the Department of State, along with the environmental studies I just went through. Due to the magnitude of the reroute, this would likely trigger a supplemental NEPA process. This process would involve a notice of intent, additional scoping meetings, preparation of a supplemental draft environmental impact statement, a public comment on that draft environmental impact statement, an issuance of a supplemental final environmental impact statement. This process would likely take in the neighborhood of six to nine months.

Q. What about the timing of whether there would be a Commission-approved route? Would that have any impact on Keystone?

A. I believe Keystone would not be aware of the Commission-approved route until the Commission's order as issued in this case, which I believe is in November of this year. If a reroute were required, Keystone presumably would have to file for the approval of the proposed reroute. Keystone would then have to notify the new landowners impacted by the reroute. Additional public hearings and formal hearing may be required.

This would likely take what I would suggest as approximately six months.

MR. KELSCH: I have no further questions.

JUDGE WAHL: Mr. Delaney.

FURTHER CROSS-EXAMINATION

BY MR. DELANEY:

Q. Mr. Cowling, if -- if indeed this reroute lessens the possibility of contamination of a resource such as the Fordville aquifer, don't you think this extra work is worth it?

A. Mr. Delaney, based on the application that Keystone has filed and the information that has been presented over four days, I think Keystone believes that we've spent a lot of time doing all of this work and we believe that we have, and we've had expert witnesses say that we have in particular in the Fordville aquifer a very safe route.

Q. Certainly if the Commissioners were to decide that the reroute were necessary or if they were to require that of Keystone, Keystone's in a position and is prepared to do the extra work that you've outlined, are you not?

A. Certainly.

MR. DELANEY: Okay. I have no other questions.

JUDGE WAHL: Mr. Binek?

MR. BINEK: I have no questions.

JUDGE WAHL: Questions from the Commission? Commissioner Wefald.

COMMISSIONER WEFALD: Yes.

FURTHER EXAMINATION

BY COMMISSIONER WEFALD:

Q. Was it yourself or was it someone else -- who was it that testified yesterday regarding the reroute?

A. That would have been -- if memory serves me correct, it would have been Mike Koski.

Q. That person said something that the company had already received -- I wrote it down somewhere -- 70 easements.

A. That's on the current route. The reroute we have not identified -- we don't have a line list, we don't know landowners. On the current route, and if memory serves me correct -- and I can be corrected, please, by the record -- I believe on the current route there's approximately 110 landowners of which we've received 70 easements.

Q. I had written those numbers down under the proposed reroutes, 230, under the Fordville aquifer eastern reroute I wrote, out of 358 that you had

moved forward and in good faith were doing those things.

A. We have only been acquiring -- we have only been acquiring easements on our proposed route.

Q. Why would I have 70 out of 118 out of the Fordville aquifer western reroute and then under the Fordville aquifer eastern reroute I have 230 out of 358?

A. Can I see the --

MR. KELSCH: Commissioner Wefald, if I may, I think the testimony was because it was -- there were two different potential reroutes, one was moving to the east and one was moving to the west, and there were different lengths, but the comparison was to the number of landowners on the current route that basically would be moved -- if you went east, that number would be the ones that they wouldn't go over anymore, and if they went west, again they wouldn't be going over those people that have already signed easements on the further current route. So those numbers were basically for the current route, not for the new routes or the --

THE WITNESS: Conceptual routes.

MR. KELSCH: -- conceptual routes either east or west.

COMMISSIONER WEFALD: I don't get it.

MR. KELSCH: Well, Commissioner Wefald, I think the position -- I think the purpose that that testimony was put in was to basically show that 70 percent of the people on the current route have basically already signed an easement and apparently don't have a problem with the current route, and it was 70 out of the 110 of the short -- shorter version, if you went west, and the eastern version is a longer version, and so it was about 70 percent, too -- I don't have the numbers right in front of me, I think you do --

COMMISSIONER WEFALD: 230 of 358.

MR. KELSCH: Yeah. And so that was the amount of people on the current route that have already approved it. That if we move the route over to the east, I guess they wouldn't get their money for their easement or --

COMMISSIONER WEFALD: All right. Thank you.

THE WITNESS: Sorry. I should have asked for the piece of paper to review.

JUDGE WAHL: Any -- Commissioner Cramer.

FURTHER EXAMINATION

BY COMMISSIONER CRAMER:

Q. I want to get back to the opportunities that you talked about earlier, and I understand that one of the -- in your cost/benefit analysis or your analysis of potential routes -- other potential routes, crossing the Missouri River was a major factor, and first of all, TransCanada is part-owner of the Northern Border Pipeline; isn't that true?

A. We are, yes.

Q. Okay. Was that a corridor that was considered realizing that would be one that would, I believe, cross the Missouri somewhere in North Dakota?

A. For the Keystone Pipeline project, no. Again, the Keystone, as I -- at least to the best of my knowledge, the Keystone pipeline project, the fundamentals behind the project are the use of the conversion, and the use of Northern Border's inlet into the foothills system in Canada would not utilize the converted line-100 section.

Q. I understand that. So then I guess the answer to my question I might have asked, Mr. Cowling, yesterday, was the decision where to enter

North Dakota -- well, the decision to use that converted gas pipeline was made first before analyzing the possible routes in the United States; is that accurate?

A. I would suggest that that's accurate, yes. This is -- again I think as we've discussed over the last number of days, this is a very long, linear project, and the fundamentals behind the project -- that decision was a backbone for the project.

COMMISSIONER CRAMER: I don't want to confuse this with a pre- prudence hearing that we're involved in in another case, so that's all I have.

JUDGE WAHL: Commissioner Clark.

FURTHER EXAMINATION

BY COMMISSIONER CLARK:

Q. On the Missouri River crossing that you had mentioned, I assume that's the crossing at Yankton that --

A. That is correct.

Q. What makes that particular location one that would be favorable as compared to other spots on the river?

A. Now you're asking me a question that I

don't have a lot of detail on, but I think as you move -- and this would be subject to check -- as you move further west from Yankton, there's a lot of water bodies, lakes, et cetera, and the river, itself, would be very, very difficult to cross. In our analysis -- I believe in our analysis that I had Mike Koski -- Mr. Mike Koski and his team do, we believe or have come to the conclusion that crossing the Missouri River at or near Yankton is the best spot to cross -- to cross.

COMMISSIONER CLARK: Thanks.

JUDGE WAHL: Anything further from the Commission?

COMMISSIONER CRAMER: I just want to pursue this one more time.

FURTHER EXAMINATION

BY COMMISSIONER CRAMER:

Q. Was the Alliance Pipeline corridor a consideration? And I want to get back to your east/west converted gas. That -- you could still use that at some point and enter coming to the south or more diagonally southeast at some other point west of where you're doing that. Was that a consideration?

A. Well, actually I would suggest it wasn't,

and actually I did have some folks run some information for me last night. The Alliance Pipeline enters the U.S. near Shepherd, North Dakota, as I'm sure you're aware. It meets with Keystone near Valley City. Our current route for Keystone is approximately 218 miles long. If we were to use that route, we would essentially be increasing our route length by about 100 miles. So again, as you look at that from an environmental perspective because you're still going to use the land -- and I can't say can you look at it from an environmental perspective because we haven't, but just from a linear perspective, it's an increase of over 100 miles in pipeline length.

Q. In North Dakota?

A. In North Dakota.

Q. It would actually be shorter in the overall project; is that accurate?

A. It would be -- actually it would be shorter in the overall project. However, we're utilizing existing assets in Canada, so it's probably not a fair comparison, from my perspective.

Q. Well, let me just take it one step further. You'd be using -- you'd be not using, I

don't know, 150 miles or so of an existing asset, but you'd be using nearly 300 miles of an existing corridor and there would be some trade-off benefit to that, would there not?

A. You know what, I -- based on paralleling other pipelines, you're still going to have -- you're probably in this instance going to have a number of more landowners, you're going to be accessing or being required to access more land. So I -- you know, without doing that detailed analysis, my experience and just thinking about it very quickly would say that it would have different environmental impacts.

COMMISSIONER CRAMER: That's all. Thank you.

JUDGE WAHL: Anything further from the Commission? Followup, Mr. Kelsch?

FURTHER REDIRECT EXAMINATION

BY MR. KELSCH:

Q. Mr. Cowling, if you did run, you would be running adjacent to that Alliance Pipeline. You wouldn't be in their easement area.

A. That's correct.

Q. So the -- we'll call it the permanent easement area that you'd go through, the trees you

would be cutting down, the lakes or rivers you'd be crossing, you'd would be crossing in a different area and having different environmental impact or additional environmental impact.

A. I would suggest yes.

MR. KELSCH: No further questions.

JUDGE WAHL: Mr. Delaney.

MR. DELANEY: I have no further questions.

JUDGE WAHL: Mr. Binek.

MR. BINEK: None.

JUDGE WAHL: Any followup from the Commission? All right. Mr. Kelsch.

MR. KELSCH: I have no further witnesses, Your Honor.

JUDGE WAHL: Thank you, Mr. Cowling. Mr. Delaney.

MR. DELANEY: I would call Jim Horner.

JUDGE WAHL: Mr. Horner, as you doubtless have heard me advise previous witnesses, your testimony is required to be under oath and I'm required by law to advise you regarding perjury before administering the oath. Perjury is a false statement of material fact which you do not believe to be true, in other words, generally speaking, a lie. In North Dakota perjury is a Class C felony

punishable by a fine up to $5,000, imprisonment for a period of up to 5 years, or both.

(Witness sworn.)

JUDGE WAHL: Mr. Delaney.

JIM HORNER,

having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. DELANEY:

Q. Can you state your name and spell your last name for the record?

A. Jim Horner, H-o-r-n-e-r.

Q. Mr. Horner, what is your occupation?

A. I'm a geologist with the North Dakota Department of Health, division of water quality, groundwater protection.

Q. And how long have you held that position?

A. Approximately 15 years.

Q. And what's your education?

A. BS, geology.

Q. The reason I called you to the stand, Mr. Horner, today is because I want to get a sense of the Department of Health's role in this entire process. Okay?

A. Okay.

Q. What up until this point have you reviewed regarding the pipeline project we've been talking about?

A. I've reviewed the proposed route since --

Q. Is that -- oh, go on.

A. Okay. Well, I'll tell you. I think I began in 2005 when they initially had their public meeting, I think a town meeting, in Park River area. I'm not sure about Park River exactly, and that's where the water operator, public works director from Park River was concerned that the original routing was a pencil line through the Fordville aquifer and the Park River wellhead protection area.

Q. And did you attend that meeting because -- were you noticed of that meeting by the pipeline company?

A. No. They sent the department a letter with their concerns, and that's when I became involved in the process.

Q. I see. And just generally speaking, the Department of Health -- what does the Department of Health do in the State of North Dakota, generally?

A. Well, okay. We do a number of things. We're -- I'm in the environmental health section.

The Department of Health encompasses like epidemiology, diseases, West Nile, et cetera, where we deal with environmental questions, waste management, air quality, water quality. I deal with water quality.

Q. Okay. So your department is responsible for water quality in the state.

A. That's correct.

Q. Okay. And you said it was 2005 when you were first notified or --

A. When I became aware of the project.

Q. -- became aware of this project? Okay. And with a project like this, a pipeline, what is it that the Department of Health does?

A. We work with the corporation or company on siting, groundwater concerns, issues that arise. I have no regulatory authority personally in what I do.

Q. Does the department have any regulatory authority?

A. Yes, we do.

Q. Can you elaborate on that a little bit?

A. Okay. Just -- I don't do that, but there is listed in the appendix that you brought up, the dewatering hydrostatic testing, that's permitted

through our North Dakota discharge program. And then there's Section 401, 402, 404, which I believe is permitted through the Corps of Engineers -- I'm not sure of that -- and then I know our gentleman, the next -- Mike Sauer, has -- can put requirements in that permit.

Q. Okay. And is that part of the 401 certification that the state does?

A. I don't know. I'm not going to comment on that. Mike's the guy.

Q. Okay. And so thus far what has been -- since 2005 when you first became aware of the project up until now, what has been your involvement?

A. I've been talking with their hydrologist out of ENSR about the initial route and telling him you can't go through wellhead protection areas, which they were aware of, and I provided them with that data. I didn't want them -- I can't stop them from going through surficial aquifers, but I sent them those maps showing where those aquifers were, and then they rerouted it.

Q. Okay.

A. So that's the way you work with them. You negotiate. If you say don't do this, you get in

trouble.

Q. You mentioned a hydrologist. Whose hydrologist was it?

A. ENSR, the consultant for TransCanada out of Denver.

Q. Okay. I believe that Mr. Scott Ellis was from ENSR. Have you been in contact with him before?

A. Well, I met him at the meetings. I think the gentleman's name is Jim Burrell.

Q. So other than look at the route and suggest some changes on the routing, have you done anything else?

A. Well, I've attended all the meetings, the public hearings, and I did the route analysis myself, I mean, on their -- when I knew they had a pretty hard, fast route, then I went from Canada to South Dakota and did the geology cross sections, hydrogeology on my own for our -- North Dakota.

Q. Okay. And did you get any information from Keystone that you used in that analysis?

A. No. That's all our data. My only contact with Keystone was asking Heidi what kind of product -- what kind of crude was going to go through that line.

Q. Okay. And the -- have you received or reviewed at all frequency volume studies?

A. No.

Q. Any risk assessments?

A. No. Can I make a comment or get myself in trouble?

JUDGE WAHL: No, you may not.

THE WITNESS: Okay.

MR. DELANEY: Okay. I think those are actually all the questions I have of you.

JUDGE WAHL: Mr. Kelsch.

MR. KELSCH: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. KELSCH:

Q. Mr. Horner, you stated that when you first got involved in this, the route was penciled in over -- over top of the Fordville aquifer; is that correct?

A. Yes. They cut through a number of aquifers on the eastern part of the state.

Q. And as I understand your testimony, you advised Keystone that they shouldn't go there, and they moved the line to the west of the Fordville aquifer.

A. That's correct.

Q. Now were you satisfied with the line where they moved it to?

A. Yes. And then there was --

Q. From a groundwater --

A. From a groundwater perspective, yes.

Q. And I think did you also request that they move it out of some surficial aquifers down in the south and maybe the hecla sand areas?

A. Correct. They did a reroute, and then when I became aware of that, they pushed it over into the Oakes aquifer, and then I again advised them that's not going to work, and so then they put it back in their original route.

Q. So has Keystone with their current route that they have, have they, I guess, listened to your suggestions or recommendations as far as a groundwater location?

A. Yes, yes.

Q. Okay. You've seen their current route that they have right now that's before the Public Service Commission?

A. Yes.

Q. And from a groundwater -- I understand that's your area of expertise. From a groundwater protection standpoint, are you comfortable with the

route location?

A. Yes.

Q. There was some questions -- I think you probably were here in the room concerning some of these -- I don't know if it -- the wellhead protection areas. Commissioner Wefald was asking about some wellhead protection areas, I think, on the -- that are on the map. Are there some wellhead protection areas that are, I guess, no longer considered wellhead protection areas, if that's what it's called?

A. On our database there have been a number of systems that became consecutive users and no longer use their water supply wells, their public water supply wells. Walhalla, which uses the Pembina River aquifer, has several years ago become a consecutive user from North Valley Akra well field, which is an icelandic aquifer.

Q. What do you mean by consecutive user?

A. Okay. They no longer produce their water. They buy it from another producer.

Q. So if -- would that be -- I think you maybe have a -- the application in front of you. Do you?

A. Oh, yeah.

Q. If we -- because this was a question from Commissioner Wefald, if you'd maybe go to map one of ten?

A. Okay.

Q. And I guess the part I'm looking at it would be the one of ten map that would have the wellhead protection aquifer listing?

A. Okay.

Q. Was that -- is that the Walhalla aquifer up there that's no longer in use?

A. I believe so, yes. This is not my map, but that's a correct location.

Q. Okay. So that area would not -- would not be -- those -- that isn't a public water system anymore.

A. No. But yet the wells may still be in place. They do not notify us if they -- they notify the Board of Water Well Contractors if they properly plug and abandon the wells. So they no longer produce as a public water system, but they still maybe may be functional in the future for emergency water use.

Q. Okay. Then I believe you mentioned that there was another one that was no longer being used. What --

A. That was called the Gardar well field that is located -- which I believe on there they don't have a name for it. It's in the Gardar aquifer and I believe just on the border between Pembina and Walsh County, and that -- they no longer use that. They supply it out of their Icelandic aquifer, but those wells are still in place but it's no longer considered a public water system.

Q. Would that be the one shown on map two of ten?

A. I believe so, yes. Let me make sure. Yes. That's correct. And that's called the Gardar aquifer.

Q. How about the Town of Sharon? Did they -- are they no longer using their --

A. Sharon is no longer a public water system. They buy their water from another supplier.

Q. And where would -- now Sharon, that's, I guess, further south, right, or where would that be on these maps, if you know?

A. I don't know on these maps. I don't.

Q. How about North Valley? Is that also not a public water system?

A. Well, North Valley is -- they have two well fields, the Icelandic, called the Akra well

field. That's an Icelandic aquifer. The one that is no longer a public water system is their system -- Gardar system.

Q. Okay. You already mentioned that.

A. That's the one that -- but the wells are still functional, and in the future they can put them back in production, depending on their distribution needs. So if they're no longer public water systems, the wellhead protection area no longer is functional, unless they turn them on.

Q. Now one of the concerns that your department or you and your department are dealing with is groundwater, and perhaps I might not be using the correct terminology, but it would be from a nonspecific source, pollution?

A. Non-point source and point source.

Q. Now is the Keystone Pipeline a point source?

A. Yes.

Q. And what do you mean by that?

A. It's a -- if they have a -- it's a linear feature that is a specific point that you -- it's a confirmed release. They're talking about whether it's slow release, a rupture, whatever. It's a point source release that we can deal with.

Non-point source -- to make the distinction, non-point sources are more difficult to find what's causing it. There's no responsible party to address the issue.

Q. If there would be a point-source release on the pipeline, would your department -- you and your department get involved with the company to, I guess, limit any impact on the underground part?

A. Yes. The assessment and abatement, they would have to follow what we require, vertical and horizontal extent of the contaminant plume both in the absorbed and the dissolved phase, as well as any air, misting or odors, and we would set requirements, but we are not first responders. We would respond following and require that to be cleaned up, excavation, whatever is required.

Q. So they would be responding and doing it, and you would be monitoring what they're doing and making sure that they do what you want.

A. Yes. And then in that we have the regulatory authority to require them to do these things.

Q. Is that through the EPA, your authority through them, or just the state?

A. No. This is just through the state and

Century Code -- I can't quote -- 61-28 is the all-encompassing one for contaminant releases.

MR. KELSCH: I have no further questions.

JUDGE WAHL: Mr. Binek.

MR. BINEK: I don't think I have any questions.

JUDGE WAHL: Questions from the commissioners?

COMMISSIONER CRAMER: I don't have any.

JUDGE WAHL: Commissioner Clark.

COMMISSIONER CLARK: Just quickly.

EXAMINATION

BY COMMISSIONER CLARK:

Q. So I understand the process that the health department would use, you don't actually grant a permit or anything like that to Keystone, do you?

A. For the routing, no.

Q. It's more of a -- if I understand it correctly, it's a situation where the health department monitors a project like this, and if you see problems, you let the applicant know that you see a problem. Hopefully, they respond to that. If you had continued concerns, say you had someone who didn't move a line that you said you thought

there were going to be problems with or something like that, what would be the next step? Would it be the health department intervening, say, here before the Commission to block it or is there a separate administrative procedure in addition to that?

A. No. My understanding is it goes to another level. If I say I don't like something, I tell my division director or my manager, whatever. I don't know what that level is. I imagine it would come back. We would not -- we would send you a letter saying, no, we don't like this. I mean, we would go to the next level. I don't deal with the next level.

Q. Sure. So to the extent that the health department hasn't intervened before this proceeding and is indicating to the Commission that you oppose it, you're indicating to us that you don't -- you do not have concerns with the current --

A. On the groundwater issues.

Q. On the groundwater issues.

A. I'm speaking on the groundwater issues.

Q. Exactly.

A. I do not speak for --

Q. Trees or anything else?

A. -- trees or anything like that.

Q. Yeah. I understand that fully. It's with regard to the water and natural resource within North Dakota.

A. Correct.

COMMISSIONER CLARK: Okay. Thank you.

EXAMINATION

BY COMMISSIONER WEFALD:

Q. Are you the only person at the health department who reviews the groundwater issues?

A. Well, up to this point, yes. I just follow the project from the beginning, our knowledge of it. Yes. But there are other -- my co-workers would be -- take part in it.

Q. And the only way you became aware of this as this project was getting started was not through any letter from the TransCanada but only --

A. Well, we received -- this was in December of 2005 when we received the letter from City of Park River, and there was others from Bill Link, Walsh Rural Water System. The City of Minto within -- let me clarify. Park River took over the wells about three years ago from Cavalier Air Force Base. Now those water wells belong to City of Park River. That's why they closed their surface water

intake. Then I immediately called the TransCanada 800 number, and, of course, it was Christmas vacation time, but during that time period I received some -- the department received some publicity or notification of the project, the meetings, dates, et cetera, and how to contact them, but they immediately contacted me in the new year and addressed the original concerns about the Park River situation.

Q. Okay. And then on the -- on the Fordville aquifer, if you can just explain to me, what is a WHPA?

A. That is called a wellhead protection area. Now those are not correct terminology. There's source water protection areas. They -- I don't want to get into this. It should be source water protection area.

Q. Source water protection area.

A. We distinguish between surface water and groundwater sources, but they're all source water protection areas.

Q. And why -- it appears to me that the current route goes right through a source water protection area. Why isn't that a concern?

A. That is no longer -- the City of Cavalier

shut their surface water intake, that that was a wellhead protection -- source water protection area for their surface water intake in the home reservoir. They no longer use that. They're now a groundwater system using groundwater from the Fordville aquifer and those ten wells that you saw on their map, and so that is no longer a functioning source water protection area.

Q. All right. And so those wells no longer function or they're just not being used at the present time?

A. No. The intake no longer -- I don't know, see. I imagine they would just quit using -- they don't have the distribution system connected to surface water intake. They draw all their water supply from the ten groundwater wells located in the Fordville aquifer.

COMMISSIONER WEFALD: All right. Thank you.

JUDGE WAHL: Any further questions from the Commission? Followup, Mr. Delaney?

MR. DELANEY: Briefly.

REDIRECT EXAMINATION

BY MR. DELANEY:

Q. The groundwater concerns that the -- your

department focuses on are -- my understanding is that you're concerned with public water supplies and not so much a farmer's private well that he has out in the middle of his farm.

A. No. That's not correct. Our regulatory authority is only on public water supplies. We are just as concerned about groundwater quality in a domestic or stock well even.

Q. Okay. Did you look at how many private wells are located near the route?

A. I didn't count them, but I have them all in a three-ringed binder. Yes, I did.

Q. Do you have that binder with you?

A. I have one part.

Q. Do you have one part of the line or --

A. Yes. I have three three-ringed binders, and I walked over here and I couldn't carry them all.

Q. Is there any way you could supply that to -- a copy of that here?

A. I have that right here, the Fordville aquifer, the northern portion.

Q. But do you have identifiers of where there are private wells located --

A. They're listed in the North Dakota State

Water Commission database. They're available to the public. It's data resources under the North Dakota State Water Commission, and they're all listed township, range, section, but they're only the ones on record. By law since 1972 private water wells have to be put on file with the Board of Water Well Commissioners. Prior to 1972 there was not that requirement. So not -- on the database not all -- but most of them are on there, but unfortunately they don't give a lot of times well logs, the lithology of them.

Q. So with respect to this project and these private wells, what did you look at?

A. Well, just pretty much the location, if they had well construction records, and I put them in there. I wanted to know the slope of the land from the centerline of the route to the aquifers -- all the aquifers on both the west and east and the locations -- I did not locate the private wells unless I had a construction record, but I have by township, range, section, quarter, quarter, quarter, I have the location of all the private wells that are on the database. Yes.

MR. DELANEY: Okay. I don't have any more questions.

JUDGE WAHL: Mr. Kelsch?

MR. KELSCH: No further questions.

JUDGE WAHL: Mr. Binek?

MR. BINEK: None.

JUDGE WAHL: Any followup by the Commission?

COMMISSIONER WEFALD: I have one.

FURTHER EXAMINATION

BY COMMISSIONER WEFALD:

Q. Do you have a certain distance you'd like a pipeline to be from a private well, let's say an oil pipeline?

A. Well, I would -- I'd like to see them kind of hold that 500, like they're trying to stay 500 feet from the private. I deal with assessment and abatement of release sites, as well.

Q. Have you noticed that there are any closer than 500 feet to the pipeline?

A. No, I can't say that on the scale that I've worked on. There are some that I would have to say are approximately 500 feet, but I did not have the time to do a detailed -- those maps are in meters and the scale is a pretty large scale, and I just couldn't do it.

Q. So you can't tell from the large map that

you've been given where -- exactly where it is in relationship?

A. No. Not -- I located them on this topo sheet because I wanted to know the slope. These other maps are only meaningful to someone else. For example, most of the route -- I know this. There are very few wells from the northern part of the state to -- you're getting down around to Valley City, when you go south of Valley City, then there's getting a few more. You've got that narrow corridor between the Brampton aquifer and the Oakes aquifer, now you're getting some more, but on my sections I didn't locate. I just did observation wells where I have records of and test holes where I had lithology and geology.

Q. How much work would it take for you to identify whether there are any private wells within --

A. When I did my analysis, it took me four weeks, so it would take me another four weeks. I mean, it's a tedious job. Your database shows you the data, but you have to put it together, but I know this, that on just my test holes there's just not much water. You know, with the glacial till overlying the shale in the north, the Pierre shale,

and it gets -- it's the same thing all the way through the pipeline, and in the till overlying the shale it's primarily clay, but there are sand and gravel pockets in lenses. They're very -- they vary from 1 foot to 10, occasionally 10 to 20. They can provide water to a private farmstead or private domestic homestead, but they can't -- they're not large -- aerial large enough to provide water to be a productive aquifer.

Q. All right. And are you -- you're satisfied also with the Lake Ashtabula -- how close that is to the pipeline?

A. Well, I can only concur with the testimony that Ms. Tillquist gave. At Lake Ashtabula the slope is very flat, and I'm not overly concerned with that. I would say the Fordville aquifer -- on that I agree with Ms. Tillquist that it's safe at its present location, and I agree with her -- I won't use slightly better to the west -- it would be safer to the west. You have the same drainage going down, but it is further away, but it's the same lithology, hydrogeology. It just gives a little more travel time.

Q. Okay. And that's the main aquifer that you have any concerns about on the whole route.

None of these other surface waters --

A. No. I'm really not that concerned about the Fordville aquifer. I never have been, except when the original route went through it.

Q. Right. But of the other areas you're fine, even with the surface water aquifers going right over the top?

A. Well, no. Oakes and the Brampton -- Oakes aquifer is a highly productive aquifer, but I'm fine when they snuck it through the corridor. Now we're in a different geologic kind of setting there. We have more lake sediments rather than the till drops out, the glacial drip. It's still glacial drip, but now it's deposited by buried channels in buried channels and in former lakes. So there's thin lenses of fine sand. Now the gravel component lessens somewhat, but the sand -- there's pockets of sand more in the clay.

COMMISSIONER WEFALD: Okay. Thank you.

JUDGE WAHL: Any further questions from the Commission? Mr. Delaney.

MR. DELANEY: No.

JUDGE WAHL: Mr. Kelsch.

MR. KELSCH: One, Your Honor.

RECROSS-EXAMINATION

BY MR. KELSCH:

Q. Mr. Horner, so I understand you, in the Fordville area you're agreeing with Ms. Tillquist that the current location of the pipeline is safe with respect to the Fordville aquifer?

A. I said that, yes, it's safe, but west is better.

MR. KELSCH: No further questions.

JUDGE WAHL: Mr. Binek, anything further?

MR. BINEK: No.

JUDGE WAHL: Any followup from the Commission? All right. Mr. Delaney. Thank you very much, Mr. Horner.

MR. DELANEY: Mike Sauer.

JUDGE WAHL: Mr. Sauer, we need to do the drill, of course. As you've heard me advise previous witnesses, your testimony is required to be under oath and I'm required by law to advise you regarding perjury before administering the oath. Perjury is a false statement of material fact which you do not believe to be true, in other words, generally speaking, a lie. In North Dakota perjury is a Class C felony punishable by a fine up to $5,000, imprisonment for a period of up to 5 years,

or both.

(Witness sworn.)

JUDGE WAHL: Mr. Delaney.

MIKE SAUER,

having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. DELANEY:

Q. Can you state your full name for the record and spell your last name?

A. Michael, middle initial T, Sauer, S-a-u-e-r.

Q. Mr. Sauer, what's your occupation?

A. I am a senior scientist for the division of water quality, North Dakota Department of Health.

Q. And how long have you held that position?

A. Approximately 15 years, although I've worked for the department 28 years. Prior to being senior scientist I was limnologist for the department.

Q. Okay. Well, we got a little bit of a sense of what Jim does at the department. What is it exactly that you do?

A. Well, I do a number of different things,

but pertaining to this case I administer the Section 401 program for the state, and basically Section 401 is a water quality certification process and it applies to federal permits, in particular, the 404 permitting process administered by the U.S. Army Corps of Engineers.

Q. So walk me through what you do in this process exactly with respect to a project such as this.

A. Well, I'm going to have to be somewhat speculative here because normally we receive a completed application from the Corps of Engineers. The Corps of Engineers gets all kinds of information from a proposed applicant, such as Keystone. They compile that and they determine if, in fact, that application is complete. That's when they send it to the Department of Health for review, and we don't really review prior to that.

Q. Okay. And so once the Corps gets their completed application, then they send it to you basically for your certification, your comments, your conditions that you may want to say?

A. Right. Not only the Department of Health. They put it out for public review, they put it out for other resource agencies. The difference here

is many agencies and the public have comment authority. The North Dakota Department of Health under 401 is a regulatory program. For instance, a 404 permit cannot be issued without a 401 water quality certification. However, if 401 water quality certification is issued, that is not a guarantee that a 404 will be issued.

Q. And what exactly does a certification involve just generally, a 401 certification? Can you put parameters or conditions on the permit itself?

A. Yes, we can. Anything that we put in there relative to water quality must be transcribed verbatim into the Corps permit and is a condition of that permit.

Q. So you as of yet -- you've yet to receive any of these application materials for the Corps relative to this project.

A. No, I haven't.

Q. And when you do receive those materials, I suppose it depends on the project, but roughly how long does it take you to go through the certification process?

A. Well, based on the complexity of the project -- now I'm not sure how the Corps is

intending to process this application, whether they will be using nationwide permits for certain portions of the project or they will go individual permits for other portions.

Q. Okay. Do you --

A. Or it may -- I would think it's going to be one application, but it might be a dozen.

Q. Okay. Do you have any idea, I guess, based on previous experience as to how long it will take you to do this 401 certification process for a project such as this?

A. Well, what we will do -- the normal comment period is 30 days, and it's my understanding the Department of Health, as long as we're asking questions of the applicant and they're responding or getting data, that it can go on indefinitely. If we do not respond within one year, they can issue that permit under the assumption we have no comments, but I don't think that's ever happened, though.

Q. So your department hasn't yet received any risk assessments or any other documents relative to this project?

A. I took a cursory look at some of the risk assessment.

Q. Okay. But you haven't received anything from the Corps or the applicant for that matter?

A. No.

MR. DELANEY: Okay. Those are all the questions I have.

JUDGE WAHL: Mr. Kelsch?

MR. KELSCH: No questions.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No questions.

JUDGE WAHL: Questions from the Commission? Commissioner Clark.

COMMISSIONER CLARK: Just very briefly.

EXAMINATION

BY COMMISSIONER CLARK:

Q. Could you differentiate this process from what Mr. Horner discussed? How does it duplicate or are you looking at the same kinds of things or maybe just lead me through this.

A. No. They're completely different. What I'm doing is strictly a regulatory program, and when the state issues the water quality certification under Section 401 of the Clean Water Act, it's essentially the state's opinion that the proposed project will not violate applicable state water quality standards, and we have a booklet of

the standards.

Q. Okay. Whereas the process that he led us through is a more consultative process between the health department and someone who is looking to site a line like this?

A. That's my understanding, but I don't work in that area. The 401 basically deals with the groundwater -- I mean the surface water component, river crossings, wetland crossings, anything -- any time the Corps deems that the project will impact jurisdictional waters and they decide what's jurisdictional, but certainly most of the river crossings, the major river crossings, the Pembina River, the Sheyenne River, the Goose River, the Tongue River, the three branches of the Park and the Forest, I believe those would be jurisdictions.

Q. But some of the intermittent dry creek beds --

A. Some of the intermittents may not be, but they're in a state of flux right now in defining what is jurisdictional from recent Corps tests.

COMMISSIONER CLARK: Okay. Thanks.

EXAMINATION

BY COMMISSIONER WEFALD:

Q. Do you generally have any -- do you care

at all then about -- let's just put it this way. There's sometimes a choice that the Commission has that we can order that they would drill under a river or they would go across the river and distribute while they're doing it. Is that -- is that an issue that you care about or is that not an issue you care about?

A. I care about that very much.

Q. You would?

A. Yes. And let me elaborate a little bit on that, if you'd like me to. The construction methods are very important, and certainly directional drilling is a preferred method for crossing water bodies or underneath them, especially our major rivers like Pembina and I would suggest the Sheyenne. Although until we have a specific route and an application in hand -- and I might do an onsite inspection particularly on the Sheyenne River, I might do it on one or two branches of the Park River, certainly on the Pembina River, although I heard some testimony given that directional boring is likely on the Pembina River. And now if they directional bore the Pembina River, a Corps of Engineers permit may not be necessary because they're not adding

anything to or taking anything out of that river. They're coming underneath.

Q. Now we had a letter from North Dakota Game & Fish that was in the appendix, and it said that they preferred, if it was possible, to have directional drilling of these streams, Pembina River, Sheyenne River, middle branch of the Forest River, Tongue River, and a specific tributary in Pembina County, Goose River, north and south branches of Park River, middle branch of Park River, and north branch of Forest River. So as a commissioner who's supposed to issue a permit one way or the other on this, I know it's possible for them to directional drill, and so is it important for me to put in some -- that we want them to directional drill these, or do I leave it to you to come up -- to make those determinations later? What -- and do I need input from you to know whether I should order directional drilling or should -- based on the recommendation of North Dakota Game & Fish, should I order them to directional drill, because they really wanted that to happen for fisheries reasons, let alone water quality reasons.

A. As part of the 404 process I do review and

get copies of the various resource agencies' comments on the Corps permit. I take those into consideration. Certainly prior to onsite inspection of the proposed site I may see something that I find important for on ecological purpose to maintain community, the ecological structure of that stream where trenching and side casting may be undesirable. I may look at the sediment type there. If it's an organic muck type of situation, we may not allow them to excavate that and side cast it and then fill in the trench afterwards because that organic muck has environmental consequences associated with it, so any number of things, but if they directional bore under all these rivers, that may not even necessitate a 404 permit, but we would still be involved certainly on the wetland crossings and all sorts of things. All the waters are waters of the state, therefore we regulate them.

COMMISSIONER WEFALD: Okay. Thank you.

JUDGE WAHL: Any further questions from the Commission? Mr. Delaney, followup?

MR. DELANEY: No.

MR. KELSCH: No, Your Honor.

JUDGE WAHL: Mr. Binek?

CROSS-EXAMINATION

BY MR. BINEK:

Q. Will it make a difference to you where the Commission decides the route should be? If you were looking at reviewing this down the road and the Commission approves a route where directional bore doesn't work, for instance, and you feel that there should be directional boring, what happens then?

A. Well, it would be difficult to evaluate on a site-specific basis the plethora or myriad of different crossing scenarios. Generally I think we can accommodate just about anyplace, although directional boring may be extremely difficult in some areas, I acknowledge that, but they will be crossing rivers, there's no question about it, and I believe perhaps up to 100 unnamed first order streams or small ephemeral drainages. Those aren't probably of great consequence, but each one of those may need to be looked at, although I can't imagine directional boring under all hundred intermittent or ephemeral streams, and we would compare the crossing area to what we call our 303-D list, and that is our list of impaired waters and which waters and why they're impaired and for what

parameter and see if, in fact, the trenching may be allowable or some other technique may be needed.

Q. Have you looked at all at the locations where -- where Keystone plans to cross these different rivers?

A. I took a look at the Sheyenne River just on the larger maps.

Q. Just -- do you have any opinion at this point whether that can be directional bored?

A. Well, without going out onsite and seeing the morphology of the river at that location where the thalweg is or the deepest area, what type of riparian zone you have, it's very difficult -- or what type of sediment is in that particular area, it's really difficult to tell.

Q. And I guess I'm still not sure, does it -- does it make a difference to you that -- the Commission has the application before it now with a proposed route. So does it particularly make a difference to you whether the Commission approves the proposed route or something different?

A. On hindsight it may, but not at this stage of the evaluation because we don't have anything to evaluate yet from the Corps of Engineers and what their specific process is going to be for stream

crossings and actual locations, either, because I'm hearing that there's a number of options yet available for the actual routing, so --

MR. BINEK: Nothing further.

JUDGE WAHL: Any followup by the commissioners? Mr. Delaney?

COMMISSIONER WEFALD: I have just one.

JUDGE WAHL: I'm sorry.

FURTHER EXAMINATION

BY COMMISSIONER WEFALD:

Q. So -- I'm always trying to figure out how to do this. We've always put in -- you know, when we issue a permit, we say subject to meeting the conditions of all other state and federal agencies you have the ability to put it here, and then so we always think in our mind as we do this that then if you had a real concern of where we put the crossing, that you would be able to say to us -- you know, to the company, we don't like where this is and you're going to have to reroute this slightly to meet the criteria if you needed to have it drilled underneath or whatever. Do you -- does that make sense to you that -- do you ever feel that you have the ability to change the route?

A. Well, we have the ability to change the

route with a denial of 401 --

Q. I see.

A. -- pending alternatives, but part of the process for the Corps to have a completed application is an alternatives analysis. Now I don't know how --

Q. So do you think that perhaps we should require some alternatives of the Sheyenne River crossing in our application as a condition to give you a couple options?

A. Well, I don't know if I can recommend that, but I will be looking very closely at that Sheyenne River crossing relative to water quality and ecological community structure dynamics on that reach of river.

Q. Would you be able to give us any recommendations in the next month?

A. Not until I see the exact route.

Q. But we have an exact route that they propose right now that we're -- that we're thinking -- we're considering because it's the only one that's been proposed to us. Would you be able to give us some input on that route --

A. On the Sheyenne River --

Q. On the Sheyenne River.

A. On just that one if someone -- if the company wants to go up and put stakes exactly where that crossing is, where the center of the pipeline is and your right-of-way, I'll go out and take a look at that in the next 30 days.

Q. And if you could then send us a letter about whether you think directional drilling would be possible there or whether it's not and give us some input into that. We'll leave the Pembina River to the other folks who are worried about that up there. I think there's another state agency involved up there, so I'm not so worried about that one.

A. Well, we're going to take a close look at the Pembina River, too.

Q. I'm sure you are, too. I'm sure you are. That could be the same situation, you know, that there needs to be options up there.

A. Maybe.

JUDGE WAHL: Any further questions from the Commission? Mr. Delaney?

MR. DELANEY: No.

JUDGE WAHL: Mr. Kelsch?

CROSS-EXAMINATION

BY MR. KELSCH:

Q. The -- one of the letters I think that Commissioner Wefald talked about from the Game & Fish mentioned -- or that the Game & Fish either wanted horizontal drilling or no construction between April 15th to June 1st. Is that something that you often look at, too, from water quality standpoints?

A. Well, they put that restriction on construction mainly in response to spawning season when most of the fish of various species will be done with that process, and they feel that construction activities disrupts that process. That's usually put right in verbatim by the Corps of Engineers as one of their conditions, so it's a condition of the permit. I'd like to see them construct during low-water periods for the most part, generally in the fall when we have our general low-flow conditions.

MR. KELSCH: Okay. I have no further questions.

COMMISSIONER WEFALD: I would just like to comment that when I read the letter today -- and I just read it today -- it said the department

requested directional drilling, and if it's not feasible, they would like to have construction between April 1st and June 1st. It's not an either/or. It's only if it's not feasible that they're willing to consider the other option.

JUDGE WAHL: All right. Let me see. Where am I? Mr. Delaney?

MR. DELANEY: Nothing further.

JUDGE WAHL: Mr. Kelsch?

MR. KELSCH: Nothing further.

MR. BINEK: Nothing further.

JUDGE WAHL: All right. Thank you very much, Mr. Sauer. Mr. Delaney.

MR. DELANEY: I have no other witnesses.

JUDGE WAHL: Intervenors rest. Mr. Binek, anything from the Commission?

MR. BINEK: We have no witnesses. We're not taking an advocacy role here.

JUDGE WAHL: All right. Ms. Hayen -- or Hayen, I'm sorry. Ms. Hayen, will you state your name for the record, please, and spell your first and last names?

MS. HAYEN: Valera Hayen, V-a-l-e-r-a, H-a-y-e-n.

JUDGE WAHL: Ms. Hayen as you have heard

me advise previous witnesses, your testimony is required to be under oath and I'm required by law to advise you regarding perjury before administering the oath. Perjury is a false statement of material fact which you do not believe to be true, in other words, generally speaking, a lie. In North Dakota perjury is a Class C felony punishable by a fine up to $5,000, imprisonment for a period of up to 5 years, or both.

(Witness sworn.)

JUDGE WAHL: Please present your testimony to the commission, Ms. Hayen.

VALERA HAYEN,

having been first duly sworn, was examined and testified as follows:

MS. HAYEN: Okay. I heard yesterday Mr. Cowling said that landowners were informed. I've got a problem with my voice. We received one small brochure in the mail very shortly before the land agent came to our door. He brought the easement, went over the compensation and wanted us to sign right away. We did not sign, and he would not leave a copy for us to look over or to bring to an attorney.

The next day he called and we asked for a

survey to show us exactly where the line would run. The survey was completed, and about a month later we received a contract in the mail. We were advised by an attorney not to sign the easement. The easement allows for more than one pipeline, which is not acceptable. As I understand it, we are allowed payment for crop damage only one time, no matter how many times they come through, and also we are expected to accept additional risks with no compensation for whatever else is flowing through our land. There's no place on the easement for Keystone to sign binding them to do as they say they will. We also feel that the value of our land will be reduced and also the rental value eventually.

Keystone wants as straight a line as possible, but we also need what's best for our business, and the least invasive would be to follow the quarter line.

The greater problem is the safety issue for people living here and the impact of the leak into our aquifers. We are taking a huge gamble with an irreplaceable resource. No amount of money is worth our water supply, and I do not see any benefits for the people of North Dakota.

JUDGE WAHL: Does that conclude your testimony?

MS. HAYEN: Yes.

JUDGE WAHL: Mr. Kelsch?

MR. KELSCH: No questions.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: I have no questions.

JUDGE WAHL: Mr. Binek?

MR. BINEK: Just one.

CROSS-EXAMINATION

BY MR. BINEK:

Q. Where do you live?

A. In Sargent County.

Q. Relative to what town?

A. Cogswell.

Q. Can you give us a township and section of your property?

A. It's southwest quarter of Section 12, Township 130, Range 58.

MR. BINEK: Thank you.

JUDGE WAHL: Questions from the Commission?

COMMISSIONER CRAMER: None, just thank you for your testimony.

EXAMINATION

BY COMMISSIONER WEFALD:

Q. Were you treated politely by the easement agent representing the company?

A. I think he would have liked to tell us, you know -- warn us of our -- about condemnation, but he didn't say it. I think he implied it.

Q. But he was -- he treated you politely?

A. Yeah.

Q. Did you feel that he was polite with you --

A. Yes.

Q. -- and fair?

A. Mm-hmm.

COMMISSIONER WEFALD: Thank you.

COMMISSIONER CLARK: No questions. Just also thanks for driving to Bismarck.

JUDGE WAHL: Thank you very much, Ms. Hayen. Mr. Mathews, please. Mr. Mathews has asked to offer rebuttal testimony and, in fact, had some additional supplemental testimony, and I have agreed that he may do so, and Mr. Mathews, you understand, of course, that your testimony remains under oath and subject to penalties of perjury?

MR. MATHEWS: Yes, I do, Your Honor.

JUDGE WAHL: And, Mr. Mathews, state your name for the record please.

MR. MATHEWS: Paul Mathews, M-a-t-h-e-w-s.

JUDGE WAHL: You may proceed.

PAUL MATHEWS,

having been previously first duly sworn, was examined and testified further as follows:

MR. MATHEWS: First of all, I've been gone for two days, and my 11-year-old son asked me before I left -- he said -- I asked him, Should there be something I should say for you, and he said, Well, as a U.S. citizen why can't we just say no? Well, that's -- we'll have more talk about that.

Yesterday the applicant prepared and discussed, I think it was, Exhibit T8, and I was the Mr. Mathews with the 500-foot border, and I think it left an impression that things were okay with Mr. Mathews. Not quite.

Last Tuesday I had my first land agent meeting. Now if you recall, I've been asking for this land agent meeting since the 1st of February. Upon review of the document the agent gave me, I probably repeated this statement five times to make sure that he knew exactly what I was talking about.

"There may be a route, there may be an easement, but not this one that I'm willing to sign. If you can't, who can I negotiate with?" He had some additional easement elements of concern, and after hearing some of them, he said that he felt he must be honest with me, that in his opinion, other than changing the route, if that's proved correctly, he wanted -- he said he'd be merely visiting me two more times and my documents would end up in condemnation file.

Last month in Valley City, Commissioner Wefald, you asked me is 500 feet adequate, and I -- I struggled with that and I did mail additional remarks to it, and so I -- I'll -- I hope that you found that letter helpful to help determine that. In the past month I have naturally done some more looking to what I felt may be safe to help even answer that. I found a document on the Office of Pipeline Safety that indicates about 1,000 feet for an HCA would be a good buffer zone in today's terms.

I built and incorporated house plans that will make us able that we could live there even if we become persons of limited mobility. Therefore, I hope the commissioners will recognize that as --

one of my goals is a minimum of 1,000 feet.

In early May, discussions with the company personnel in Kansas City regarding the waiver of the avoidance zone, that agent in Kansas City encouraged me to consider signing that waiver as he felt 156 feet was safe and that moving the line would cause a financial hardship for a very expensive reroute.

Again, in this past month I've done some Internet work and I have -- that causes me to believe that landowner costs are somewhat immaterial to this whole -- and insignificant to this project. I consider it insignificant that I did some math with how much potential gasoline is there in this crude line going by? My -- the conclusion that I arrived at was probably less than 500ths of a penny amount to the landowner's easement costs and probably around three cents for the entire project cost, is what a retailer as you pull up to a gas station would be paying.

So please join me in considering that some route changes should be carefully considered, including the I-29 corridor. I think I just heard this afternoon sight and smell. I think we have a lot of people going down I-29 that could be very

good observers.

Finally, I would like you to consider, your office, to withhold from the company eminent domain. You would not be the first state to have this condition. In May 1977 Illinois did that exact, same thing, yet the pipeline was built using very negotiated easements. In other words, I think they found willing people to have that pipeline imposed on their land. So please, for the sake of North Dakota landowners, it makes a huge difference to your citizens to have minimum adverse human environment impact. Withhold eminent domain.

Thank you.

JUDGE WAHL: Mr. Kelsch, any questions?

MR. KELSCH: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. KELSCH:

Q. Mr. Mathews, the -- when you were talking about the Office of Pipeline Safety, a thousand-foot distance for an HCA, are you aware that that was for a natural gas line versus a crude oil line?

A. Yes.

Q. Now on the -- the agent that you said you dealt with, I guess, relatively recently that talked to you, did that agent treat you in any --

with any disrespect or a poor manner?

A. No.

Q. And he did not threaten condemnation to you?

A. "Your documents will end up in the condemnation file."

Q. How about the agent that you talked with in Kansas City? Do you know -- did that individual treat you in a disrespectful manner?

A. No.

MR. KELSCH: I have no further questions.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: I have no questions.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No questions.

JUDGE WAHL: Questions from the Commission?

EXAMINATION

BY COMMISSIONER WEFALD:

Q. Do you know the name of the person that you talked to, because we heard yesterday they were never given names and then they couldn't track who their agents were.

A. Yes.

Q. All right. Can you tell us that?

A. For the record?

Q. Yes.

A. My Kansas City agent was -- can you guys help me on that?

Q. If you don't remember, it's okay. Just say I don't know.

A. Denny -- Denny Niedum, Denny Niedum.

Q. And your North Dakota --

A. Randy Maxwell.

Q. Randy Maxwell. Thank you. And then on -- okay. Go ahead. I have one more question.

JUDGE WAHL: Yes. You may proceed, Commissioner Wefald.

Q. (COMMISSIONER WEFALD CONTINUING) Now I remember your testimony that we had at the previous hearing, and it was that you built your house in November of 2004, and at first they had thought your house was going to be 156 feet to the pipeline, but the pipeline has been moved now 500 feet from your home. Is that all correct?

A. I'm not sure. The easement documents I have available -- the easement documents I can give as exhibits today. The exhibit shows it at 156 feet again.

Q. Why is that?

A. I don't know that answer.

Q. Because we were told at the hearing that it would be moved 500 feet from your home. I mean, someone said it was 500 feet. Was it you who told us it had been moved 500 feet?

A. Yesterday they mentioned the 500, also. Would you like to see the document? I can provide it as an exhibit?

Q. Yes, why not. Have you been at any time offered an easement with the 500 feet indicated?

A. No.

Q. No? Well, I am confused about this because yesterday they told us that it was 500 feet, so where would it be in the documents?

JUDGE WAHL: Excuse me, Commissioner. For the record, I have from Mr. Mathews what has been marked for identification as Exhibit PM1, which is an easement and right-of-way agreement with an attachment of a plat consisting of five pages. Mr. Kelsch?

MR. KELSCH: No objection.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: No objection.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No objection.

JUDGE WAHL: Exhibit PM1 is received. Commissioner Wefald, you may proceed.

Q. (COMMISSIONER WEFALD CONTINUING) Yes. I'm just curious, where does it say anywhere on here the distance from your home?

A. I'm not aware that it does say it. I just look at the exhibit. My house is about 600 feet east of the county road.

Q. Where does it say --

A. If you go to page four, I believe.

Q. Page four. Okay. Thank you. I haven't ever looked at one of these. I'm sorry. And do you have one in front of you so that you can help me?

JUDGE WAHL: Oh, I'm sorry. Did I -- I didn't realize you gave them all to me.

Q. (COMMISSIONER WEFALD CONTINUING) Where is your home?

A. Where it says "baseline" in the middle of that square --

Q. Yes.

A. -- I would say it would probably be 156 feet west of that mark.

Q. Okay. And so you're basing your determination that it's 156 feet on the diagram

that's on page -- as you called it, page four?

A. Yes.

COMMISSIONER WEFALD: Okay. All right. Thank you.

JUDGE WAHL: Any further questions from the Commission?

COMMISSIONER CLARK: Just quickly.

EXAMINATION

BY MR. CLARK:

Q. And when again was this delivered to you?

A. Last Tuesday, about 3:30 in the afternoon.

Q. Okay. And remind me, your residence is how far north of the South Dakota border?

A. 11 miles north of the border.

COMMISSIONER CLARK: 11 miles. Okay. Thank you.

COMMISSIONER CRAMER: Nothing. Thank you.

JUDGE WAHL: Followup, Mr. Kelsch?

MR. KELSCH: Yes. Just a couple.

RECROSS-EXAMINATION

BY MR. KELSCH:

Q. Mr. Mathews, so this map was attached to the easement that you received just last -- I can't remember when.

A. Last Tuesday.

Q. Last Tuesday. I'm sorry.

A. Mm-hmm.

MR. KELSCH: And if that's the case, I do apologize. I do notice on the date on it that it was dated -- the map diagram was dated April 19th of 2007, which I believe was before the change in that, so I -- this is an old map that would have -- you're correct, it would have the old -- the old description on there and it shouldn't have been there. No further questions.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: I have no questions.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No questions.

JUDGE WAHL: Any further questions from the Commission?

COMMISSIONER CRAMER: Just thank you.

COMMISSIONER WEFALD: Go ahead.

COMMISSIONER CLARK: Well, I don't know if this is so much a question, but again, thank you, Mr. Mathews. I do know you brought up the issue of condemnation and eminent domain, and perhaps just to clarify, that particular procedure is a judicial one. So while the Commission can site a particular line, actual power of eminent domain does not rest

with us. It rests with the court system, in North Dakota at least. I'm not familiar with other states, but kind of for your information.

JUDGE WAHL: All right. Mr. Mathews, thank you very much. Mr. Banderet, will you testify?

MR. BANDERET: I think so.

JUDGE WAHL: Please. Oh, I'm sorry. Be seated, Mr. Banderet, and we're going to take an in-place recess while we change court reporters, about five minutes. All right. Then let's take a recess to stretch while we change court reporters.

(Recess taken.)

JUDGE WAHL: All right. Mr. Banderet, would you please state and spell your name for the record, please.

MR. BANDERET: Robert Banderet, B-, as in Baker, a-n-d-e-r-e-t.

JUDGE WAHL: What is your residence address, please?

MR. BANDERET: 9942 118th Avenue Southeast, Cogswell.

JUDGE WAHL: Mr. Banderet, as you heard me advise previous witnesses, your testimony is required to be under oath and I'm required by law

to advise you regarding perjury before administering the oath. Perjury is a false statement of material fact which you do not believe to be true; in other words, generally speaking, a lie. In North Dakota perjury is a Class C felony, punishable by a fine up to $5,000, imprisonment for a period of up to five years, or both. Will you raise your right hand, please?

(Witness sworn.)

JUDGE WAHL: You may proceed.

ROBERT BANDERET,

being first duly sworn, was examined and testified as follows:

MR. BANDERET: I'm a landowner that was told that my case was being turned over to the TransCanada lawyers for condemnation. One of the reasons that I have not signed up to this point, I was also told that easement acquisition was a priority of the company right now and that any discussion of crop damage compensation would take place later. I believe he said later this fall.

It's my contention that if a landowner signs that easement, he then gives up any leverage that he has of helping to determine what fair crop damage compensation is. Then what? Do we just

take what we're given then?

And I guess I had other points, but a lot of them were touched on, so I guess that would be my main point.

JUDGE WAHL: That concludes your testimony?

MR. BANDERET: Yes.

JUDGE WAHL: Mr. Kelsch.

CROSS-EXAMINATION

BY MR. KELSCH:

Q. Mr Banderet, do you recall what agent -- the name of the agent you were dealing with?

A. Kelly Vistel.

Q. Kelly Vistel?

A. Yes.

Q. And when were you told this? Was this on more than one occasion or this was a --

A. The first time it was brought up would have been August 1st.

Q. You hadn't had any contact with any Keystone personnel before that?

A. Yes. Yes, I had.

Q. How many meetings have you had with Keystone land people?

A. At least two.

Q. And when was the other one?

A. The August 1st conversation would have been a telephone conversation. The last meeting would have been August 6th. And prior to that it would have been -- I don't remember the exact date, but it would have been July.

Q. All with Kelly Vistel?

A. Yes.

Q. What was discussed -- there was no offer concerning what crop damage would be?

A. It was discussed briefly back in the July meeting, but he was going to do some checking and then get back to me.

Q. Other than the reference of maybe turning your file over to condemnation, were you treated with respect by -- is it Mr. Vistel?

A. Yes. Yes. Yes, I was.

MR. KELSCH: No further questions.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: I have no questions.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No questions.

JUDGE WAHL: Questions by the Commissioners?

COMMISSIONER CRAMER: I have nothing.

COMMISSIONER: No questions. Just thanks for coming.

COMMISSIONER WEFALD: No, I have no questions. Thank you so much for coming. What are you hoping to happen today as a result of your testimony?

MR. BANDERET: That the Commission and anybody would be aware that we're willing to work with them, but we would like a fair easement contract. There's some issues in there that I'm not comfortable with, and they talk about addressing them, but then either they don't get back to you or -- one instance, it didn't happen to me because I haven't -- I haven't seen a contract with the change that I had asked for, but a neighbor had wanted one -- only one pipeline put in there -- a provision put in, and it was changed on the first page, but then multiple pipelines was left in on other pages. Just to answer your question, just to get a fair easement contract that I can live with.

COMMISSIONER WEFALD: And at this point, are you concerned that if there's just one aspect of the agreement you don't like, they're not going to negotiate with you, they're just going to tell

you, well, you're going to face condemnation then?

MR. BANDERET: Well, that has happened. I was told that.

COMMISSIONER WEFALD: Okay. Thank you.

JUDGE WAHL: Any further questions from the Commission? Followup, Mr. Kelsch?

MR. KELSCH: No.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: No.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No.

JUDGE WAHL: Thank you very much, Mr. Banderet.

COMMISSIONER WEFALD: Can I just say something or not?

JUDGE WAHL: You're the Commissioner. Yes.

COMMISSIONER WEFALD: I was just going to say -- thank you -- this would be the very first siting, whether it's a pipeline or whether it is a transmission line in the state, where we would have had to go to condemnation. During the time I've been a commissioner, for 15 years, I have not had -- there have not been any condemnation proceedings, and I would like to keep that record

while I'm on the Commission, whether that's for two more years or if the people of North Dakota choose to elect me for another six after that.

JUDGE WAHL: Mr. Starke, I need to get some eye contact. Commissioners, Mr. Starke has asked to offer both some rebuttal testimony and some additional testimony and I've agreed that he may do that. Mr. Starke, you understand, of course, that your testimony continues under oath and subject to the penalties of perjury?

MR. STARKE: Yes, I do.

JUDGE WAHL: All right. And there were two points that you wish to bring to the Commission's notice and one concerned the use of the I-29 right-of-way. Would you address that, please, for the Commission?

MR. STARKE: Certainly.

RICHARD STARKE,

having been previously duly sworn, was examined and testified as follows:

MR. STARKE: The Interstate 29 right-of-way is 400 feet wide and it parallels the eastern border through the state and then it goes on down to South Dakota. My opinion as an industrial engineer is that it is an excellent

place to put it for several reasons.

First of all, that property is the property of the State of North Dakota. Secondly, as far as spills are concerned, you have traffic up and down the road, and if there's a spill out in that ditch, it's going to be reported quickly. Third, the interchanges on the interstate can be penetrated by the boring method to put the pipe in. They recently did one in Minot. It's 400 feet with a 30-inch -- 36-inch water line. So that's three possible -- well, one more thing. It doesn't require the surrender of any farmland because the state owns that land already.

My second idea -- is that enough?

JUDGE WAHL: Yes. That concludes your testimony regarding the use of the I-29 right-of-way. And the second matter you wanted to bring to the Commission's attention was the placement of the land -- I'm sorry -- of the pipeline in western North Dakota?

MR. STARKE: Yes, sir.

JUDGE WAHL: And you have offered an exhibit. I have marked for identification Exhibit RS 5, which consists of four pages and ten photographs. I have only one set of originals,

which I'm going to give to Commissioner Wefald, but I also have photocopies, which, unfortunately, are not great photocopies, but will provide some identification. I think counsel all have theirs. Mr. Kelsch?

MR. KELSCH: No objection.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: No objection.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No objection.

JUDGE WAHL: All right. Mr. Starke, tell the Commission, please, the information you wanted them to -- oh, and I'm sorry, here's the exhibit, so when you tell the Commission about why you would recommend -- would advise the placement of the pipeline in western North Dakota, these are the photographs that they have that you have offered as your Exhibit RS 5.

MR. STARKE: Thank you.

JUDGE WAHL: You may proceed.

MR. STARKE: I'm a hunter. I have hunted in the state now -- a lot of places around the world, but as far as I'm concerned, the area west of a line between Dickinson and Williston is very sparsely populated, there are no trees on it, and,

surprisingly enough, the turkeys and the antelope are there, so I have taken some photographs here of the terrain as it appears, and could I get -- oh, they got copies.

JUDGE WAHL: The Commissioners have copies. You can refer to those photographs. I recommend you refer to them by page, page 1, 2, 3 and 4.

MR. STARKE: Okay. Page 1, the upper photograph is looking south along a section line. To the left you see fence posts. To the right the land is not fenced. The unfenced line goes for miles and miles and miles.

The second photograph is a little bit further to the left. There are a whole bunch of antelope there, but they don't show up. So these were taken looking south from the point about three miles northwest of Rhame, R-h-a-m-e, North Dakota.

The bottom one is turning and looking back to the north along the same area. You see there are no cattle in the pastures. On the right side the fence is broken down. On the left side, I wouldn't put anything in there. But there's no livestock grazing out there. There are also no trees.

On page 2, this is taken 10 miles north of the first photograph, and, again, you see nothing. It's worthless land. I don't know what it would be good for, but it is not agriculture. It is not good for grazing. And so it just sits there.

The middle photograph is a photograph of a shelterbelt made of Russian olives -- I mean, Chinese elm and also Siberian elm -- Chinese elm. They're dead. They grow very well in this condition of water here, but out there they can't make it. So there's no fences. That's the first sign of civilization we saw.

The bottom photograph is the same view, but my friend, you see, is between the turkey I just shot. I'm a hundred percent disability. I have permission from the State Game and Fish Department to shoot from a stationary vehicle. I would rather get out and walk, but I cannot.

The third page, again, shows a little bit more of the view to the southeast, and you can see from the end of the shelterbelt there's nothing there. There's the same situation on the middle and the bottom page.

Page 4 is looking from a pickup where I shot from southwest. The fence is in disrepair.

It's not used. There's no livestock in the pasture. There are no houses available -- there are no houses out there.

So that's my recommendation for a substitute route, would be through the sparsely populated extreme western North Dakota.

JUDGE WAHL: That concludes your testimony?

MR. STARKE: Yes, sir, that's my testimony.

JUDGE WAHL: Thank you very much, Mr. Starke. Mr. Kelsch?

MR. KELSCH: No questions.

JUDGE WAHL: Mr. Delaney?

MR. DELANEY: No questions.

JUDGE WAHL: Mr. Binek?

MR. BINEK: No questions.

JUDGE WAHL: Questions by the Commission?

COMMISSIONER WEFALD: No questions.

COMMISSIONER CLARK: None.

COMMISSIONER CRAMER: None. Thank you for making the trip.

JUDGE WAHL: Thank you, Mr. Starke, for your help.

MR. STARKE: Thank you, Your Honor.

JUDGE WAHL: All right. Rebuttal.

COMMISSIONER WEFALD: I have a question.

JUDGE WAHL: Yes.

COMMISSIONER WEFALD: I have a question that I need to get answered before we go to rebuttal.

JUDGE WAHL: All right.

COMMISSIONER WEFALD: We heard from about, you know, 10 people when we were in Valley City and in Park River who were from Lankin who were not happy about the pipeline, and Lankin is near the Fordville aquifer, and I can see on the map that you've provided to me about Lankin that the pipeline goes slightly to the west of Lankin. I'm wondering, are you having difficult getting easements in the Lankin area, because it looked to me like at least 10 percent of the town showed up to protest against the pipeline. So I was rather happy when I saw that there was the alternate route to the west, you know. Is there a possibility of routing -- making a short detour -- if you're having difficulty getting easements in the Lankin area, if someone can answer that for me, is it possible to reroute to the west slightly around Lankin? You know, if it's not the full 50-mile

route that you have indicated on your map, is there another reroute that the Commission should consider, because I hate to have people forced into condemnation who are just not happy about this pipeline and yet -- and so I thought you presented to us the western route, which you thought was a good alternative, but now I understand from hearing the testimony that was presented by Mr. Cowling that you're not happy with that western route. So I'm wanting to try to accommodate some people that I realize are not happy at all with this pipeline and I'm wondering if there is another alternative that I should be presented with.

MR. KELSCH: Commissioner Wefald, I don't think we have the information as far as the number of easements that we've got other than the general information on that area that Mr. Koski talked about. That is information we could provide as a late-filed exhibit to let you know what easements and I guess where -- perhaps a map, or whatever, showing where they've been obtained.

COMMISSIONER WEFALD: Because if we have -- if the people along the route are happy to have the pipeline and have signed easements, I guess that's one thing, and maybe it's just the folks who

live nearby that aren't happy, but if it's the people right along your proposed route and you're not getting easements, I mean, that's another problem that the Commission needs to be aware of.

MR. KELSCH: Like I said, I think we would be willing to provide a late-filed exhibit that would show, I guess, the status of where we are concerning those easements. I'm not sure that I'm prepared to look at another route around that area at this time.

JUDGE WAHL: All right. For the record, it's Exhibit T37, and, Mr. Kelsch, if you will help me with a concise description of that exhibit.

MR. KELSCH: I guess it would be a map -- I suppose a map and perhaps a diagram of the status of easement acquisition in the Fordville-Lankin area.

COMMISSIONER WEFALD: Yes. I would say perhaps five miles north of Lankin and five miles south of Lankin.

MR. KELSCH: Ten-mile area?

COMMISSIONER WEFALD: Ten-mile area. Does my staff have a -- should I ask for something more?

JUDGE WAHL: This is sufficient for my purposes -- for our purposes.

COMMISSIONER WEFALD: Okay.

JUDGE WAHL: Anything further from the Commission at this point? Rebuttal?

MR. KELSCH: No rebuttal witnesses, Your Honor.

JUDGE WAHL: All right. Anything further for the record from counsel? Mr. Kelsch?

MR. KELSCH: Just in looking at the transcript from Valley City, T2 was the application. There was a note on there there would be a late-filed exhibit. That's because I don't think we had one. I think we used -- the intent was to use the application that was filed with the Commission as that exhibit. Just to clarify that for the record. Is that --

JUDGE WAHL: Yeah, I think actually we --

MR. BINEK: The application has been marked as an exhibit in the Commission's file.

MR. KELSCH: Okay.

JUDGE WAHL: All right.

MR. KELSCH: I just wanted to clarify that. That's, I believe, the only thing I have other than perhaps a schedule for briefing.

JUDGE WAHL: Yeah, but we'll do that off the record. Mr. Delaney?

MR. DELANEY: I have nothing further.

JUDGE WAHL: Mr. Binek, anything further for the record at this time?

MR. BINEK: No.

JUDGE WAHL: Commissioners. Commissioner Wefald, any closing comments or instructions?

COMMISSIONER WEFALD: Thank you. Both parties presented good evidence to help the Commission make a decision on this matter. This is a big project for this state, and so I can see why we spent two days on it and two days also in public hearings. It's always hard when you have a greenfield site, and I think it's to be expected that there's concerns by people along the route, and I just want to encourage the company to try to address those concerns in the most meaningful way that they can, because it is change to people's lifestyle to have something come by their doorway that they're not familiar with, and I think the company should just be a little bit understanding that people may want to have -- put their own individual imprint on their own easement in some way and be willing to deal with that. So I would encourage the company to work extra hard on accommodations in the easement and I hope that that

can happen.

I would like to thank everyone who attended today -- you've come a long way -- to help the Commission make the best decision that it can, and I certainly, and I know my fellow commissioners, as well, will be carefully taking a look at all of these late-filed exhibits that we've asked for. We do take a close look at this information that comes in and then making the best decision possible. Thank you.

JUDGE WAHL: Commissioner Cramer.

COMMISSIONER CRAMER: Well, let me, too, thank especially members of the public for taking the time to be here and for caring enough to be here. Thanks to all of the witnesses that testified. It was some heavy lifting, and I appreciate the technical testimony. I want to say especially, though, how impressed I was and am with the North Dakota public officials who testified. The two scientists, neither of whom I had met before, were as articulate and as bright as anybody that I've heard in a long time. And I'm sorry I didn't say that to them while they were here, but I will convey that to their respective agencies at the North Dakota Department of Health.

And with that, there's a lot of heavy lifting for us to do yet, but thank you for giving us so much to weigh and to consider.

JUDGE WAHL: Commissioner Clark.

COMMISSIONER CLARK: And I would just also express my thanks to both the applicant and the witnesses that testified for them, but also especially for members of the general public and affected landowners who took a lot of time out of their schedule. I mean, we're all paid to be here and went through about 25 hours of hearing, and I know a lot of you aren't paid to be here and sat through 25 hours of hearing. So I would just recognize your commitment of time and interest and thanks to all of you for developing what is a very full record for the Commission to consider and hopefully make a sound decision upon which it can be based. Thank you.

JUDGE WAHL: Thank you, Commissioners. Counsel, this hearing is closed subject to the filing of briefs.

MR. BINEK: Your Honor, we would also ask for proposed findings of fact, conclusion of law and order.

JUDGE WAHL: Absolutely, Mr. Binek, and

I'm going to deal with that in two minutes here.

(Concluded at 5:14 p.m., Thursday, September 6, 2007.)

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I, Denise M. Andahl, a Registered Professional Reporter,

DO HEREBY CERTIFY that I recorded in shorthand the foregoing proceedings had and made of record at the time and place hereinbefore indicated.

I DO HEREBY FURTHER CERTIFY that the foregoing typewritten pages (Pages 1-284 and 563-582) contain an accurate transcript of my shorthand notes then and there taken.

Bismarck, North Dakota, this 18th day of September, 2007.



Denise M. Andahl
Registered Professional Reporter

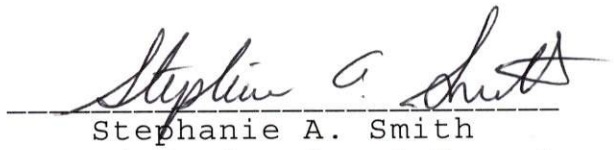
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I, Stephanie A. Smith, a Registered Professional Reporter,

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Bismarck, North Dakota, this 18th day of September, 2007.



Stephanie A. Smith
Registered Professional Reporter

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