ENBRIDGE PIPELINES INC.

INTERVIEW

OF

TED FARQUHAR

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INTERVIEW OF TED FARQUHAR, TAKEN AT 2:02 P.M.:

MR. JENNER: Good afternoon. Today is Friday, July 30th, 2010. My name is Stephen Jenner, and I'm an investigator with the National Transportation Safety Board in Washington, D.C. We are currently in Edmonton, Canada at the Crowne Plaza Hotel, and we're here in regards to a pipeline rupture, a pipeline spill in Marshall, Michigan that occurred on July 26th, 2010.

And right now we'll go around the room and have everyone in this room and everyone who's calling in introduce themselves and please state who you're with and your job title.

MR. GULSTAD: I'm Rick Gulstad, and I'm an engineer for the Pipeline and Hazardous Materials Safety Administration, abbreviated PHMSA, and I

[redacted]

Missouri.

MR. TOLLEFSON: Tyler Tollefson, senior legal counsel, Enbridge Pipelines.

MR. GOESON: Curt Goeson, control centre supervisor, Enbridge Pipelines.

MR. JENNER: Karen?

MS. BUTLER: Karen Butler, PHMSA, and I'm [redacted] and I'm a regional project manager.

MR. JENNER: Ted, are you still with us?

A Yeah. That wasn't me.

MR. TOLLEFSON: It was around that time yesterday when we had that guy dial in to see if the call was still going, so I wonder -- that was in and out, so I think we can probably assume that's what that was.

MR. JENNER: Very good.

QUESTIONS BY MR. JENNER:

Q MR. JENNER: Okay, Ted, if you just introduce yourself.

A Okay. My name is Ted Farquhar. I'm an engineer with the pipeline modelling group with Enbridge Pipelines. My office is based out of Edmonton, but typically I work remote from [redacted].

Q And where are you calling in from right now?

A I'm calling in from [redacted]

Q And you're employed by Enbridge?

A That is correct.

Q Great. Well, thank you.

Ted, I'd like to get a little bit about your background. When you first started at Enbridge, when was that and what was your position?

A I started with Enbridge in March of 2002. I joined what was then called SCADA, and I worked with pipeline modelling people on the leak detection systems. I worked on that for three years. And in March of 2005, I moved to the Core Capital Group

also with Enbridge Pipelines, and I worked as project manager.

In June of 2009 -- or, sorry, 2008, I resigned from the company to move to Halifax. Six months or four months later, I was offered a temporary position back in the pipeline modelling group, and in November, I accepted that, and we tried working remote from Halifax for six months. And ever since then, I've been a permanent employee of Enbridge working from Halifax.

Q Okay. In your current position, can you just give a summary of your duties and responsibilities?

A Well, I'm an engineer, a senior engineer with the pipeline modelling group. My responsibilities focus primarily on the building and maintaining of the material balance system, which is the leak detection system that we use.

I build and maintain several pipelines, several MBSs, and I also do on-call support 24/7 where I analyze leak alarms that come in. And I also work on our design standard and on reviewing design documents to make sure that they meet our standards for leak detection purposes.

Q Great. Thank you for that background.

Where were you on July 26 and July 27th of this year?

A Monday and Tuesday of this week, I was in [redacted]

Q And is that the same for the 25th as well?
A That's correct.
Q Okay.
MR. GOESON: So that was a Sunday and Monday; right? Is that what you're shooting for?
Q MR. JENNER: I may have given the wrong days. So we've covered Sunday, Monday, Tuesday, you were in [redacted]
A Correct.
Q Great. Ted, what I'm going to do is pass the initial questions on to Karen, and when she's done, we'll probably -- we'll go around the room, and I imagine we'll have some follow-up questions for you.
A Okay.
MR. JENNER: Okay, Karen.
QUESTIONS BY MS. BUTLER:

Q MS. BUTLER: Okay, Ted, thank you for being willing to talk to us, and really, I just need some information and some understanding as to how some things work and some information on what they may have asked you to do to help analyze in regards to some specific alarms concerns they had.

So with that, in the pipeline modelling group, what model are you working with hydraulically? Is it a specific software?

A Oh, okay, we use a realtime transient model as our

CPM or computational pipeline model. Stoner software is the modelling software that we use; it's also known as GL or GL Noble Denton or Advantica. They've had a number of name changes.

Q Okay. And have you guys done anything above that, like, written your own transient application or your own interface to read in existing values from SCADA, or have you made any modifications to what Stoner would sell off the valve?

A Stoner comes with -- it's called Leak Finder is the name of their software, and we basically use the exact same software. We build it the exact same way, but we build in our own alarming function with our own set of thresholds and our own calculations for imbalances on the line. That's the extent of it. We haven't done anything else.

Q Okay. So that's just a mechanism for getting

alarms from this leak detection software into the SCADA system, is that a fair analysis, and to set the threshold based on that SCADA data?

A Yes, it is.

Q Okay. And so when changes happen on the pipeline for whatever reason, instrumentations moved, you've got some pipeline replacement projects going on, they add a check valve, they add a back pressure control valve, they add a tank, when those types of changes are going on, how do you get notified?

A There's different methods. We usually would rely on being included on the project team and seeing drawings that come in and then working off of that to adjust the MBS.

Q Okay. So, for example, when -- it's not unusual in field operations to occasionally replace transmitters or move them around even. So if it's routine maintenance work as opposed to, say, a major project but it involves some change, how is that communicated? In a similar way or something different?

A Yeah, the best efforts would be to have -- like, with Enbridge, we usually use changes in PNIDs before we even knew, like, the location of a pressure transmitter, and we would rely on that.

Now, if we're not included in the project team, then we would rely on the SCADA services

department to inform us of these changes shortly before they're happening, and that happens on occasion.

Q So talk to me a little bit about the leak detection system. I take it that it's using the same hydraulic model, is that correct, or are they different models?

A I'm sorry. Can you tell me, different model than what?

Q Okay. Is the leak detection system that we have in

place actually using the same hydraulic model that you would for calculating imbalances or for playing with -- trying to determine whether this pump being out a service here has this particular pressure profile intact?

A Let's just -- I'll focus on the first one.

Q Okay.

A It is the exact same model. We use -- it's a single model, and we call it the material balance system where I'll say MBS. So that is our realtime transient model, and that's what we use to calculate the imbalances.

Q Okay.

A Now, you asked about how a -- say a pump, how that would impact pressures?

Q Right. Right.

A Do you mean, like, on a design perspective if

you're trying to size a pump?

Q Or if, for example, they're trying to figure out -- they're in a strange configuration, and they're bypassed a couple stations, and they traditionally don't do that, and they're trained to determine how they can get enough horsepower with the certain combination or certain few elements that are out of service or to move a certain volume, would they use this same type of model for that?

A I would call that a simulation what you're

referring to, and we don't need a model. That would be something different.

Q Okay. On the simulation that they would use, how are the hydraulics built for that; do you know?

A I know that there's a couple of different methods within Enbridge. I don't personally work with the simulators. I can't answer that.

Q Okay. Okay, so let's switch gears a little bit. Since you don't really work with the simulators, then I would take it that your output screens or formatting, there's no need for it to be provided in a mechanism that operators can read it; is that fair?

A (INDISCERNIBLE).

Q What I mean by that is -- go ahead, I'm sorry.

A Actually we provide a hydraulic head display. That's one of the features of the MBS and Stoner

software. That's the visual interpretation of elevation, your hydraulic head, pressure, low density, viscosity, temperature, pretty much any variable that you can think of.

Q All right. And so you mentioned that you previously were in the leak detection group, right, I think is how you said it?

A Yeah, pipeline modelling.

Q Right, but on the leak section system; correct?

A Correct. At Enbridge, we would refer to pipeline

modelling as probably 90 percent -- sorry, the pipeline modelling group is about 90 percent leak detection.

Q Okay. And when we say "90 percent leak detection," is that also the same thing as saying that they're working on the MBS system?

A Correct. And I just want to clarify that the 90 percent is a very rough estimate.

Q Yeah, I know. Thank you. I didn't take it that you meant that to be exact, that you're just trying to explain to me what you did. So thank you very much for that clarification.

So as they go through and they have this -- when you work in the pipeline leak detection system, was it common for the models to produce column separation alarms?

A Yes. Can I -- before we go on, can I just clarify

one thing? I'm getting the impression that --

Q Absolutely.

A Okay, that you asked about how I used to be in the leak detection group?

Q Correct.

A Typically, it's the same group, and this is my second stint in it.

Q Okay.

A It's largely the same. I want to make that clear in that I spent three years in project management

between my two stints. And in between the two stints, the name of the group changed a little bit. It was part of SCADA before, and now the group is formally called pipeline modelling.

Q Okay. So when you build models from scratch, what do you usually use to put those together?

A Basically we use a lot -- a lot of data to do this. I'll start out with the physical design of the pipeline. We would require a detailed elevation profile. We need to know the outside diameter and the wall thickness of the entire length of pipe as it changes. We need to know the milepost of the valves and their pump stations, the locations of any temperature transmitters or pressure transmitters on the line.

At each of the pump stations, we'd have to know what the configuration is, for instance,

whether or not there are traps there. How many valves do you have, the pump statuses, all the pressure -- all the process instrumentation like pressure and temperature in flow and density. That would all be brought back into the model, and we would basically design a virtual pipeline that should be a replica of what's in the field.

Q Okay. So would it be common for you to put in valving arrangements such that a station would be able to be bypassed or not?

A Yes. We'd -- the most likely way of designing that would be through logic where we would tell the model logic to look at valve faces and then modify how you use your pressure transmitters in the case of a bypass.

Q Okay. And so for the model that Enbridge has for the leak detection systems -- and obviously they have a variety of pipelines -- were all of those built by Enbridge, do you know, personnel? Or were some of them built outside, or when they bought an asset, they brought the model in?

A So you're saying were all of our MBSs built by Enbridge personnel?

Q Yes.

A I would say to the large extent, yes. In a few situations, the MBS would have been built by consultants, local consultants who work with our --

with the pipeline modelling group.

Q Okay. To your knowledge, have you ever purchased a pipeline asset and just used an existing model from someone else?

A No, we haven't.

Q And so I would take it that the pipeline model that would have been available for the particular pipeline in question, 6B, has probably been around for a while; does that -- in other words, it's not new?

A The pipeline model, I believe that was built in 2002, maybe 2003.

Q Do you periodically just make a point to go through the models and double-check data such as maintenance logs or things that have happened just to make sure that you've got what you need in there, or do you just continue to fine-tune pressures to match closer and closer to what's there, and that's how you believe you've adjusted?

A No, we would do some proactive checks.

Q And explain that if you don't mind.

A Review of PNIDs or view of our SCADA displays to compare against what we have would be the primary one, or flow diagrams and review of the response of the MBS over time. If you're noticing common false alarms -- sorry, common non-leak alarms or some certain troublesome behaviours, then you would do

an investigation into what it is and then try to repair it.

Q Okay. It's our understanding that you were called by one of the analysts that was on shift in an effort to get your technical opinion or expertise of some column separation condition. Is that an accurate statement?

A I think I was called to investigate the -- what was happening on the line. I was told that there was a column separation, and that at that point, they

were wondering -- they said there was, I guess, an imbalance in the -- there wasn't as much coming out of the pipeline at the delivery location as they thought there should be and that we needed to do a more detailed investigation.

Q Okay. So do you remember when you got that call?

A The time?

Q Yes, and what day, sorry.

A Oh, I was called on Monday morning, so that would be July 26. I don't recall the exact time, but I would put it between 8 a.m. and 9 a.m. Edmonton mountain daylight time.

Q Okay. When you took that call, did they -- explain to me in your own words what they specifically asked you to do.

A Okay. I'm having trouble remembering the exact words.

Q That's okay. In general.

A So I was called by the backup -- I was not on backup support on Monday morning, but I was called by the backup support, one of our younger engineers named Brendan Burg, and he said that Shane had called him to do investigation on line 6B, and he wanted to forward that on to me. And I said okay.

He said that there wasn't -- I guess there was not as much oil coming out as they thought there should be and that there was column separations and

that there was concern that they needed to take a closer look.

Q Okay. So what did you start to do?

A The first thing I did is that I pulled up the line 6 MBS display, and then I investigated. I look at the pressure plot and the hydraulic head, and I saw there was a column separation. And then I started looking back at our alarm history, or I call it the diagnostic flow display, and I could see the pattern of diagnostic flows and alarms in that section of pipe going back to the following day. Because I noticed that the line hadn't been running. It was shut down, and there was a column separation and had been that way ever since.

Q Okay.

A I followed that up by doing a more detailed look at the pressures and flows. I looked closely at the

18 times and what time the flows started dropping and
19 when the pressures dropped.
20 Q Okay.
21 A And then I noticed that in the alarm from the
22 previous night before, that there had been a large
23 pressure drop. It happened rapidly.
24 Q Okay.
25 A And then at that point, I called -- again, I'm
26 trying to remember the exact sequence. I believe I
27 spoke on a conference call with Brendan and with

Shane, and we talked a little bit about what happened about the pressures at Marshall and column sep. and so on. At this point, we didn't know what was occurring. And then I told them that I was going to talk to the CCOC, myself. And so I got off the phone, and I called the CCOC, and we discussed --

Q Who's the CCOC?

A I believe that was Blaine I was speaking to. Oh, no, wait. There was two CCOCs. Blaine was one, and I can't remember the name of the other one.

MR. GOESON: Just to clarify, I think -- are you referring to the shift leads on the -- in the control centre?

A That's correct, Curt.

MR. GOESON: Okay, so shift leads.

A Shift lead would be the correct term.

Q MS. BUTLER: Okay. And keep going.
A I spoke with -- I spoke with the shift lead, and I said -- I mentioned the pressures at Marshall and that that was suspicious from the night before.
Q Okay.
A And then I asked them if there's anything else I can do, and he told me just to keep investigating. I asked him what was going on. And, again, there's a couple conversations that took place in this hour, but I think he said at that point that there

was -- may have been a report of oil and that they were sending their people out to Marshall area to investigate. And at that point, it hadn't been proven if there was oil on the ground.

Q Okay. Did you look any further back prior to that peek -- or drop, I should say, because it was drop in pressure --

A (INDISCERNIBLE).

Q Yeah.

A Not immediately. I did -- did more investigation on the pressures, and I looked at the alarms that came in early on Sunday morning at 1 o'clock and 4 o'clock during the startups. Spent more time looking at that.

After several hours over the next couple days, I did spend time looking at the data prior to the 25th, and I've been unable to find anything that

was particularly notable.

Actually, well, I should say one thing. During my first analysis, I did look -- like, on Monday morning, I did look at the trend of our diagnostic flows which, to be clear, that is the measure of imbalance. I did look back to, like, the 24th and 23rd, and what I saw was that there was no indication, there is no alarms or no imbalances that were remarkable. And so that's when I just focused on when I -- when we started

seeing noticeable imbalances.

Q Okay. And so the first time -- or the first general time frame around noticeable imbalances on your review was Sunday; is that --

A That's correct.

Q Okay, and --

A Sorry, I might have got my time frames mixed up there.

Q Okay.

A When I said startups on Sunday, I meant Monday at 1 o'clock and 4 o'clock.

Q Okay.

A So and then you are correct. There was the imbalance starting on Sunday. That's the -- that's the first one that I noticed that was remarkable.

Q Okay. And so I'm curious about the time frame just before that on Sunday but carrying over into

Saturday. So it would be, like, the evening hours of Saturday. Did you see anything in the evening hours of Saturday moving into Sunday?

A No, I haven't seen anything.

Q Okay. Now I'm going to chop this up a bit. I should probably let us finish that sequence, so forgive me for wanting to chop. So we'll go back into (INDISCERNIBLE) sequence.

So we reassessed, and we explained what we saw. They hadn't had confirmed a leak. You went

back and started looking at other data. You only found this event as noticeable. Is there anything else that was significant that, say, occurred on Monday regarding the services that you provided or things you may have communicated to the control room or they communicated to you?

A I don't think there's really anything that was remarkable. After that, we talked a few times and rehashed the same thing until a point that they confirmed that there was oil just downstream of Marshall.

Q Okay. All right, so backing up a bit, the first column separation alarm occurred, at least from what we understand -- it really wasn't a column separation alarm. Let me clarify that.

The first imbalance alarm that was, I believe, a five-minute came in on Sunday, and they reviewed

it, and they thought it was due to column separation. And I believe this is pretty near the time that you would have noticed the significant pressure drop. Is that what your assessment shows, that that alarm and this pressure drop were very close in proximity for timing, or is it something different than that?

A I would say they're very close.

Q Okay. Do you know if the -- from the information that you reviewed, had the shutdown activities

already started and were in progress when that first alarm occurred and then the pressure dropped, or could you tell what led the other?

A I think I can tell what led the other.

Q Okay.

A I believe that the line started shutdown at about 1456 and that the pressure drop at Marshall occurred at 1458, and the first column separation occurred at 1500.

Q And from that information, what was the next event that you saw after that 1500 first call and the separation alarm?

A We would have had a second column separation.

Q Okay. And when did that second column separation come in?

A I don't have the exact time. It was within five minutes of 1500.

Q Okay. And did any -- did the first column separation alarm clear and then another one come in, or were they just staying?

A I'm sorry. Can you repeat that?

Q Well, did -- the first column separation was a five-minute from what I understand, and I'm doing this from memory, and so I may be stating it incorrectly. But from what we've been told, there was a five-minute imbalance alarm, and so that came in, and then it cleared. But did it clear first

and then a second alarm came in, or did that alarm just stay and then another one came in?

A No, there was only one alarm that occurred.

Q Okay.

A One five-minute alarm, and then it cleared.

Q Okay. And then when we talked about the second column separation alarm within five minutes, is that the clearing activity, or is that a second column separation starting?

A No, I'd say it's a -- it would be a separate column separation on a different piece of pipe. One was upstream; one was downstream.

Q Okay. So on the first one that came in at 1500, do we know which section of pipe that was on from where to where?

A I can't recall right now what -- which side it was.

Q Okay. Were they both on -- like, was one on the

upstream side of Marshall and the other on the downstream side of Marshall?

A That's correct.

Q Okay. In your history, because, you know, you're obviously somewhat of -- a person that's very familiar with modelling, do you typically see column separations on one side and then another in combination like that?

A I don't know the answer. I've never looked at it like that before.

Q Okay. When you -- having done a little bit of leak detection in your life obviously, is there a signature that you look for for a leak, and does this fit it?

A Is there a signature for a leak? I'd really be offering my opinion.

Q That's fine. I'm interested in your opinion because you've modelled quite a bit.

A Okay. What I would say is -- let me break this up again. You say is there a signature for a leak? There are probably several different signatures for a leak for what you -- sorry, I'm having a little bit of trouble wording this. Yes, there is a signature for a leak, and in this case, I would think that the drop in pressure does show a signature of a leak.

Q Okay. Would you expect the model to show

separation or column separation if that occurs?

A Would I expect the model to show a column separation --

Q If you had a leak --

A -- if a leak occurred?

Q Occurred with a pressure drop that's significant.

A Yeah, I would say in certain cases, in many cases, yes. I would think that eventually that would lead off the pressure to cause a column separation.

Q Okay. We had previously received information that

the bypass for Niles, because of a pigging operation, wasn't really put in the model. Is that typical or unusual?

A No, that's not typical.

Q Okay.

A That is not typical.

Q And can that confuse the alarming element?

A If it created a net negative imbalance, it could. Normally this would cause what we call a (INDISCERNIBLE) where there's a net zero, and they got positive diagnostic flows on one side and negative on the other side.

Q Okay. Is that -- did the fact that the bypass wasn't in there potentially going to generate more imbalance alarms?

A Can you repeat that?

Q Okay. If -- because the bypass wasn't in the

model, is it possible that there were more imbalance alarms caused that could have been confusing for an operator to look at and understand?

A You're asking that -- first of all, I'm not sure that the bypass wasn't there. I'd like to verify that myself --

Q Okay.

A -- But I can't right now. Secondly, generally speaking, you're saying is if the model wasn't set

up to handle a bypass --

Q Right.

A -- could that generate false alarms?

Q Right.

A Is that what you're saying?

Q Yes.

A It could. Yes, you could.

Q Okay, so now more to some pointed specifics. It's our understanding that, you know, we went on for a period of time trying to understand what was going on, and we did a startup, and we exceeded a ten-minute interval, and we ran a little bit longer, and then we shout down.

And then we did a second startup, but before we did that second startup, we had a communication with the supervisor and explained that we had exceeded the ten-minute alarm -- or threshold where

they couldn't get their pressures that they wanted within that ten minutes, and that there had been some leak imbalance alarms come in.

And when they got people on the phone, one person's version indicates that they thought that these leak alarms were false alarms. So can you explain to me a little bit why they might say they were false alarms?

A I think I'd really be speculating.

Q Okay.

A And that -- yeah, I don't think it would be fair.
Q Okay. All right. So let me ask a different question then. As you were doing your review and you found the significant pressure drop, then the alarms that came after that, did you review any of those that came after the significant pressure drop?
A Yes.
Q Okay. And when you reviewed those, did they seem like they were telling a good story, or was the system just in so much flux because there was a leak that the story would have been hard to interpret correctly?
A I don't think there was any flux. The reason why is because on the second startup, the model was configured to handle the bypass, and it demonstrated nearly an identical alarm response.

Q Okay. All right. In your review of the alarms, did you find anything else to be significant after the pressure drop?

A So between the pressure drop and the startup at 1 o'clock?

Q Yeah.

A No, the line was -- was static. There was no changes.

Q Okay. So when they started up at 1 o'clock, did the alarms that started to come in then make sense?

A I think so, yes.

Q All right. Then when they -- I think they continued to come in a bit, and then when they shut down, I believe there were some alarms as well. Did those make sense?

A My recollection is that we had a number of alarms, I think about six alarms that came in while the line was trying to be brought up, that they remained active for a while after the line was brought down. It wasn't as if there was a new batch of alarms that came in after they shut down. It was more the --

Q Oh, okay.

A -- (INDISCERNIBLE).

Q All right, thank you for that.

So also with our second startup, did we see similar alarms on the second startup?

A Yes.

Q Okay. And when they shut down that second time, were we still getting alarms because of the same previous example where things were coming in, but it was really because of the startup and not so much the shutdown?

A I don't usually think of it that way that -- I look at it as a single event. And while you're starting up and the oil is getting pushed into the line and it's not coming out, that's what's causing the

diagnostic flows. And then once you stop and the oil slowly goes to zero, then eventually the imbalance will also go to zero.

Q Okay. All right. So shifting gears for a bit off of that, how did this communicate to, like, the batch tracking software? Are you familiar with that particular system where they're tracking, what's going on with a batch movement?

A Referring to CMT?

Q Sorry?

A Are you referring to CMT?

Q I am.

A The MBS has its own batch tracking which is separate from CMT, and it isn't used for batch tracking for commercial purposes.

Q Okay.

A It uses the data from CMT to populate a line fill

whenever you need to restart an MBS --

Q Okay.

A -- like, when you're starting from scratch.

Q All right. Okay. If you were to improve how people understand the leak detection system and what certain things might mean or could lead to, how would you do that?

A Depends who my audience is.

Q You'd what, I'm sorry?

A I'm sorry. It depends who my audience is and what

they already know about the MBS.

Q Okay.

A I could do a very in-depth answer to somebody who knows a fair bit, or I wouldn't go into much detail if somebody didn't know anything about what an MBS is.

Q Okay. For some reason, we've had multiple people look at this initially then and not see the pressure drop. So because you're modelling -- you've done modelling a lot of times obviously. Is there any particular element of training you would recommend to enhance that ability?

A To enhance the ability to what? Understand?

Q Yes, understand or look for sharp pressure drop or be aware that column separations can conceivably hide other elements or --

A Yes, well, I'd say that when you have a column

separation, like, there's -- you have -- whoever is looking has to know what caused the column separation before a decision is made on what to do.

Q Okay.

A There's lots of things that can cause column separation including a leak, and if an alarm is called -- if the cause of an alarm is a column separation, that doesn't say it's not a leak.

Q Okay. Good point. Is there anything that you saw in your review that indicated we had a high

pressure or an unusually high pressure at any point on the pipeline?

A No, there isn't.

Q Okay. I think you've answered most of my questions. I thank you for that, and I'm sure we'll go around.

MS. BUTLER: So, Steve, are you next?

MR. JENNER: Yes.

QUESTIONS BY MR. JENNER:

Q MR. JENNER: Just to clarify one point, going back to Sunday around the time of 1500, there are two alarms within five minutes of each other, and I think they were both determined to be related to column separation; is that correct?

A I only saw one alarm.

Q Okay, I'm misunderstanding something. I thought I heard there was a first column separation alarm,

and then I -- was there discussion of a second column separation within five minutes of 1500?

A No. Well, let me -- I'll try to clarify.

Q Okay, thank you.

A There was a single alarm that occurred around 1500. That was caused by column separations, and the column separations were on either end of Marshall. Just because you have -- if you have five column separations, it doesn't mean you're going to have five different alarms coming in.

An alarm means that there's a hydraulic event occurring, in this case a column separation. The -- and -- sorry, my house is a little bit dry. What I'm trying to say is that the number of column separations is not equivalent to the number of alarms. You could have more column separations than there are alarms, or a single column separation could generate multiple alarms. There's no continuity of this thing.

Q I see. So thank you for that. In this case, one alarm is indicative -- well, one alarm -- when you investigated the alarm, you were able to detect two column separations --

A Yes.

Q -- based on exploring one alarm?

A Yes.

Q Okay, thank you for that clarification.

The drop in pressure, which I think you may have said is significant drop in pressure around the 1500 time frame on Sunday, can you recall any values attributed to that drop in pressure?

A What do you mean by "values"?

Q Well, when you -- when you express it as a significant drop in pressure, is that a fair way of conceptualizing it?

A Yes, definitely.

Q Why would you call it a significant drop in

pressure? What are you looking at? Are you looking at graphical representations?

A Yeah, I looked at the graphical representation, and I looked at the raw data file, and I found that it dropped. Like, the pressures at Marshall dropped a couple hundred PSI in about five seconds.

Q That's what I was asking about, the PSIs.

A Okay. Yeah, and I'd say to me -- I mean, it's, like, I don't have a measure that says what's significant enough. I just know it when I see it, and I say that's a lot.

Q When you say "a couple hundred," are we talking 200 PSI? Do you have a figure in mind that you can recall?

A Yeah, well, you see there's a suction pressure dropped about somewhere around 250 and a discharge pressure dropped about 450. They're at different

pressures to start with, and they both went close to zero. That's sort of the magnitude that we're talking about.

Q Great. That's what I was looking for. Thank you.

When you see those type of drops in pressure, are there other -- one interpretation that it's due to a leak. Are there other reasonable interpretations that can be made given just looking at those values?

A I would rely on assistance from an operator in that

case. I'd say, like, there -- reasonable things could be a pressure transmitter is being calibrated or a rapid shutdown of a pipeline.

Q But nothing within the normal range of operations?

A No, not that I can think of, no.

Q Okay.

A I wouldn't expect to see this.

Q Okay. So, again, it's -- what drew your attention was a reduction in suction pressure and discharge pressure --

A That's right.

Q -- relatively at the same time?

A Correct.

Q And to a value close to zero?

A Correct.

Q Okay, great. Thank you for elaborating.

MR. JENNER: I'm done with my questions.

I'll just pass it on to Rick here.

QUESTIONS BY MR. GULSTAD:

Q MR. GULSTAD: Yeah, I've got a couple of questions. Over the course of doing these interviews, we've had different responses from different controllers and shift leads as to how accurately you can pinpoint the location of a column separation. I know you just mentioned, you know, you've got a pressure transmitter on the suction and discharge side of Marshall, but when

you see a column separation, how accurate can you get in identifying the location along the pipeline of a column separation typically?

A Oh, I'd have a lot of trouble answering that. If you wanted to give me -- if you wanted me to give you an answer, like, within a couple miles or something like that -- I mean, I would just start off by saying that you wouldn't -- you would know that it would be in between two pump stations because that's where your pressure transmitters are.

Q Okay.

A And then that's to start out with. So you wouldn't be confused about which chunk of pipe is having a column separation. And then within that section of pipe, I would guess that it's -- again, I'm having trouble. I wouldn't rely on it being fairly

accurate. It's based on your elevations. Your elevation of a pipe will determine where the column separation is, that along with pressure, and we model that in the MBS. So I think it would tell us fairly accurately where it's going to be.

Q Okay. So you start between pump stations where you've got transmitters, but then how do you break it down further than that? Do you get a graphic display between pump stations that kind of shows you where -- based on calculations where it could

be or --

A Yes, yes, yes. Okay, I'm sorry, Rick. I keep forgetting that you're not familiar with what our MBSs look like.

Q You're right. Yeah, I haven't seen a visual screen, so I don't know anything about it.

A Okay, we have -- it's a display. It's -- it would be like an elevation profile of the pipeline, and it's got nomenclature to show you where all the pump stations are, and it's got hydraulic head above the elevation profile.

Q Okay.

A So when your head crosses your elevation, you've got column separation. And that would be -- you could zoom in extremely close with the MBS to see, like, exactly what milepost it is. And you said how accurate is the MBS at detecting the actual

milepost, and I'd say I'm not quite sure. I think it's pretty close. I would trust it, but I can't give you, like, a plus or minus number on it.

Q Okay, well, that helps a lot, so --

A Yeah.

Q -- when you had a column sep. upstream of Marshall and one downstream of Marshall, on your display, did it show that it was -- that you had one upstream and one downstream?

A Yeah, it did.

Q Okay. And in the control room, do the operators -- can they go up to a terminal and pull up the same display that you would see from Nova Scotia?

A Yes. Yes, it can.

Q So they should be able to -- if they wanted to, they could zoom in and get pretty close to what you're looking at then?

A Yes.

Q Okay. And then I guess my other question, just a different train of thought, do you train, like, Jim and Shane, or do you work with them on this MBS system, or how do they get trained? Do they work with you on training, or do you train them, or how does that work?

A I'm not involved in the formal training of the analysts. What I do is I review alarm reports as they come in, and if I -- I review them, and if I

see that there's something that's missing or if I want clarification because I don't understand what they wrote or if I think of something else, then I will review the alarm. I would modify the alarm report, and I would e-mail or call the analyst and discuss it with them.

Q Okay. So, I mean, they're looking at the same thing you are, but you've never really had any formal training with either Jim or Shane?

A No formal, but I'll admit I've done informal

training. I've done analysis of alarms in the past, like, with our -- as a group, we would sit around with people, and we would look at alarms. And I've organized that and done a cause analysis of those.

Q Now, would that include shift leads or controllers or both as well?

A No, that would only include the pipeline modelling staff and then the analysts.

Q Okay. That's all I've got. Thank you.

MR. JENNER: Okay, Curt?

MS. BUTLER: I think we -- we normally go through just a brief second round of questions.

And, Curt, did you have any point of clarifications?

MR. GOESON: No, I didn't, Karen.

MS. BUTLER: Okay. With that, just a

couple brief more, and then we'll see if Steve does.

FURTHER QUESTIONS BY MS. BUTLER:

Q MS. BUTLER: On this 6B column separations for this particular line, would you say column separations are common on 6B or not, in your opinion, based on other models you see?

A I'd rather -- I'd like to look at the figures. We keep statistics on this type of thing, and I can't just shoot off the top of my head.

Q Okay. But have you seen them before on 6B?
A I don't recall, but that doesn't mean I haven't.
Q Okay.
A I don't know the answer.
Q Okay. Do you recall other pipelines in the control room you've seen them on?
A Yes.
Q Okay. And then the last element is I think that maybe you sent an e-mail to the control room regarding some of your analysis or what you found. Was it you that sent the e-mail?
A Yes.
Q Can you give me what the content of that e-mail was, just verbally explain it to me?
A Okay. I sent an e-mail on Monday. I gave a preliminary analysis of the incident, and I stated that I thought that the most likely time for the

leak start period was Sunday at 1500 during the shutdown. And then I stated what I knew about the alarms that came in, in which case I listened to how many alarms came in during the shutdown and then during the startup and then what the analyst on site had said.

Q Okay. When you said "what the analyst on site had said," what did that entail?

A I said that the analyst diagnosed the cause of the alarm as a column separation near Marshall.

Q Okay. Did you indicate that you thought it was a leak?

A No, I didn't say that.

Q Okay.

A Actually, let me just think about that one.

Q Yes.

A Did I say that I thought it was a leak?

Q Yeah.

A Yeah, well, I guess that's what I'm saying is -- sorry, I think that the leak started at 1500 during the shutdown and that the leak caused the column separation.

Q Okay.

MS. BUTLER: All right, that's all that I had. Do you have anything, Steve?

MR. JENNER: I do not have any follow-up questions. Thank you.

MS. BUTLER: Rick?

MR. GULSTAD: Nothing else.

MS. BUTLER: Well, with that, Steve, then I'll let you do your normal -- this is the close and thank him. And we do thank you very much.

MR. JENNER: Curt, did you have any follow-up questions or clarifications?

MR. GOESON: No, I do not.

CLOSING BY MR. JENNER:

MR. JENNER: Great. Okay, Ted, let me

thank you for calling in and helping us out, and you really were a very big help. We appreciate your time.

What I like to end things with is just the opportunity that if you have any thoughts at this time about changes that can be made to this system in terms of procedures or software or hardware or anything that may make it a little safer, we'd love to hear from you if you have anything in mind.

A At this point, no, not yet. I might, and I'd have to think about that and formulate something specific.

MR. JENNER: That's fine. We would -- you know, our agency and your company would both be very interested in your input, so let me encourage you to communicate your thoughts along those lines.

But, again, I want to thank you for all your

assistance, and if you don't have any questions -- do you have any questions for us?

A I guess I'll say, what happens next?

MR. JENNER: Well, I'll answer it from my agency, the NTSB. We have -- we're conducting interviews, and we're requesting a number of documentations that we'll take back, and we also have people on scene in Michigan, and they're looking into matters there.

Eventually we pull all our reports together

and form a bigger report that -- from the factual information, we come up with our own analysis of what we think happened. Based on that, the most valuable part of our reports are safety recommendations, and those are -- can be made to a company. It can be made to other federal agencies, local agencies and where we think there may be some areas that we think can be improved.

This takes -- this takes us quite a few months to put together a report, and -- but that's our final product.

Do you want to answer what -- you can talk to Curt now or later about what happens from internally.

MR. GOESON: Yeah, Ted, I guess you'll probably be involved in our internal investigation which is really just getting underway other than

having pulled the initial documentation. So you can probably just expect to hear from either myself or Blaine probably in the next day or two here, okay?

A Okay.

MR. GOESON: And that's strictly from some input into the events, so... Okay?

A Yeah, okay. Well, I'm here to help out in any way I can.

MR. GOESON: Thank you. Appreciate it,

Ted.

MS. BUTLER: Thank you so very much for your time and your gracious explanations and catching us up to speed.

A Okay, thanks, guys.

MR. JENNER: Thank you. We'll conclude the interview.

PROCEEDINGS CONCLUDED AT 3:10 P.M.

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Dated at the City of Edmonton, Province of Alberta, this 12th day of August, 2010.

_____

C. L. Stabbler, CSR(A)

Court Reporter

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Phone: (780) 497-4223

ENBRIDGE PIPELINES INC.

INTERVIEW

OF

TED FARQUHAR

Tyler W. Tollefson, Esq. Senior Legal Counsel for
Enbridge Pipelines Inc.

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