ENBRIDGE PIPELINES INC.

INTERVIEW

OF

JIM KNUDSON

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

Curt Goeson — Supervisor - Control Centre Operations for Enbridge Pipelines Inc.

Stephen M. Jenner, Ph.D. — For National Transportation Safety Board

Rick Gulstad, PE and Karen Butler — For U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration

Carissa L. Stabbler, CSR(A) — Court Reporter

Edmonton, Alberta, Canada
July 29, 2010

TABLE OF CONTENTS

INTERVIEW OF JIM KNUDSON, TAKEN AT 3:22 P.M.:

MR. JENNER: Good afternoon. Today is Thursday, July 29, 2010. My name is Stephen Jenner. 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 in regards to a pipeline spill in Marshall, Michigan that occurred on July 26, 2010.

We'll go around the room and have everyone introduce themselves.

MR. GULSTAD: I'm Rick Gulstad. I'm an engineer with PHMSA. [redacted]

[redacted]

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

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

MR. KNUDSON: Jim Knudson, MBS analyst 3 with Enbridge Pipelines.

MR. JENNER: Karen?

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

MR. JENNER: Great, thank you.

QUESTIONS BY MR. JENNER:

Q MR. JENNER: As I mentioned earlier, we're interested in talking to you and just finding out

some of the events that occurred related to this incident.

So, Jim, if you would just state your name and spelling for the record, please.

A Okay, Jim Knudson, J-I-M, K-N-U-D-S-O-N.

Q And you -- what is your title?

A MBS analyst 3.

Q And who are you employed by?

A I'm employed by Enbridge in a pipeline modelling department.

Q Can you just explain analyst 3 versus 2 and 1?

A When -- when a new analyst starts, he starts in the position of analyst 1. As he progresses, he progresses through to a 2 and then to a 3. Three being currently the highest level an analyst can achieve.

Q Okay. In regards to that, if you can walk us

through your employment, your tenure at Enbridge.
When did you get started?
A I started just about 23 years ago in Norman Wells,
and I spent 5 years in Norman Wells as a pipeline
operator. I spent 15 years in the Edmonton control
centre as a pipeline operator, and then I moved
into the current position of pipeline modelling for
the -- since 2008.
Q So about two years in your current position?
A Yeah, it would have been two years in February.

Q Okay. Why did you decide to make the move to your current position?

A There was an opening that became available for 24/7 analysts for a new position to be created in a control centre that would use material balance system, and they solicited the operators for anyone that had any interest in it. And this has always been an area of interest for me, so I chose to go into this position.

Q Just out of curiosity, for anyone who's an analyst, is pipeline operator a prerequisite?

A It's not a prerequisite. We do have two of our analysts that -- who were non-pipeline operators. It's preferable due to the knowledge of the system.

Q Do you find that that background does help you out?

A Yes. It's essential in understanding the Enbridge system.

Q Great. Thank you for that.

A Yeah.

Q What I'd like to do is just have you walk me through your shift on -- that I think began Sunday evening.

A Right. My shift began at 1800.

Q Okay. If you could just -- I'll throw it in your direction. Typically there's a shift changeover. If you can start there and walk us through it.

A Well, similar to as you've heard with pipeline

operators, we actually do perform a shift change where information from the previous shift is passed on to the new -- kind of the on-shift analyst that's coming on.

The information that was relayed to me was the number of -- was the MBS calls that had been received for that day. And anything that would -- would be of interest to an MBS analyst, that would probably occur over my shift.

The next thing that I did is I usually look through the events that occurred over the last 12 hours and look at those and make sure that they have a closing date put on them and that the information is -- has been entered for them.

So in this case, I looked, and there had only been two alarms for that day. The last one being line -- for line 6 at 1500 to 1505. And the alarm

was recorded as a column separation on line shutdown.

Q Did the alarm -- what's called the column separation is --

A The alarm was called a five-minute volume balance alarm. And it was in the section between Griffith and Marshall.

Q Just a moment ago, you called it a column separation, but more specifically, a five-minute volume balance alarm?

A Right. The alarm classification is by whether it's 5 minutes, 20 minutes or a 2-hour alarm. So we've heard them as BB 1, 2, or 3. So when we receive an alarm, it's because an operator has received it on his console, and he has gone through his procedure to -- on how he's supposed to handle an MBS alarm.

So we receive that, and then from that, we do -- we go in, and we look at the actual model, and we determine what the cause is of the alarm.

Q And you're -- a moment ago, you called it column separation because that's what you determined it to be?

A Well, it's not what I determined to be. It was what the on-shift analyst had determined it to be.

Q So someone gave it that name so to speak? Someone else said this -- oh, this five-minute balance alarm is related to column separation?

A Yes.

Q Okay. And then who -- who was that that gave it that --

A Shane Lynch.

Q Okay. So the previous analyst?

A The previous analyst.

Q I'm sorry to interrupt.

A That's okay. Oh, okay, so from that point, I usually look at them, and if the time hasn't been closed off on it, I will -- I'll close it off,

check and see when the alarm actually cleared, and I'll enter that. If the -- if the information isn't as detailed as it should be, then I may fill it in. I might review it. Then we have capabilities of replaying particular periods of time and being able to review them. But normally if -- if the write-up is indicated and the write-up is factual, then I usually do not bother to review it.

Q Okay.

A And that's kind of part and parcel of -- like, I was the person that trained our other analysts, so because of that, I have a vested interest in their development. So that's not normally something that most analysts might not do. They might review -- they might look and see the number of alarms that have occurred, but they normally don't review them.

18 Q Okay. So you have your chance to review previous
19 alarms and --
20 A But in this case, this one was not -- this one was
21 reviewed for the event but was not reviewed for any
22 of the details that were -- that entailed the
23 alarm.
24 Q Okay. So how does that affect you?
25 A How does it affect me as in?
26 Q What else do you need to do with reviewing details?
27 A Okay, like, well, what I said was, like, I have a

vested interest in the development of our -- of our analysts, so that's my reason for actually looking at this alarm --

Q I see.

A -- and making sure that it was -- it was closed out correctly, and there was enough details sufficient for how you normally handle this type of alarm.

So and like I said, like, this isn't something another analyst might -- might do. It's simply because, like I said, I have a vested interest in their development, and that's part and parcel is being able to write -- write up MBS events correctly is part of their development.

Q From what you had an opportunity to review, did it look --

A Yes, his write-up was -- was consistent with past volume balance alarms that are associated with the

column separation.

Q So you took no issue to the write-up or the conclusions that Shane had come up with?

A No. I felt his -- I felt that the detail he had in it was -- was more than sufficient to explain why the alarm had occurred.

Q Okay. Okay, thank you. Okay, what else is happening on your shift?

A Well, the rest -- well, and the rest of my shift was involved with being available to handle further

alarms that would have -- would have come in from -- from the operators and working on project work as dictated by my supervisor.

Q How would you regard your shift in terms of overall workload? Was it a busy shift or slow shift, a normal?

A It was a moderate shift. There was a particular project that I was working on that occupied quite a bit of my time. But the way we work on projects is that receiving alarms is first and foremost our priority, and projects are put aside during periods when we do handle alarms.

Q Do you recall the number of alarms you had to deal with that shift?

A There might have been a couple of alarms or -- in addition to handling alarms, usually we'll handle any type -- like, an anomaly that an operator might

notice that maybe the model isn't working quite as accurately as it could.

If -- there might be something, maybe a flow -- a flow profile isn't exactly as they think it should be, and they might call us and comment about that. And we'll review the model and do something to see if we can do something to increase its performance.

So I think I received a couple calls like that, and I think it was from line 5. And the rest

of it was fairly bread-and-butter shift.

Q Okay.

A So before the startup on line 6B -- it was probably somewhere around 2300 or so -- the Sarnia console, which is the receiving end of line 6 -- we're about 10 feet away from where that console is, where we sit. And I overheard a conversation from the operator of line 6 who passed on to the terminal operator that he would be starting up at approximately 1 o'clock. He expected that he was -- probably would not -- it would be a difficult startup because of the number of column separations that were on the line.

Q He thought it would be a difficult --

A Yes.

Q Because of the number of column separations?

A Because of the number of column separations.

So at that time, I quickly looked at the line 6 model and looked at what's called a distance blot to see the number of liquid fractions that were in the section of line 6B. And at the time, it looked like there were probably four or five evidence of liquid fraction.

So from -- after seeing that, I decided that what I would do is probably monitor the startup on line 6B as they started, which is something that a lot of the times the shift leads will ask that as

well, that they'll ask us to actively be realtime monitoring. So in this case, this is what I was doing.

So when -- when the time came, they started it up. I was actively monitoring it. The first anomaly that I saw that -- that I felt there was something that wasn't quite right with the model was -- involved the Niles station. So I walked down and talked to the line 6 operator and asked him if he had a communication problem at Niles, or was there any reason why we weren't receiving the correct pressures. And he informed me at the time that they were bypassing the station on startup.

So I went back to my desk. And what's customary is when we're bypassing a station is to check the suction and discharge pressures to make sure that the model is accurately giving the

pressures because sometimes, depending on where the transmitter is located, it could be inside of the station, which would be isolated away from the main line. And in a case -- in those cases, we'd have to turn off the actual -- the actual suction transmitter in the model so that it doesn't use the SCADA value.

So in this case, I tried doing that, but it created what's called a negative differential. The discharge was actually -- it was higher than the

suction. So I reviewed the model file and discovered that our model did not have a bypass valve that was modelled in it, so the flow through the station couldn't be accurately modelled.

So in order to handle that type of a problem, what we do is we influence what's called a header force device, which is a -- it's a macro within the model itself which calculates what the pressures should be across the station. In other words, it's what produces the lift at a station in a model to show that the pressure is increasing in order for the flow to transfer further downstream.

So in this case, I went through, and I changed the header force device so that the pressures would be equal across the station using the pressure from the suction side which would have been from the gradient between La Porte and Niles to be the

accurate value and penalize the discharge pressure to be the same. So we have capability of doing that within the model.

So by the time I finished doing this, they had already shut down line 6. They had reached a point where the estimated volume to restore the column had been passed. So I could go no further than that point. I was asked by the shift lead quickly afterwards if I could look at the pressures and could I look at what was happening on the startup.

So when I reviewed the pressures, what I found was that we still had an existing column separation involved at Marshall. I did a hand calculation to see how much frictional and elevation losses would have been required to arrive at a pressure above zero at Marshall. So I determined that we needed approximately 310 pounds of pressure at Minden in order to be able to increase the pressure above zero at Marshall.

I reviewed the model pressures and the SCADA values and found that we'd only achieved 280 pounds of pressure at Minden which was not sufficient to restore the column at Marshall.

So the alarms on startup at that point were 5-minute alarms and 20-minute alarms which migrated to 2-hour alarms because of the extent that we pump from Griffith to restore the column at Marshall.

So once the alarm was shut down, I believe we waited probably till about somewhere around 3, 3:30 before it was decided that we would try to start it up again.

At that time, the -- all of the alarms had cleared. There were no active alarms. The static profile that the model was showing for line 6B indicated five sections where column separation existed and the summary alarms or the summary volumes were at zero.

Q Let me interrupt for a second. Your -- in our previous discussions with other people, the focus has been on one primary column separation around Marshall --

A Right.

Q -- and this is the first we're discussing others in the line. Would there be alarms associated with the other separations?

A These alarms would have been associated on the line shutdown that would have occurred earlier, the section from Stockbridge to -- to Sarnia.

MR. GOESON: Downstream.

A Downstream section.

Q MR. JENNER: Oh, the ones you're talking about are downstream?

A The ones I'm talking about are the column separation that existed at Marshall. There would

have been a further column separation just downstream of Stockbridge. There would have been a further one that would have been at Leonard station. There would have been another one that would have been at Fowler, and then another one just between Fowler station and Sarnia.

Q Everything farther downstream?

A Right.

Q Okay, thank you.

A So if you were looking at the actual depiction of

what the line is, what you would see is you would see head pressure above elevation at points where there was sufficient pressure to be above vapour pressure. At other points where there wasn't sufficient enough head above elevation, then these would indicate column separation.

In addition to the display that we look at is liquid fraction in order to measure the amount of gas and liquid in that section of the line. So we're able to kind of determine how much of a vapour bubble is actually in that for that section.

Q Okay, thank you. Okay, I'm sorry. You can continue.

A So looking at the static profile after the shutdown, reviewing that the alarms had cleared and seeing that there were no summary volume balance -- like, they were all at zero, the summaries -- I was

asked if I would sit in with the conversation that was discussed with Blaine Reinbolt. Darin Parsons had ask me if I would just sit in while he was talking to Blaine.

Q Okay.

A So I listened to the conversation between them. They discussed how they had tried to start up and really hadn't been able to restore the Marshall column.

So Blaine asked me what I thought, and I said

it's a column separation, and you did not have enough energy from Minden station to restore the column. I said I'm not sure if it's because you're bypassing Niles that you're not able to put this column back together. I said I'm not sure because I don't operate the pipeline. But I said I can tell you that you've reached 280 pounds, and you still need an additional 40 pounds to get oil to Marshall, and you're going to need an additional (INDISCERNIBLE) to fill a column.

So at that time, it was up to Blaine to make the decision on what he wanted -- what he would like to do. And my input into this was simply as an information. I hadn't been asked to do any analysis or anything. I was just asked for information in regard to what I knew about the material balance system.

Q Right. So you provided Blaine with that information and a decision was made?

A And he asked me -- I believe he asked me the state of the model, and I told him that the model was as is usually is in column separation. It's not reliable. And the reason it's not reliable is because we need a full liquid medium in order for -- optimize the model. It's a liquid -- it's a liquid model, so with column separation, we have a mixture of gas and oil, and it's not able to

correctly model sections where column -- column separation exists.

Q Okay. So a decision was made to give another attempt to restart the line, and that was Blaine's decision?

A Yes, I believe it was.

Q Okay. And were you on board with that? Did you take any exception to that decision?

A No, because really, the only thing I knew for a fact was that it was a column separation at Marshall, and that's what my software was telling me is that there was a column separation at Marshall and that the model was unreliable at that point.

Q And, again, the unreliability is because of the mixture of gas and oil?

A Right. At points upstream where we are above

vapour pressure -- all points upstream of where we're above vapour pressure are correctly modelled. It's only the portion from where we drop below vapour pressure until we restore above vapour pressure again it becomes unreliable.

Q I see.

A So the sections between Griffith and whoever the head of the column would have been would have been -- would have been able to accurately use -- use the material balance system.

Q Okay. All right. So, again, the decision was made to restart?
A Yes.
Q And are you part of the second attempt?
A I'm only part of it in that I was requested to monitor it again on startup.
Q And by monitoring, how -- what is that process for you?
A I generally watch the flow as it's generated out of the injection location, and I look for development of -- of pressure in a line. And I monitor the stations to assure that the model and the SCADA data are consistent. I look for what's called diagnostic flows which are generated when the SCADA value is not the same as what the model calculated value is.
Our system functions off of -- diagnostic

flows are created when there's a difference between the SCADA and the actual model value, and the diagnostic flows are then used to calculate out the volume-in balance.

So I'm looking for this, a creation of diagnostic flows and following to see whether the column will be integrated as well. And I can do this by looking at the liquid fraction and watch it as it -- as it goes back to a liquid state.

So there's two different displays that I can

look, and there's actually multiple displays that I can look at. My focus was on seeing the extent of the diagnostic flows and whether there was any volume balance that was being created from it, and also watching closely to see if the column at Marshall was being reintegrated.

Q So you have -- so the decision was we'll give it ten minutes for all this to play itself out?

A I'm not sure if what -- what the time was because I'm not really involved with -- with any calculation on how much is needed to restore. I don't give any input into that. That's not something a shift lead would ask me.

Q Okay.

A So this is something that the control centre would do on their own. So I simply -- I monitor until such time as they tell me or I become aware that

they're shutting it down.

Q Okay. So you're monitoring this, and then what happens?

A I monitored it until the point when they -- they shut down, and at the time they shut down, I informed the shift leads that they still had an existing column separation. And here again, we generated both 5, 20-minute, and 2-hour alarms on the startup.

Now, all of these alarms -- both times when it

started up at 1 o'clock and when they started up here after 3 o'clock, all of the alarms were associated with column separations. There were no anomalies outside of the column separation that existed that we could attribute any of the alarms to.

Q Based on your current position and experience and based on your experience as an operator, did you have any other ideas about what's happening? You guys have tried twice to start up the line, and it failed. So what are you thinking?

A Well, first and foremost, my job as an analyst -- and it's my job to analyze the material balance system. It's not my job to analyze pressures or flows. I do that in the context of I examine them for how well the model is actually working and analyzing the software. I do not -- I do not

analyze pressures or flow for the purpose of the control centre for leak detection. Leak detection that's provided is provided by our software and not by the MBS analyst.

Q Okay. Okay, thanks for that clarification.

A Okay.

Q So is anything else asked of you after the shutdown?

A No, there was nothing asked of me, just it's -- once it shut down and I think -- I think Aaron

asked me if we still had -- if we still had alarms, and I told him that we still did.

Q And those alarms are consistent with the column separation and consistent with the information that you have in front of you?

A They're consistent with attempts to start up when we have a column separation because at the point where the column separation exists, there can be no flow go past. So when we're measuring volume imbalance, you're measuring the amount of oil that's going into the system and the amount of oil that's coming out of the system.

In the case where you have column separation, the only drive that you have for the flow at the delivery point is whatever elevation change there is because there is no flow that's generated from -- from pumps.

So when the delivery end is open, it will produce a flow. I think in this case, it was, like, about 600 cubic metres an hour. At the Griffith start, at the injection point, the flow was at 1,900 cubic metres per hour.

So as it generates that flow, obviously there's an imbalance of 1,300 cubic metres. So if they run for ten minutes, you can estimate how much of an imbalance there will be. Now, that imbalance is what will trigger the MBS alarms.

Now, when a column is fully intact, the flow is -- is measured off of the pressure. As pressure goes up, the flow will go down in a pipeline, and it can -- it can calculate the volume by the change in pressure. It uses the flow, and it uses the pressure in order to figure out how much balance or how much volume is moved from point "A" to point "B." And that's the essence of the way the volume balance system works.

So in this case, if we're putting 1,900 cubic metres an hour into it, and we're only receiving 600, the model can do nothing but alarm because there is an imbalance.

Now, that -- that volume balance will exist until such time as all columns are fully integrated, and a model is able to use the pressures to -- as to what the volume will be in

the line.

So usually column separations, they are lengthy in order for them to clear. Lots of times this will be two hours before it finally recovers the amount. But all columns are required to be fully integrated before the model will start moving towards clearing those alarms.

In a case -- in the first case where we had shut down, there was a sufficient amount of time that the column separation was able to absorb the

losses, and that's how the model compensates and clears alarms is because it makes that determination that this is where the flow went.

So it doesn't show, indicate that we put 1,900 cubic metres into Marshall, and we didn't take anything out. So it does a calculation, and then over a period of time, it -- it can rationalize exactly where it thinks that oil went.

And that's why it's -- that's why it's deemed as being unreliable at that point because for the flow to be absorbed into a column separation is basically fiction. So the model is deemed as being unreliable and not -- and alternatively, methods will need to be used until such time as the columns are integrated.

Q I see. Very good. Now, after all this, you're coming up toward the end of your shift?

A Well, at the end of my shift, like I said, we still had an active two-hour alarm. I passed this on to my relief and told them about the problems they were having on line 6 and told them what he could expect for the rest of the day.

Q And what was -- what sort of information did you share about the problems?

A Generally I'll -- if -- if I'm aware that there -- maybe line 5 will be starting up or line 5 will be starting into the (INDISCERNIBLE), things like

that, like, if it's been passed on to me by the operators, and I'll pass it on to whoever is relieving me just so they have an idea of the operational things that are going on in the room.

Because sometimes we do monitor things. We monitor for the purpose of looking at the quality of the model during transitional times because if we're able to look at things and we see there is a problem, we can pass that on to our support staff who work at tailoring the models to work optimum efficiency.

So we have a vested interest as analysts in order to be able to pass this information on to our support people.

Q Well, thank you for a very thorough description. What I'm going to do is pass it on right now, and we have other people who probably want to ask you

some questions.

MR. JENNER: Karen, do you have any questions?

MS. BUTLER: Yeah.

QUESTIONS BY MS. BUTLER:

MS. BUTLER: Jim, we're just going to -- it's going to take me a bit to ask and get your answers typed in because I'm trying to catch up as I type, so forgive me for the pauses between the questions. Don't think that that's anymore than

I'm just trying to document what I ask you.

A I don't type very fast either, so...

Q Well, thank goodness.

You started out stating that you had experience in the control room. And forgive me if you've stated this already and I missed it. But did you have experience specifically on line 6?

A I probably operated line 6 for, I would say, probably maybe seven years, but that would have been before -- about two years before I started with material balance or with pipeline modelling.

Q Okay. And have there been any significant changes hydraulically on that pipeline since you would have operated that you're aware of?

A The only hydraulic changes that I would be aware of would have been passed on through our modelling group. And at this time, I'm not aware of any

changes that were made.

Q Okay. Okay, and because I'm not really sure how the model versus leak protection works --

A Well, leak detection -- leak detection within -- within Enbridge is many different things. The portion that I assist with is called the CPM or computerized pipeline modelling, which is just one of the components of leak detection within Enbridge.

Q Okay. So talk to me about what the other leak

detection sections or systems are.

A Operators operating the pipeline are a form of leak detection. Shift leads who monitor pipelines at times are part of it. Pipeline patrols that fly over the right-of-way. Our field staff or electricians and mechanics out in the field are another form of leak detection. The public themselves calling in through 911 calls or the police calling in through 911 or public calling in through our emergency line are another form of leak detection.

Q Okay. So before I get off on another topic, is there any other software system internally or any other calculations that are being done internally that you would consider a form of leak detection besides this model and its outcome?

A Not in realtime.

Q Okay. All right. So when you say that, I assume that means, like, there's tools that they can use to calculate things that are then after the fact that might be able to assist, but this would be the only thing that's going on simultaneously?

A Well, like Curt mentioned was CMT, but CMT is just another tool that an operator would use, and it's not a tool that we would use in pipeline modelling.

Q Okay. But is it true that the pipeline model that you're working with passes information to CMT?

A No. We receive the information from CMT. We do not pass it to them.
Q Okay. Okay. So what do you receive from CMT?
A From CMT, we receive the batch ID at the injection point, and we receive a line fill every two hours. And the purpose of that is in case we need to restart a line because the line fill is incorrect.
Q Okay. Anything else?
A No.
Q Okay. So one of the things that confuses me a bit is obviously for CMT to be calculating a line fill, it's got to have some basic pipe information that would also apply to hydraulic; correct?
A No.
Q Okay. So explain to me why not.
A CMT is basically an accounting system that relies on operators to input the batch sizes. In some

cases, some of the information that it receives is automated. Now, I don't work with CMT, and I haven't since I was a pipeline operator, so exactly how that all takes place I'm not really familiar. I know how -- I know how CMT is used by our group but not how it's -- not how the automated portion and that is derived.

Q Okay. All right. So with that, we'll move off of that topic and on to the leak -- the model -- the pipeline model itself.

A Okay.

Q Okay. You know, I did some hydraulic modelling and built models that it would have been on SCADA system, okay? So one of the first things we did in building our models is we would go through and make sure that the element that we had in our model matched the pipeline and the associated facility, and then we would run some steady state analyses to determine that that would be reasonable and (INDISCERNIBLE) things were left out, and then we'd run transient and determine if they were tracking sufficiently and then make adjustments to that model in order to make them track better. So since -- you've been involved with this since the inception of the department, is that true, or did I misunderstand that?

A No -- yeah, slightly. I've been involved with it

since the inception of a 24-hour analyst being in a room.

Q Okay. All right. So were the models built prior to you then?

A Yes. We build models as we develop pipelines. And as you're aware, there's been a couple of pipelines that have come on stream. So we've been -- I've been minorly involved in assisting with the creation of displays and some of the newer ones, but most of the models that I use now were created

over the last probably 10 to 12 years, and they are -- they're generally developed by our engineering staff within pipeline modelling. I'm not an engineer. I'm -- my position as an MBS analyst is as a user of the software.

Q Okay. So jumping down to what I thought you said, but once again, I may have misunderstood. We were talking about the fact that Niles station was bypassed and the fact that it wasn't showing correct pressures, and you were looking at that, that the section I think you were talking about that it wasn't quite modelled sufficiently?

A Right.

Q And there was -- did I misunderstand that there was a bypass valve that was not modelled, or did I catch that correctly?

A Yes. A lot of the older stations -- and Niles

being one of the older lines on line 6 -- the stations were constructed so that the flow would always be through the station. And on a lot of these stations, bypass valves were added later on when the -- you know, the practice of running pigs and such became -- you know, became part of normal -- normal pipeline operations.

So in this particular case, because we have an ongoing development into our models and increasing their efficiency in adding things, Niles is one of

those stations where we modelled the actual input into the station and output out of the station, and modelling flow past the station when it's bypassing, we did -- there's no valve that was modelled -- that's in the model.

So because of this when they close the station inlet and station outlet, we use the transmitters that they're either on the main line or inside of the station. In the case of Niles, we were using the -- we were using the pressures that were inside the station rather than outside.

So the SCADA value that we were getting a read back on was from the pressure that was inside the station. So this was making the model erroneous because it was reading the wrong transmitter.

Q Okay. So based on that, I want to talk to that just a little bit so that I understand.

All right, so the first thing is that this was a circumstance that developed because we didn't have a bypass valve shown in the model. Hydraulically we've compensated for that in other ways, but clearly, we needed to have that capability because of pig runs and things that were going to be going on if we wanted the model to same accurate a greater percent of the time; is that a good way to put it?

A Yes. I'd like to clarify that, though. If -- if

we're reading correct transmitters that are out on the main line, there isn't a requirement, and it wouldn't have been a problem for -- for the -- for the model to handle it because it would have been receiving accurate suction and discharge pressures and wouldn't need the -- the HF device to be modified.

Q Gotcha. So -- but basically what we are saying here is for all intents and purposes, the transmitters were reading a stagnant value and not reading the value on the pipeline?

A Correct.

Q Okay. So since the transmitters are reading a stagnant value, then the leak detection system since Niles has been bypassed wasn't effective from where to where in your opinion?

A I wouldn't say it wasn't -- that it wasn't

effective. It was effective in the point that it was creating diagnostic flows because of the problem at Niles. So it was indicating -- the model was indicating that there may have possibly been a problem at Niles.

Now, reviewing it, like I said, reviewing the model files, I was able to determine that there wasn't a model bypass valve, and I knew how to, in realtime, make repairs to the model so that the diagnostic flows would not be created.

Q Okay. So back up in history with me a little bit then. Okay, so the bypass valve isn't there, and our transmitters are reading a little different. Then on the original shutdown where we had a column separation, there is some confusion in our notes about when Niles was actually bypassed.

So bearing that in mind, if Niles had been bypassed prior to the end of the shift where we had the first column separation, which I believe Shane was on before, then there would have been a profile that was not quite right during that time frame; is that correct?

A I can't answer that because I didn't look at that. I never reviewed the model through that period in time, so I really can't make a statement on something that I didn't see.

Q Okay. All right. So but in theory, theoretically

because the bypass valve wasn't in there, from the time that the model -- from the time that Niles was bypassed to the time that you picked up on that, the model for certain areas would not have been accurate; is that fair?

A Not quite. The column separation was probably the largest contributing factor to why the model was unreliable. The problem at Niles was able to be repaired to the point that with the pressures from La Porte and the pressures from Minden, the actual

model pressures would be very similar to what the SCADA values were.

Now, when I was on shift, this was the case. I don't know what happened in the case -- I'm not even sure if Niles is even bypassed or at what time, whether it was bypassed simply on startup. I don't have that information.

Q Okay. But you were capable of making a decision that helped the pressures become line significant, but you clearly had to recognize a problem was there to make that decision.

So my issue is there's nothing that would automatically cause the model to trigger into some other mode when this didn't match. Is there -- or is there some type of automatic trigger that I'm unaware of?

A I'm not quite sure what you mean by "mode."

Q Okay. You had indicated -- and I'm calling it a mode probably inappropriately. But I think hydraulically -- let me back up here so I use how I think you could better describe it.

I believe you forced -- you used the header-force device?

A Yes.

Q And that would allow you, I think, to create pressures that were more equivalent to what was actually going on to the line; is that correct?

A Yes.
Q Okay. So that header-force device, is that a manual action only, or can that automatically be triggered by something?
A The header-force device is designed to indicate the lift at a station such as adding pumps. We do not read -- we read pump status, but we do not read differential from the pump. What we do is we use a header-force device that creates the lift at a station so that we can properly show what the flow is across the station by utilizing that lift.
The function of the header-force device uses suction transmitter and a discharge transmitter in the model, and from those two values, it's able to compute how much pressure increase there is at the station and how much actual flow is being generated past the station. Does that clarify it a little

bit better?

Q I think so. I think what you're telling me, though, is there's nothing that would automatically do that. That's something that you make a conscious decision based on the differences in data that you're seeing in order to do that?

A Right. This is -- this is no different than if we were mapped to both the suction and the discharge transmitters that were behind the sectionalizing valves and not on a main line. We would probably

just be required to turn those off.

Now, in -- if there was a proper bypass valve, then it's able to know that the flow is past the station, and it'll put the correct pressures in. But in this case because the bypass valve isn't there and because of the increase in pressure from upstream and downstream that it's now trying to use, it tries -- it tries to compensate for that, and it produces a differential between a suction and discharge which is a false flow into the system which has the capabilities of making the model even more unreliable.

Our intention -- our intention by doing this is to remove the diagnostic flows from a known problem so that diagnostic flows would be triggered from where a possible problem could exist.

Q Okay. So we've got this model, and it triggers

some alarms that are tied into the SCADA system. Is there -- when a controller acknowledges an alarm, is there anything that redoes a threshold or moves anything within the model or the output of that model?

A No. Thresholds are a static value that are set at the model when it -- at the first time that it's run. Those are changed based on engineering studies that our pipeline modelling engineers do. But for all essential purposes, those are static --

static values that are set.

Q Okay. Is there -- are there any others changes to the model that you're aware of that have recently been done?

A On -- for the line 6 model, no. There hasn't been anything done on this model. Like I said, like, you know, probably somewhere in the near future, we probably will be going through it and modelling the actual bypass valve or the check valve or whatever exists at the station. At this time, I'm not even sure if it's a check valve or if it's an actual bypass valve.

Now, we contacted our SCADA people who would tell us what that is, and then we will add that to the model.

Q Okay. So then moving on just a bit, when there's a hydraulic change actually made in the field,

whether that be piping is changed or another valving arrangement is made, what in the process keeps the model in sync with the field changes?

A The process we use is -- we are part of what's called IT SCADA operations, so they're involved with any new installations and creating the displays and creating, like, the station displays and any things that are added in the field. We are part of that, and we receive that information when we receive the information on any of the components

that are either added or removed.

Those are passed on to us through our -- through our modelling engineers, and they add anything as quickly as possible to any new models, that it doesn't have any inaccuracies. So we're part of the -- we're part of that process.

Q Okay, great. Is there documentation that kind of shows the flow of changes?

A Yes, there is within -- the in-prep file, we keep a record of anything that's been added or taken out. And also within a -- we have what's called a jura (ph) issue tracking, and anything that's been added or anything that's been required to be added to a model is also listed in there as well.

Q Okay, thank you.

All right, so then back to a little shift here. We have a normal shutdown or what we think

is a scheduled shutdown, and we had a column separation, and then when we go back and we're getting ready to start back up, we've got a -- we've got several column separations if I understood this correctly?

A Well, partially. The column separations that would have been downstream of Marshall, like, looking downstream from Stockbridge where -- I believe at 5 o'clock in the morning they started a Stockbridge delivery. Those column separations that were

downstream of Stockbridge existed from the 5 o'clock shutdown of the section between Stockbridge and Sarnia.

Q Okay. And that was 5 o'clock --

A Would have been 5 o'clock on the 25th or 24th maybe. It would have been previous -- it would have been previous to when they shut down into Stockbridge when the total line shut down.

Q Pipeline time 5 o'clock or --

A Well, I'm just giving you a rough time. Like --

Q Yeah, I know. I just want to make sure that -- I'm looking for that as approximately.

A It would have been whenever they started their Stockbridge delivery. The section between Stockbridge and Sarnia would have been shut down. At the time of the shutdown, the column separations would have occurred.

Q Okay.

MR. GOESON: Are we talking about the shutdown on Sunday?

A The shutdown at 5 o'clock on Saturday, the previous -- it would have been previous to 1500.

Q MS. BUTLER: Yeah, okay.

MR. GOESON: That's just the first we heard of this shutdown.

Q MS. BUTLER: Yeah, because I want to make sure that, you know --

MR. GOESON: So it sounds like it was a -- sorry, Karen -- scheduled delivery into Stockbridge the previous day.

A Right.

Q MS. BUTLER: Right. I thought that it was a scheduled delivery into Stockbridge, but it's occurring before on Saturday, but there would have been column separations generated as a result of that, and so it would have been -- we would have had multiple column separations at that time if I understood correctly but only on a portion of time downstream of Marshall?

A Yes.

Q Okay. All right. So now that we know that we've got multiple column separations then and then we've shut the line down later if I understand right, later in the day on a scheduled basis, and we had a

column separation right before that, but that would have been conceivably at a different location, or was that at Marshall?

A That would have been in a section between Stockbridge and Griffith.

Q Okay.

A Now, the block valve would have been closed at Stockbridge which would have isolated the section from Stockbridge to Sarnia during the delivery into Stockbridge. So the subsequent column separations

that occurred on the shutdown between Griffith and Stockbridge occurred on that shutdown. And those previous column separations had occurred on the shutdown between Stockbridge and Sarnia. So they didn't -- those -- the column separations that were downstream of Stockbridge did not reoccur on the shutdown at 1500.

Q Okay. So we've got a scheduled shutdown that's occurred. We had that one column separation alarm or the five-minute, and I think it only was a five-minute one?

A Right, 1500 to 1505.

Q Right. Okay, so we've got that going on, and then the pipeline shuts down, and it stabilizes or maybe not because of the leak, but nonetheless, and that alarm clears. Now, that alarm clears because of what?

A The alarm cleared because of the column separation. It was caused by the column separation, but when the flow into the line went to zero when Griffith was shut -- was shut down, the model used a column separation in order to put the flow that it -- or the volume that it thought was lost into the column separation.

Q Okay, so in your particular model, there's nothing that is resetting things automatically when you have a shutdown or a --

A No. Alarms are allowed to clear themselves naturally. We do not restart models. We let models run until alarms are cleared. If there are any restarts on models that are required, they're only restarted when a model has -- does not have any alarms.

Q Oh, okay. So there's nothing that prevents alarms from going to an operator that are just the result of a shutdown of a pipeline; is that correct?

A Any alarms that go to the operator are triggered when a volume balance alarm occurs, and it will be 5-minute or 20-minute or a 2-hour alarm. Those are the only alarms that are issued from the -- from the MBS system.

So they'll receive the -- they'll receive that the alarm occurred, and they'll also receive that the alarm cleared. So in this case, they would

have received an alarm probably at 1500 when it occurred telling them that they had a five-minute alarm in the section between Griffith and Marshall, and then they also would have had a clearing alarm at 1505 for the section between Griffith and Marshall.

Q So based on what you know now, not what you knew at the time of your shift, when do you think the leak occurred?

A I don't know.

Q Okay.
A The only thing that I know is that there was a column separation on the line shutdown. And from material balance system, the model became unreliable at that point and would not regain its reliability until such time as the pressures at Marshall were above vapour pressure.
Q Okay. The column separation alarm happening at the 1500 and 1505 that clearing, that's a normal circumstance on a shutdown?
A In some cases. It depends -- it depends on the pressures on the line. And the alarm isn't received as a column separation alarm; it's received as a five-minute volume balance alarm. There is not --
Q Right.
A There is -- the operator, unless he's aware of what

the pressures are in the line, would not know whether it was a column separation unless he looked and determined he was under vapour pressure for that. The model is the only tool that we have that will calculate that out in realtime.

Q All right. So the model generates it five-minute volume balance, but then we have an analyst tell us it was due to column separation; right? So the operator doesn't make that call; the analyst makes that call; is that correct?

A I believe the analyst said that the column separation occurred and that the five-minute alarm was attributed to the column separation that occurred.

MR. GOESON: Are we talking about the time frame during the shift?

A No.

MR. GOESON: Are we talking about --

A I believe she's talking about 1500.

MS. BUTLER: Yeah, we're talking about Shane's shift.

MR. GOESON: Okay.

MS. BUTLER: Yes, because I was trying to understand -- the reason this came into play right here is because I was trying to understand two key concepts which is what role, if any, the bypass situation at Niles had on indications they would

have received during that normal shutdown if it had already been bypassed. And then secondly, to understand whether or not this was a typical condition for this particular line segment. And what I'm getting is it may or may not have been. That would have been based on the pressures. And so that ties in a little bit with the fact that a pressure would have gone to zero, and it normally shouldn't have.

Q MS. BUTLER: Okay, so I think I'm clear. I

will reread this in detail after I've got a chance to think about this a little more. I appreciate your tolerance --

A Oh, no problem.

Q -- in how I ask these questions. And the fact that you've explained there are no automatic triggering changes or software elements that would come into play, that helps simplify things.

And if there's anything about the model that you find unique to this particular line, I would like your input on that. Is there anything in the model that you find unique to this particular line?

A Only the fact that the model is in -- the model is in a constant state of development, such as I said, for things such as, like, the bypass valve at Niles and that.

As -- you know, as we get information and we

review our models on a regular basis, we start to notice things that aren't -- that aren't in there that should be added, so we'll contact our SCADA department.

Now, our projects department usually heads up developments on lines and additions of things and changes that are made, which funnels that information through to our IT SCADA. It's only been in the -- probably the past couple of years that we've really become a strong player in getting

that information.

Now, the department I'm in used to be part of an engineering department, and then it's moved into the IT SCADA department. So as we moved into the IT SCADA, those type of things have improved where we're starting to get more information on things that have been added to the pipeline.

But as far as any remodels, whether it's line 6, line 5 or any of our newer ones, they're always in a state of constant development. That's why we have engineering -- we have engineers to constantly develop and improve the capabilities of -- of the models.

Q So, Jim, there's one thing that puzzles me a bit, and maybe you can explain this, and that is, you know, besides being a previous modeller, I also, you know, spent first behind the consoles, and so I

have a real propensity for wanting the operators to see very accurate data.

And so I'm a little bit baffled by the fact that we've ran a pig on this line obviously before because we're doing digs as a result of that, right, and we're running a set of pigs now, but yet this bypass situation, it shouldn't be the first time this has occurred.

So somewhere along the line, somebody either did exactly what you did or meaning the forced

option, and they just never came back and made a note of it, or they just let kind of the console operator suffer through a little bit of unknown territory there.

So is there any thoughts you have on how that could have occurred, like, how it didn't get noticed before now?

A Yes. I think you're looking at this as a consistent problem, and it isn't a consistent problem. This is more associated with a transient condition during a startup --

Q Right.

A -- where a requirement was needed to do this. In normal conditions, whether the station were to be bypassed or not, the model, once regained into a balanced state, would not need these type of requirements. It's only because of the heavy

transition during a startup that I felt that I did not want to take away the opportunity for the model to put together the column correctly by having the diagnostic flow that I observed at Niles as influencing it.

Q Yeah, I get -- yeah, I get the fact that during different conditions in a startup or shutdown, this isn't going to be as significant, but because those are such hairy times when things can go wrong, that's why I said what I said, so I appreciate your

feedback very much.

A Okay. Like, it -- like, there could be a startup, or there wouldn't be a problem. You know, I don't know if there wasn't a -- if there wasn't a column separation at Marshall, maybe this wouldn't have been a problem.

We pressure our sections based on flow metres. There's a flow metre at Griffith, and there's a flow metre at Marshall. Those flow metres influence the calculated pressures, and in the absence of pressures at Niles because of the isolation, this might have had a strong effect on it.

Now, if the column had been intact at Marshall, then this might not have been an issue at Niles.

Q Okay.

A But I felt that triggering false diagnostics on a startup into a column separation, it seemed prudent to me as an analyst and having the capabilities of optimizing our model, that it seemed prudent to be able to take these steps and try to equalize the pressure correctly in the model for Niles.

Q Right, gotcha, and I so appreciate that.

Just so I don't make one -- another incorrect assumption, I take it that the other analysts have the same capabilities to be able to do that, the

same action or not?

A They might not have ever have taken that action before, but when we do things like this that are a little bit out of the norm, we tend to document them correctly and step by step. In this particular case, in order to be able to influence a header-force device, there's actually a detailed write-up on how to do this.

And in addition to that, if we're unable to understand how to do it, we do have backup support 24/7 for all of our analysts so that he can talk to an engineer who can provide them with the correct instruction for doing this.

Q All right. I so appreciate all of that. Thank you very much for that last little bit of discussion.

MS. BUTLER: And I think I'm done. I'm sorry it took a while.

MR. JENNER: Okay, thank you.

MR. GULSTAD: I don't have many questions, but...

QUESTIONS BY MR. GULSTAD:

Q MR. GULSTAD: You referred to a column separation at Marshall, but how close to the Marshall station can you -- can you determine where that column separation really is?

A We can't because what we're using is we're using the pressures from Minden, and we're using the

existing elevation changes. So providing those elevation changes are accurate, we can -- the model can do a pretty good job of getting close. But as far as me knowing exactly what the mile post is -- unless I exactly zoomed in to see exactly where that was, I would not know exactly where it was.

Q Would you know if it was upstream or downstream of Marshall?

A Unless I zoomed in, I would not. And in my case, I did not zoom in on it. I was simply more involved with waiting for pressure to arrive at that -- at that point.

Q When you say "zoom in," what do you -- what do you mean?

A Well, zoom in, we're able to select the section of the pipeline that we wish to look at. Normally, we would be looking at the section from Griffith to

Sarnia, and that can be influenced by mile post. I can change the mile post so that I can strictly look at a very small segment of it.

But that's not normally something you would do in light of a column separation. It's something you may do if you're examining for incorrect -- like, a batchness alignment or incorrect interface. We would look for something like that, but it's not something you would normally do to look for a column separation.

Q So when you isolate it down by a mile post, does it have to be at a station or a valve, or can it just be any mile post within the system?

A It can be any mile post within the -- within that section. Like, when we look at a -- when we look at the model for line 6, we're looking at it from superior all the way to Sarnia, and you can isolate the section between Griffith and Sarnia, and you can also isolate the -- the -- you could isolate it to look between Minden and Marshall.

Q Okay. So if a shift lead had requested that, that's something you could have done if they had requested it. Just something you normally don't do; right?

A That's not something we would normally do. I guess in our system, we accept a column separation, you know, on or about a particular point, and the

activities in the control centre are to quickly regain those columns, you know, as quickly as possible.

Q But if they had -- if they had requested that, that's something you could have -- you could have done?

A It's something that they could have done if they had cho -- if they desired to.

Q Okay. So elevation goes into the model; right?

A Yes, elevation is part of the model.

Q And how would running a pig affect -- could that possibly create a column separation if it was in the right spot?

A It's never been my experience in, like, the two years that I've been doing this that a pig would cause -- would cause that type of a problem. There are -- there are factors that it will cause. There's a certain amount of increase in resistance depending on the type of pig that is run. You know, there are things, you know, anomalies such as having to bypass a station, and maybe we don't have the transmitter out on the main line. We're not mapped to that one. We might be mapped to one inside, or the transmitter out in the main line might be broken. And in cases like that, sometimes we do have to turn off pressures for the station. But in most cases, it's usually able to handle it.

Q Once the pigs were to go pretty close to Marshall, if they had ever gotten there, would you have run into the same problem with bypassing Marshall that you ran into with bypassing Niles?

A I couldn't answer that unless I looked exactly at that station and saw the way it was. And like I said, like, it was only the fact that there is diagnostic flows created at Niles, and I did not want this diagnostic flows turning up with our -- with the model's ability to follow the integration

of the column at Marshall that I took the steps that I did.

So whether this would happen at Marshall, I would have to review the actual in-prep file for the model to determine whether there actually was a bypass valve at that station.

Q You'd just have to check the configurations?

A Right.

Q And just one last question. At the end of the shift, you were -- you indicated you were still seeing an active alarm?

A Right.

Q What was that alarm for? I guess I didn't quite catch that.

A The alarm was the same category of alarm that we had at 1500. It was the column separation. The column had never been reintegrated at Marshall so

that when we influence the flow coming from Griffith on the startup, the model ring to this again.

Q So it was that same column separation that you had --

A Right.

Q -- indicated at Marshall --

A Right.

Q -- was still there?

MR. GULSTAD: Okay, that's enough questions.

Thank you.

MR. JENNER: Curt, anything?

MR. GOESON: None for me.

FURTHER QUESTIONS BY MR. JENNER:

Q MR. JENNER: I don't have anymore operational-type questions. I have some standard other questions related --

A Okay.

Q Can you tell me what previous shifts you worked prior to this one that we're discussing?

A I started on -- when did I start? I think I started on Wednesday. So I think I started Wednesday, Thursday, Friday, Saturday, Sunday night.

Q Were those day or evening shifts?

A They're all night shifts.

Q All night shifts. Do you consistently work night

shifts?

A Not consistently, but right now, we're -- we're one person short, and we're waiting for somebody to start training. So we normally have five people. We have four people right now. And of course, this is holiday period, so we are doing some certain amount of overtime within the context of the guidelines that are provided by the control centre.

Q Just general health questions. Are you in overall good health?

A Yeah.
Q Any conditions? Medications that you're on?
A Well, just for like everybody else my age, [redacted]
[redacted]. [redacted]
[redacted]
[redacted]. And other than that, nothing else.
Q Okay. Did you feel -- how did you feel at the start of your shift?
A Good.
Q Good?
A Yeah. I've been doing this so long, it's just -- I know how to -- I know how to get enough sleep. I know how to make sure I'm not fatigued while I'm on shift. I usually pay a lot of clo -- like, close attention to the amount of workload that I carry so that I'm not -- I'm able to respond at any time

correctly to any calls or any MBS alarms that we have. I'm very diligent in making sure I don't overtire myself or I'm not fatigued at the start of any shift.

Q Terrific. Okay, thank you.

A Okay.

MR. JENNER: Karen, anything else?

FURTHER QUESTIONS BY MS. BUTLER:

Q MS. BUTLER: I have one more, and that is is there -- in your model, can you force or

override a pressure or flow?

A Yes.

Q And if you do so, how is that picked up, or how does somebody know that that's been a force value?

A I guess I should probably clarify what I mean by "force." It actually isn't a force value because we allow the model to do a calculation. We don't force a raw value in at any time. What we do is we examine the transmitters that we receive, and in some cases, we receive the multiple transmitters, but we're only mapped to one transmitter that we use, and this may be out on the main line.

So let's say if you have three transmitters that are three, two and one, one and -- one being inside the station and three and two being outside. If we had a figure of both three and two, we would need to -- we would need to turn it off because we

cannot map a model while it's running. We have to actually map it while the mod -- offline in a test environment, and then we're able to remap and create another -- create a model of -- with an existing line fill and then reload that line fill so we don't miss anything from the transition to the change in the model. But for most cases, when we turn off something in the model, the model will actually calculate out a fairly correct value.

Now, when you say "force," I'm kind of a

little bit reluctant into you thinking that if we read 35 pounds at a station, we would actually put a 35-pound value in. That's not the case. We allow the model to use its gradients and to use its calculations based on flow upstream pressure, downstream pressure to actually create a correct pressure that in most cases, from my experience, is very close to what the SCADA value is.

Q Okay. So if you lose a transmitter, and you let the model keep calculating, and those -- that would frequently, I would think, generate some alarms?

A Not necessarily.

Q Okay, so when it -- I'm sorry. Go ahead.

A Okay, if we lose -- if we lose that particular transmitter, it doesn't necessarily mean that that's going to go into an alarm because the model at realtime is always calculating out that value.

So as long as that value is close to the SCADA value and there's no changes on a pipeline, then there will never be an alarm that will occur because that value is so close to it, but with --

Q All right. I --

A Go ahead.

Q I guess I was thinking is that I lose a transmitter due to lightning, so the actual value of that transmitter is no longer valid. So what then?

A What in terms of the model?

Q Yes.
A In terms of the model, if there is no change, it balances, is maintained on the pipeline, there's no change in rate, we may not see anything other than a flag for it being a bad value.
Q Okay, but if there is a change in rate or balance shift, what then?
A Then if it's flagged as bad, the model would automatically start calculating out its value, but if it's still coming in as a good value and that SCADA value changes, the model should change with it. But if the value stays frozen, then it is -- there's a difference between what the model is using and what the SCADA value frozen is. And at that time, it will generate an alarm.
Q Okay. And when it generates an alarm like that, what does it -- what would it say?

A If it generates, it would always be the same. It would come in as a 5-minute balance alarm or a 20 or 2 hour.

Q Okay, thank you.

A Okay.

MR. JENNER: You all set, Karen?

MS. BUTLER: Yes, I am. Thank you.

MR. JENNER: Great. Rick, anything now?

FURTHER QUESTIONS BY MR. GULSTAD:

Q MR. GULSTAD: I was just curious. Who do

you report to? If you have a question on a model or some issue with your model, who would you consult with?

A If it's while I'm on shift, I have a 24-hour support number that I can call. We -- we have a paging system, and someone will be able to respond to that page 24/7.

Q Someone within Enbridge?

A Someone within my own department, and that person would be an engineer who is probably -- usually involved with development of models or repairs or maintenance on models.

Q Okay. And you mentioned that a shift lead could zoom in themselves, but don't they have to work with you if they wanted to zoom in on a --

A Well, within our system -- the MBS system is available to the operator. Now, it's available for

viewing, and the privileges of being able to make changes in that model exist within our group. But the operator and shift lead are able to see the actual model. So they can change how they view it. Those are components of their view.

Now, it's not normally something that they would do. It's something that I might do if I'm -- have an area of interest. And I guess what I said was a column separation -- column separation isn't usually my area of interest because I'm more

interested in it being integrated because our Enbridge systems are run with four liquid mediums, and they're not usually running (INDISCERNIBLE) states.

So most of the time, when we are looking at the models, we're looking at them in pure liquid states, so there is no need to ever zoom in on something. Usually the zooming in -- the zoom-in feature that I would use is more associated with the batchness alignment or determining if an interface might be causing the problem within the model or creating an alarm.

Q And then you could zoom right in where that interface might be?

A Right.

Q Okay.

A Because we -- usually we run a test environment

where we -- we load a line fill that we get from CMT, and we can compare that to the actual line fill that's been in the running model, and then we can use that to determine exactly how far out the interface is and whether that inter -- that distance is sufficient enough to be attributed to alarms that are being caused.

MR. GULSTAD: Got it. Thank you.

MR. JENNER: Curt?

CLOSING BY MR. JENNER:

MR. JENNER: You've provided us with a tremendous amount of information, and we do appreciate that, and I think Shane owes you a dinner because his interview is going to be shorter than yours. So you helped him out indirectly.

Again, I want to thank you for all the information you provided and any inconvenience we caused you.

We're -- as I stated earlier, we're trying to think of any changes that we can think of to make the system even safer than it is, and if anything that you can think of right now to help prevent this, we'd love to hear from you.

A No. I mean, I can only look at my own position within Enbridge, and I really feel I did everything I possibly could. As a matter of fact, I actually think I went even further than I probably would

normally have gone in light of, you know, the difficulty that we had on the startup.

You know, I felt an obligation to influence, like, the header-force device at Niles, you know, which is not something you would normally do. This might be done sometime after the fact. But because we were -- we were trying to integrate this column at Marshall, I didn't want that to interrupt that process of doing it. So my goal was to try to maximize efficiency of the model.

MR. JENNER: Okay, I appreciate that. Very good. Well, again, thank you very much for your help.

A Oh, you're welcome.

MR. JENNER: We'll finish this interview.

PROCEEDINGS CONCLUDED AT 4:48 P.M.

18

19

20

21

22

23

24

25

26

27

CERTIFICATE OF TRANSCRIPT

I, the undersigned, hereby certify that the foregoing pages are a true and faithful transcript of the proceedings taken down by me in shorthand and transcribed from my shorthand notes to the best of my skill and ability.

Dated at the City of Edmonton, Province of Alberta, this 10th day of August, 2010.

_____

C. L. Stabbler, CSR(A)

Court Reporter

A.C.E. Reporting Services Inc.

Phone: (780) 497-4223

UNITED STATES OF AMERICA

NATIONAL TRANSPORTATION SAFETY BOARD

* * * * * * * * * * * * * * * * * * * *

Investigation of: *

*

ENBRIDGE OIL SPILL, * Docket No.: DCA-10-MP-007

MARSHALL, MICHIGAN *

*

* * * * * * * * * * * * * * * * * * * *

Interview of: Jim Knudson

Date: Sept. 01/2010

CHANGES TO STATEMENT

WITNESS NAME: _____

DATE OF STATEMENT: _____

PAGE	LINE	CHANGE		REASON
7	3	BB	to VB	spelling error
11	19	blot	to Plot	spelling error
12	1	be	to do	wrong word
12	27	higher	to lower	incorrect phrase
17	10	INDiscernable	to Volume	missing word?
18	24	Whoever	to Whereever	wrong word
24	13	alternatively	to alternative	wrong word
24	27	Indiscernable	to Sarnia	missing word
38	11	Jura	JIRA	spelling error
40	11	time	line	wrong word
50	24	batchness	to batch misalignment	wrong phrase
53	19	Ring	to Responded	wrong word
58	2	it	to if	wrong word
60	2	four	to full	wrong word
60	3	INDiscernable	to in a liquid	missing words

CERTIFICATE OF TRANSCRIPT

I, the undersigned, hereby certify that the foregoing pages are a true and faithful transcript of the proceedings taken down by me in shorthand and transcribed from my shorthand notes to the best of my skill and ability.

Dated at the City of Edmonton, Province of Alberta, this 10th day of August, 2010.