UNITED STATES OF AMERICA

NATIONAL TRANSPORTATION SAFETY BOARD

Investigation of:	*	
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ENBRIDGE - LINE 6B RUPTURE IN MARSHALL, MICHIGAN	*	Docket No.: DCA-10-MP-007
	*	

Interview of: LORNA HARRON

Crowne Plaza Hotel
Edmonton, Alberta
Canada

Wednesday,
November 16, 2011

The above-captioned matter convened, pursuant to notice.

BEFORE: MATTHEW NICHOLSON
Investigator-in-Charge

APPEARANCES:

MATTHEW NICHOLSON, Investigator-in-Charge
Office of Railroad, Pipeline, and
Hazardous Materials Investigations
N y Board

BARRY STRAUCH, Accident Investigator
National Transportation Safety Board

BRIAN PIERZINA, Accident Investigator
Pipeline and Hazardous Materials Safety
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KAREN BUTLER, Supervisor
Accide ons
P

JAY JOHNSON, Supervisor
Audits and Inspections
Enbridge Pipelines

I N D E X

I N T E R V I E W

MR. NICHOLSON: Okay. This is NTSB pipeline case No. DCA-10-MP-007, Enbridge Energy, July 2010, crude oil release in Marshall, Michigan. These are the Human Factors group interviews being conducted at the Crowne Plaza Hotel in Edmonton, Alberta, Canada.

Today is Wednesday, November 16th, 2011. This interview is being recorded for transcription at a later date. Copies of the transcripts will be provided to the parties and the witness for review once completed.

For the record, please state your full name with spelling, employer name, and job title, please.

MS. HARRON: Uh-huh. So, I'm Lorna Harron, L-O-R-N-A, H-A-R-R-O-N. I'm currently the Supervisor of the Operational Optimization group with Enbridge Pipelines, Inc.

MR. NICHOLSON: And, for the record, please provide a contact phone number and e-mail address that you can be reached at.

MS. HARRON: So, my telephone number is [redacted] and my e-mail address is [redacted]

MR. NICHOLSON: Okay. Lorna, you're allowed to have one other person of your choice present during this interview. This other person can be an attorney, friend, family member, co-worker, or nobody at all. If you would, please indicate whom you have chosen to be present with you during this interview.

MS. HARRON: Nobody.

MR. NICHOLSON: Okay. All right. We will go around the room and have each person introduce themselves for the record. Please include your name with spelling, your employer's name and contact phone number and e-mail address.

I will start and we'll progress clockwise and to my left. My name is Matthew Nicholson, M-A-T-T-H-E-W, N-I-C-H-O-L-S-O-N. I'm with the NTSB. My phone number is [redacted] I can be e-mailed at [redacted]

MR. PIERZINA: I'm Brian Pierzina, B-R-I-A-N, P-I-E-R-Z-I-N-A, [redacted] and my e-mail is [redacted] and my phone number is [redacted]

MR. JOHNSON: Jay Johnson, Enbridge Pipelines, [redacted]

MS. BUTLER: Karen Butler, K-A-R-E-N, B-U-T-L-E-R, PHMSA [redacted] and Supervisor over Accident Investigations. Telephone number is [redacted] and my e-mail is [redacted]

MR. STRAUCH: I'm Barry Strauch, NTSB, B-A-R-R-Y, S-T-R-A-U-C-H. My e-mail address is [redacted]. My phone number is [redacted].

INTERVIEW OF LORNA HARRON

BY MR. NICHOLSON:

Q. Okay. Lorna, just to begin with, I think it would help

everybody here if you could just explain what your position was on July of 2010. Who you reported to, who reported to you, what responsibilities you had. Could you just cover all that?

A. Certainly. So, at the time of the incident, I was the supervisor of what was called the Pipeline Modeling Group. That has subsequently been changed to the Leak Detection Group under reorganization at Enbridge.

At the time, I had the entire Pipeline Modeling group reporting to me. That included the line custodians, who are the engineering staff responsible for creating and maintaining the models. It also included the folks that were working on the trainer models that are developed for the control center operations use in their training of new employees and their refresher training on employees.

And then also was the Analyst group, and they are the 24/7 support personnel, who sit with the control center operators in the control center in Edmonton and support the control center operators through evaluation of MBS alarms and any implication those would have -- that the control center operator may ask questions about.

Q. Okay. Can you give us a little bit of background as to how you -- when you started at Enbridge, educational background, how you got into this position, other positions you've held within Enbridge?

A. Sure. So, I'm a metallurgical engineer and I have

Masters of Engineering in Risk Management and a Masters of Business Administration, a general MBA. In addition to that, I'm about 80 percent done with my Ph.D. in Risk Management as well, and all through the University of Alberta.

When I graduated from the University of Alberta, it was a second career, so prior to that I did other things. I worked directly for Imperial Oil -- worked for them for about 9 years in various capacities. So, I worked truck transportation, pipelines, facilities management. I did environment analysis type kind of work.

I also did regulatory compliance. Just about anything in the downstream side of the business was part of what -- what I ended up doing within my tenure there -- various roles, various levels of responsibility.

Then, I moved over to Enbridge in 2005. And at that time, I went into the Operational Risk Management group, and I worked with Operational Risk Management in a specialist role until 2010, so it would have been April of 2010. And then I moved over to the Pipeline Modeling group at that time as their supervisor. Again that was a Level 12, so lateral transfer for me.

And then after that, I have July 2011, moved over to the Supervisor of the Operational Optimization group within pipeline technique.

Q. Can you explain a little bit about the Operational Risk Management group? What were you -- what were you doing there?

What do they cover?

A. So, the Operational Risk Management group at Enbridge works specifically on creating models that are used to, to evaluate the risk levels of the pipelines in the facilities within our operation.

There was a liquid pipeline focus. As a specialist in that group, I was responsible for creating the facility risk model and a number of the other tools that were used by that group. I also enhanced the pipeline model at the time. There were index risk models that were used as a screening tool. And I brought in some quantitative risk modeling tools and software to assist in quantitative evaluation, in particular on the vector pipeline system that was also under our jurisdiction.

And what else did I do? I created the PHA program that is used within Enbridge today, so I was the lead on that. So, the process hazard analysis program. That includes HAZ OPS' what-if analysis, and we were just introducing LOPA, or layers of protection analysis, into the system at that time as well.

Q. Okay. So, when you were working with the risk models then you were -- that was working closely with the Integrity Management group, as well, is that correct?

A. Absolutely.

Q. Okay.

A. Yeah, the pipeline integrity threats were a large input into the pipeline risk model.

MR. STRAUCH: I'm sorry, pipeline?

MS. HARRON: Risk modeling.

BY MR. NICHOLSON:

Q. And so that -- that work in the risk modeling would have culminated in the integrity management plan or --

A. No.

Q. Okay.

A. So, the Risk Management group was responsible for the modeling and the prioritization of which lines were the highest risk areas for focusing attention.

Q. Okay.

A. Yeah.

Q. Focusing inspection is --

A. So, I did a lot of field level inspections at that time. Any activities related to consequence, for instance, like an intelligent valve placement analysis, putting in some EFRDs, that kind of thing, would all come under that risk modeling, based on the ranking that we had for those particular pipeline segments.

Q. And the risk ranking is a 0 to 100 scale, it's a percent?

A. It's a relative risk ranking.

Q. Okay.

A. So, there's a little difference between the main line and the facility one. This, of course, at the time that I was there, which is up to 2010.

Q. Um-hum.

A. And, at that time, the main line was on a 100 point scale but the facility one went over that based on the number of assets that you had, so it was a cumulative number.

Because it's an index risk model, everything is comparative in nature, so you look for what is a higher risk than the other assets that you have. So, the value that you get from an index risk model really doesn't tell you much other than a comparison with the rest of your system.

Q. So, just for Line 6B, what would be a high risk number? What would that go up to?

A. You'd have to ask the operational Risk Management group that.

Q. Okay.

A. I haven't -- I wouldn't have that at my fingertips.

Q. Okay. And you said also part of this risk management was where you placed valves on the line?

A. Uh-huh. So, there is a program within operational risk management where they look at the volume potential that comes out of pipeline segments. And from there, based on the consequence value -- so their proximity to high consequence areas, then they would have a valve placement program that would minimize the amount of volume out of that pipeline segment.

Q. And would this get into whether they were remote controlled or --

A. They were all remote controlled.

Q. These would have all been? Okay.

A. Yeah, yeah. And if there was existing valves that needed to be automated, that would be part of it as well. And then the operational Risk Management group manages all of those programs.

MR. JOHNSON: I tested on that yesterday with you, Barry; you asked in the control center.

MR. STRAUCH: Yes.

MR. JOHNSON: That was Lorna. I said she could explain it better when I get into that.

MR. STRAUCH: Yes. I recall.

MR. NICHOLSON: Okay. At this point, I think I'll hand it over to Barry then, Lorna. Barry has some questions.

MR. STRAUCH: Yeah. In fact, I'll follow up on what Jay asked.

BY MR. STRAUCH:

Q. Why are some of the valves that are manually controlled still there? Why aren't they changed to remote control valves?

A. Well, that would be part of operational risk management's plan, so you'd have to talk to them to find out where the valves fell on their consequence ranking --

Q. Okay.

A. -- to be able to determine where they are on the priority list.

Q. How much of an expense is it to change a valve from a manually controlled one to a remote control?

A. I don't know the cost off the top of my head.

MR. JOHNSON: It can be up to 500,000 --

MS. HARRON: I think you'd know better than I do. Yeah.

MR. JOHNSON: -- depending.

MR. STRAUCH: For one -- one?

MR. JOHNSON: Yeah. Depending on, you know, a lot of the factors bringing power into the site.

MS. HARRON: Right.

MR. STRAUCH: I see.

MS. HARRON: So, I would have through 250 to 500 would be my guess.

MR. JOHNSON: Yeah.

MS. HARRON: But, again, that's not an actual number. You'd have to get the actual.

MR. JOHNSON: It can be as little as 50,000 if there's other valves there or you have power.

MS. HARRON: Uh-huh, yeah.

MR. JOHNSON: It's just putting a limit to our operator on there.

MS. HARRON: Yeah.

MR. JOHNSON: So, it's a pretty wide spectrum.

MR. NICHOLSON: You're talking just retrofit here?

MR. JOHNSON: Yes.

MS. HARRON: Yeah.

MR. NICHOLSON: Okay. And the big -- so the chief cost is bringing the power?

MS. HARRON: Absolutely.

MR. NICHOLSON: Okay. Not the valve and the actual -- I'm just --

MR. JOHNSON: Yeah.

MS. HARRON: Well, that's a large part of the cost.

MR. NICHOLSON: Okay.

BY MR. STRAUCH:

Q. Okay. What did you do for Imperial Oil?

A. Well, I did various roles with them. I started as an EIT right out of school with them. And because I was a little more mature than others graduating -- I was in like in my 30s -- so as a result of that -- well, compared to a lot of the new graduates that are 22, 24 years old, I was a little bit -- a little bit more life experience behind me. So, that's what I'll call it. Not old.

So, at that point, I actually started in an advisor role. So, they took a financial advisor role, to use my BA skills, and they took a facility advisor role and -- using my engineering background, and combined those two. So, that was -- my first role was actually doing two people's job. And it was very interesting. I got to do a lot of field projects, working specifically with all the facilities in Western Canada and in the

Northwest Territories.

Q. I see.

A. Um-hum.

Q. Now, when you went to -- before you went to Enbridge, did they approach you or you approached them?

A. I actually had a friend who graduated with me. His name is Scott Ironside, and he's the director -- one of the directors in pipeline integrity. And I used to run into Scott all the time in the airport. As we would run into each other he'd tell me what he was doing and I'd tell him about what I was doing. And he always told me what a good company Enbridge was.

So, at the time where I decided it was time for me to look for a change in my career and look for something -- in my mind a little more challenging than what I was doing at the time, which was a regulatory compliance role -- I decided that Enbridge would be a place that I'd look at.

So, I went onto the website and there was an opportunity looking for risk specialists and I went through the credentials, and it felt like it had been made for me. So, I decided that it was the right kind of signal for me to apply, and so that's what I did.

Q. I see.

A. Uh-huh.

Q. How long have you been pursuing your Ph.D.?

A. Well, it's been going on for a couple of years. About 5

years now I've been working on that. I had to make a stop in it during my ORM days when I on the road about 85 percent of my time. It just wasn't possible to focus my energies on that when I got home with family obligations. And I'm a single mother so I have a 24 year old at home, yes. And at the time she wasn't 24 but (laughing) -- but definitely they take up time and energy, yeah.

Q. So, we'll discuss that off the record.

A. (Laughing).

Q. And your Ph.D. is in risk management?

A. It's risk management. So, it's actually on small liquid pipeline operators in the U.S. and its how they managed the regulatory change with 49C04195 coming into effect for small group pipeline operators -- whether they worked on -- on a resource plan that was internal resource consisting of these consultants -- what the impact was and what the benefit was to them, over the 1, 2, 3 years out.

Q. So, you're into your research stage?

A. I've already done -- I've done my candidacy exam. I've got a survey that I sent out. My issue with the Ph.D. is that I've got no response back from the small liquid pipeline operators. I've had 5 total out of over 200 surveys that I've sent out, both by e-mail and by hard copy. So, it's getting those responses back to be able to crunch the data to finish off the information.

Q. And once you get your Ph.D., what do you hope to do

then?

A. I'm still going to work in industry. I love industry. When I decide to retire from industry then at that time I'll maybe consider doing some teaching at the university. But I want to wait to. I love working in industry, so I don't have any plans of being an academic in the near term.

Q. Okay. When you think of risk management at Enbridge, what part of the operation would that apply to?

A. So, this area that I worked in was operational risk management, so I worked with all the operating regions. So, specifically I would work with the general managers and the folks that were in charge of the engineering programs there, and then the specific engineers.

If they had an area that they would come and say, you know, kind of like you to take a look at this from a risk prospective, then I would determine what assessment would be appropriate for it, and then do a field level assessment based on that.

Q. Okay. Were you ever asked an assessment of risk in the control center?

A. Actually at one point I was broached about that and my advice was to take a look at doing a human factors assessment, and to do that. And I provided a name of a consultant that I felt would be good to meet that need. One actually that I worked with in my Imperial Oil days through the Exxon Mobile network.

Q. What was the -- do you remember the specific request that was made by the person that brought it to you?

A. The request was, have we ever done risk assessments within operational risk management on a control center? And the answer was, no, we have not done the control center specifically. But, if I was to consider doing one, it would likely be a human factors analysis that would be done through an external consultant, because I did not feel that I have the expertise to be able to run that type of an evaluation.

Q. And what made you think of a need for a human factors application to that?

A. So, one of the things that I've done is taught actually a human factors engineering course at the masters and Ph.D. level for the University of Alberta. So, it is an area that I have a lot of personal passion around and something I could create a lot of interest in. So, I've actually taught a class -- taught a course in human factors engineering and designing things for humans to use effectively.

Q. Uh-huh. But you felt that you didn't have the expertise?

A. Not to run the assessment. I've worked with human factors specialists but I've never myself run the analysis.

Q. Um-hum.

A. So, I would have felt more comfortable having an expert come in to do that.

Q. Okay. Well, we're going to look at the control center as it was at the time of the accident. What were some of the areas that you thought human factors could be applied to --

A. Well --

Q. -- to reduce the risk of error?

A. -- the human factors assessment, generally as an assessment tool, focuses on things like the number of alarms that are received, the screens that are -- number of screens that they have to look through. It looks at what's automated, what is not automated, where there's opportunities to reduce the potential for human error to occur through those different means. And that's where I thought the greatest value would be.

Q. Would it also include looking at the displays within the screens?

A. Yes, absolutely, uh-huh.

Q. So, in your opinion, having some background to support that opinion, do you see any shortcomings in the screens and/or the (indiscernible)?

A. And I haven't actually worked directly with the control center operator screens. In my supervisory role with pipeline modeling --

Q. Um-hum.

A. -- I had people that I managed that did that, but it was very much a leadership role and not a technical role, so I didn't go onto their screens --

Q. Um-hum.

A. -- to see what they saw and what they didn't see so --

Q. Okay. What about the alarms?

A. The alarms, the MBS alarms -- we actually worked very hard from an MBS prospective to be able to minimize the number of nuisance alarms that were there while optimizing the sensitivity of the leak detection system. So, that's that balancing act that the line custodians who worked for me would be working.

Q. Okay. And as a result of this was the number of alarms changed?

A. As a result of?

Q. Your efforts or your examination of the alarms?

A. So, I didn't do a human factors analysis on that.

Q. I see.

A. I recommended an expert come in. And I don't know, at the end of the day, if it was done on the old control center. I believe, and you'd have to check on this, but I believe that they were considering that for the new control center that was built.

Q. So, do you -- but you don't know if, in fact, an outside third party was brought in --

A. No.

Q. -- to look at this?

A. No, I don't know.

Q. Well, from a -- from an operational prospective, why would the MBS analyst be separate from the operators?

A. In terms of their roles and responsibilities?

Q. And in terms of opportunities for error? What was the advantage of separating them and having a separate function of someone that does nothing but examine MBS lines?

A. So, we have a large number of systems that the operators deal with. And so our control center operators are set up in -- I think they call them pods -- within the control center, for their terminology. And each of these different pods focuses on very specific pipelines that they manage. So, they become experts in those systems.

The MBS analyst role is to take a look at the leak detection systems and the equipment that are on the leak detection system through all of the systems, so we don't have, for instance, one pod associated with one MBS analyst. We have one MBS analyst who would manage all the different pods that are there. So, all the systems.

So, they would have a general knowledge, but only in the MBS system because there's no way they could become the equivalent of 140 pipeline operators. So, this gave a focus area to the leak detection equipment and to take a look at the MBS systems for response to MBS alarms, and determine if there was something within the MBS model that was something -- I'll say equipment failure, things like that -- that would be communicated to the operator to help and assist his decision making on whether or not to shut down the line or what to do in the operational line.

Q. So, is it fair to say that the MBS analyst provides the leak detection expertise that an operator would rely on to determine the validity of an MBS alarm within their means?

A. Well, I don't know if I'd call it leak detection expertise because the MBS alarms were one of the leak triggers. There's a number of things that the operator sees that the MBS analyst doesn't see. So, the MBS analyst would look at the leak detection program, which is the MBS model, and they would -- they would provide input to the control center operator, specifically related to the MBS model.

Q. Okay. So, leak detection is the MBS model?

A. That's the main hydraulic model that is used in order to manage the mass balance system. So that's what MBS is, is the mass balance system. And so the mass balance system does calculations of inline product that's flowing through the pipeline between two instrumented points, and then it will determine -- if there's an imbalance, it will have an alarm that is generated.

And if that alarm is generated the MBS analyst would take a look at that alarm and say, is this something that is explainable through, you know, a failure in a piece of equipment that we've seen, or is it something that could potentially indicate a leak? And they would communicate whether or not there was any system error to the control center operator. And then the control center would look at their other leak triggers to determine if there was something that they should follow up on.

Q. Okay. And why was the MBS analyst placed in a different span of control than the -- than his or her counterpart, the control center operator?

A. So, could you define what you mean by different span?

Q. That reports to a different -- ultimately different supervisor --

A. Okay. Because --

Q. -- supervising authority that is.

A. -- right. So, the leak detection function that we have, which was pipeline modeling at the time, was in a different group than the Control Center group was.

So, one of the things that I said, when I decided to take the role as the supervisor of the Pipeline Modeling group, is I said right off that I thought -- at the time we were under the IT part of the department, of Enbridge -- and I said one of the first things I'd want to do is look at relocating us to a different area.

And there was a couple of options that existed. One of those was to look at the control center and how that is a function within that. And then the other was to take a look at one of the engineering groups and maybe take a look at that part, as one of the options.

And because the models are a part of the activities that are done by that Pipeline Modeling group -- but not all of that is just determining models. There's projects where research and

development instrumentation, that sort of thing -- it fit better and aligned better with an engineering function than it did with the control center function.

So, that had been my recommendation was to move us into an engineering group rather than the control center, so that we were aligned with the full group rather than a portion of the group.

Q. Okay. And was that done?

A. Well, we ended up reorganizing into a PCSLD group, which is pipeline control systems and Leak Detection group. That was spun off. So the SCADA portion came into a different department, as did the Leak Detection group, and it became a focal point and a brand new department within Enbridge. So that it would have its own budget, its own priorities, and it had definitely a heightened priority in the organization after the reorg.

Q. When was this reorganization? When did this take place?

A. That started what November of 2010.

Q. After the incident?

A. After the incident.

Q. Did the Marshall incident influence this reorganization?

A. My opinion would be, yes. I think that it helped speed it along. Before I took the role in April we were looking at moving the group and it had been discussed, as far as I know, from the previous supervisor to me, for about 2 years prior to that. So, the plans were to move the Pipeline Modeling group, it was

just a matter of where was the right home for it at that point.

Q. Okay. And one of the things that we've learned here is that the operators -- control center operators go through a separate -- you go through sort of an involved training process --

A. Uh-huh.

Q. -- from the time they're hired until the time they're brought up to speed?

A. Right.

Q. Can you kind of walk us through the training that an MBS analyst gets from day one until the time that they're let go?

A. Sure. So, when a person is hired into an MBS analyst position it supplies a 3-month training period for them to be -- to be trained to handle MBS alarm calls independently.

The fastest, I think, we've ever had anyone go through that program was 2 months and they had 8 months of co-op experience with us and had the engineering background with the hydraulics and the chemical engineering. So, they came in with a very strong advantage over some of the other people who may not have had that technical background.

So, when they came into those roles they -- they were able to pick up and go through the training program much quicker than others. Typically it's about 3 months and sometimes it's a little more than 3 months.

Q. And what kind of -- what happens in the training -- what are they exposed to?

A. So, they learn about the hydraulics of lines so they get some -- some training on basic hydraulic type information. They get trained on different types of alarms that are coming through. They sit with an experienced MBS analyst and they will actually take the calls with someone sitting beside them and mentoring them through, how to manage the calls, and how to go through the system, so they learn what to look for, what are different items that they need to do.

We also have scenarios that they have to run through, like a simulator type scenario where they will identify what is the cause of an MBS alarm to communicate that to the operator. So, there's all of the same type of aspects that you would see in a control center operator training program -- have been mimicked in the MBS analyst type of a training program.

Q. Okay. And what of scenarios did you use -- or are they based on?

A. Yeah, I actually brought a couple with me because I thought you might ask that (laughing). And I've never actually executed the training myself. So, there was a fellow in our group who was very experienced and he created -- I think 20 something odd years in the control center -- before he moved over as an analyst.

So, he created something called a readiness assessment. And so, the readiness assessment would talk through how to maneuver yourself through the system, how to start and stop

models, how to use the line fill information that we have from our commodity -- commodity tracking system. It would talk about changing values and how to be able to respond to that.

They had different scenarios and they would pick a scenario and work through it. So, this -- there's one, for instance, here in front of me called Scenario 3, and it says: The scenario is associated with alarm on September 2, 2010, at 18:29 involves a 5-minute, 20-minute, and a 2-hour alarm that were triggered by column separation on shutdown and a failed suction transmitter at bland. The suction pressure model is mapped to PT2S at bland. Has an actual pressure read back available on PT1S.

And then it says: The pipeline will remain shut down during the scenario so the column separation will resolve on their own with two R alarms still active on start-up.

So, they go through this scenario and they would actually have to get the data, work through the process, and determine whether it's an equipment failure, if it's something that could indicate that the model was not functioning correctly at the time. They would go through that analysis and do the communicate.

So, have the training navigate to the directory, to the archives, make sure they follow the process that is -- that they've been trained on, so they actually get checked off that they're doing all the right things for these scenarios as part of

the readiness assessment.

Q. Okay.

A. Yeah. And so this readiness assessment is done on every new MBS analyst. One thing that we have done is like a certification form. So, one of the engineering people will actually be sitting with the analyst and make sure that they've done everything properly, as well as they're training -- the person who is training them, who is a senior analyst.

Q. So, the two people check them off. An engineering specialist --

A. Yeah. At different -- so one has questions and one has scenario based. And they will both evaluate their part of the readiness assessment for the individual.

Q. Okay. Who has the questions? Is it one person has questions, one has scenarios?

A. So, the senior analyst, the one who is their mentor and has been working on their training program, is the one who would ask the questions.

Q. So, do they get a sort of oral examination at some point after the training?

A. So, yeah. So, they get -- they get a copy of a written scenario.

Q. Um-hum.

A. And they actually have to work through the scenario.

Q. Okay. I see. And it's the senior analyst who asks the

questions of the scenario?

A. Yeah. And they actually get the questions on here as well.

Q. Okay.

A. So, they know what's going to be asked.

Q. And how many of these scenarios is the -- is the trainee exposed to?

A. That I would actually have to check with the person who does the training.

Q. Okay.

A. Because I don't know off the top of my head. On this one, I think they generally for the exam choose one scenario.

Q. Okay.

A. But, as to whether or not they go through -- how many they go through in the training program, I believe that that's a large number, and that I wouldn't be able to tell you the exact number.

Q. And at some point somebody says to them, okay, you're ready to take the final exam. Is that kind of how it works?

A. Yeah. So, that's what this readiness assessment is.

Q. Um-hum.

A. So, after they've gone through their training program, they've been able to manage the calls on their own with someone there supervising them that they've done everything that they need to from a training prospective.

And if they feel that they're comfortable taking the calls on their own -- so it has to be a comfort level by the individual who's the new analyst, as well as a comfort level by the person whose done the training, that they were responding correctly. Then at that point they're ready to do the readiness assessment.

Q. Okay.

A. And then -- and we've actually had, I guess, one fellow recently who after his readiness assessment said, no, I need a little bit more time. So, they were able to extend his training and then go through this process again.

Q. Okay. And the readiness assessment is -- they're presented with a scenario. Somebody asks them questions?

A. Yeah.

Q. And they take a written examination as well?

A. Yeah, they do. So, there's some written questions that they have to answer as well. And I knew you were going to ask that one too. So, there's questions: How would you explain your position as an MBS analyst to someone that works for Enbridge and fully understands the nature of the Enbridge control center, so make sure they understand the rules and responsibilities? What is the health monitoring system and how does it apply to an analyst?

Q. Um-hum.

A. So, why are we monitoring the MBS program? What's the function of the line custodian and how does their position relate

to your job responsibilities?

So, the folks that actually create the models and that are the secondary support for analysts in the event that they can't -- they can't determine what the cause of an alarm is -- they have a technical expert that they pull on, which is the line custodian who provides backup support at that point.

And then there's a couple of kind of scenario type questions. So, what do you do if this occurs? So, again, written exam as well as -- as well as the readiness assessment. So, it's kind of part -- part and parcel of it, but they're two components.

Q. Is there an oral part of this or is it strictly a written test?

A. Well, this one is typed so my assumption is that this one was done that way, but we could check with the people who do the training for a validation of that.

Q. And two people sign the person off that he's good to do on line?

A. Yes.

Q. And those two people are the trainer --

A. The person whose done the training plus the -- a line custodian. So, one of our line custodians are our engineering staff that create the models and they're the backup support people.

Q. Okay. Do they get any kind of assessment once they qualify or after they're qualified?

A. So, a reassessment. At this time there was none in place, at the time that I was in the Pipeline Modeling group. It was something that we put on our action plan to address.

Q. Um-hum.

A. And felt that it would be a useful thing to do.

Q. Why did -- what made you think that?

A. Well, any training program that I've ever worked with, there's an initial training and then there's reassessment intervals.

Q. Um-hum.

A. And when I came into the Pipeline Modeling group I didn't see any reassessment intervals. So, when I asked the question on how often people need to be reassessed -- because it was a new position, only 3 years old -- they hadn't actually got that far down the program to say here's when we have to reassess people. So, this position only came into effect July of 2008.

Q. This position being?

A. The MBS analyst position.

Q. Um-hum. What did they have before that?

A. Before that -- the engineering stuff -- the line custodians, used to work all day and then they used to manage the MBS alarm calls on a rotational basis in the evenings and then come back to work the next day.

So, as you can imagine, the workload on those -- on those people that were doing that work was unreasonable. So,

there was a change made to bring in the separate position to alleviate that stress from the line custodians, so they could focus on their models, improving the models and then allow someone else to manage those calls. And then they were simply backup support for those calls that the analysts needed support with.

Q. Okay. So, it derived from routine duties of the line custodians?

A. Absolutely.

Q. And then became dedicated strictly to analyzing MBS alarms?

A. Yeah, based on the workload study.

Q. Okay. Were you involved in that, at that point?

A. No. It was already in place when I came in, so that was 2008 when that came into play. So, when I started in 2010 the analyst position had been in place for 2 years. So, that's where reassessment intervals really hadn't become something that they were concerned with at that point, but it was something I wanted to be considered within it.

Q. And right now, what is the status, do they get reassessed?

A. That we'd have to ask, since I left that group 6 months ago and it was on the work plan. So, as to whether or not that has been built into the work plan and accomplished yet, you'd have to ask Ray Philipenko.

Q. Okay. I guess we're going to talk to him this

afternoon.

MR. NICHOLSON: Which one?

MR. STRAUCH: Ray.

MS. HARRON: Ray Philipenko, right after me.

MR. NICHOLSON: Ray's next.

MS. HARRON: Right after me.

MR. STRAUCH: Okay.

BY MR. STRAUCH:

Q. If you look at the performance of the MBS analysts during the Marshall incident, did they perform the analysis as you had -- as you envisioned they would have?

A. So, there was a process and a procedure in place for the analysts to follow, and at the time of the incident they followed their procedure, and did all the things they were supposed to do.

Q. Okay. We were told yesterday that one of the analysts went beyond his responsibilities and provided advice beyond that.

A. Well, I'm not privy to all of those transcripts of previous investigations and things like that. That's not something that I have any information on.

Q. Okay. Well, had they done everything they were supposed to --

A. Right.

Q. -- in your mind, what would the MBS analysts have done, during the Marshall incident when they got the alarm? What should they have done when the MBS alarm went off?

A. So, that -- they actually did what they were supposed to do, which was to take a look at the MBS alarm and the model identification of whether it was something that was a cause that they saw. And based on the model it identified the column separation, so they indicated the column separation to the control center operator. And so that's what they were supposed to do and that's what they did.

Q. Okay. What information would they use to make that determination it's a column -- that's a column separation and not a leak?

A. They don't actually make that decision because the MBS model has a limitation, and any hydraulic model is exactly the same. And the limitation is that during a column separation the model cannot determine if it's a column separation or a leak, and any hydraulic model will be under the same limitation.

Q. So, the only thing they could say is it's either a column separation or a leak, but you have to make that determination as to which one it is?

A. Well, all we can do is identify if the column separation is placed -- it is in place. And so if there -- if there is on one of the displays, a column separation, that looks like its occurred, then at that point that gets communicated to the control center operator and then they will look at their other leak triggers to determine if the column separation or a leak scenario should have been the right option.

Q. Okay. Now, suppose the alarm is invalid, what does that mean?

A. You know, I don't do any of the valid/invalid -- like I say, I managed the people. I didn't do any of the technical work, so -- so I wouldn't be able to specifically talk about them. But I believe that was talked about in some of the previous interviews.

MR. JOHNSON: Yeah. I believe so.

MS. HARRON: Yeah.

MR. JOHNSON: I know it was. I shouldn't say I believe it was, it was.

MS. HARRON: Yeah. So, I -- I, yeah, I don't do any of the technical so I'm the wrong person to ask on that.

BY MR. STRAUCH:

Q. Okay. Were you involved in the determination of the criteria to hire people to be MBS analysts?

A. So, when I came in the MBS analysts were in place.

Q. Um-hum.

A. So, in 2008 there was three analysts that had originally been hired and those three analysts all were previous control center operators. And then there was two additional analysts that were hired later, and those ones did not have control center operator experience. And then when I came in, there was one fellow who was just transitioning into the role, who was a previous control center operator.

So, it takes 5 analysts to have a full complement of analysts in the chair. It takes 4.3 to do the work, so you need to have 5 individuals for the rotation and the vacation coverage and that sort of thing to manage one person's butt in the seat all the time.

Q. So, you weren't involved in hiring any MSB analysts?

A. So, we had some transfers happen as I was there. So, I had one analyst who was successful in a trainer position, and so I had to backfill him. And I actually backfilled him with an EIT, so that I could make sure we had the hydraulic experience coming into that role.

Q. Um-hum.

A. And that was one of the changes that I was implementing during my tenure there, just to make sure that the analyst position they have assigned hydraulic background coming in to supplement with their training program to be as effective as they could in their role. And so I did hire an EIT.

Q. Okay. And what does EIT stand for?

A. Engineer in training. So, he was a new grad and he'd had 8 months previous work term experience in the Pipeline Modeling group. So, he'd had 8 months experience, came in and hit the ground running for us then.

And not a lot of EITs want to work 24/7 shifts, but he was thinking it was a great learning opportunity and so he decided to take that role and has been very successful.

Q. This 24 hour -- 24/7 shifts, 24 hour shifts -- does that -- what kind of risk does that pose to you, you know, from in the factor standpoint.

A. Well, as with anything that's shift work, there's always potential of fatigue and that sort of thing going on because they are 12-hour shifts. But there's management strategies in place for that with the way that the scheduling occurs.

So, the MBS analysts have mimicked what the CCO does in terms of their shifts. And then the training that the CCO would be providing on fatigue management, that sort of thing, has been also provided to the MBS analysts.

MR. STRAUCH: Okay. That's all the questions I have for now.

MR. NICHOLSON: Karen --

MS. BUTLER: Brian, go ahead.

MR. NICHOLSON: -- or Brian, do you want to go?

MS. BUTLER: You do a couple and I'll go after you.

MR. PIERZINA: Okay.

BY MR. PIERZINA:

Q. You had talked about volume out calculations -- that was probably the ORM responsibilities?

A. ORM, yeah.

Q. Okay. Can you describe whether and/or how that's changed since the Marshall accident?

A. And I don't think I could because I'm not in that group.

Q. Okay.

A. So, that would have to be David Weir (ph.) or someone from operational risk management to do that. I don't know how they've changed it since I left.

Q. All right. You talked about recommending the human factors analysis for the control center risk. Do you know whether that's been done?

A. It was just -- it was a question.

Q. Yeah.

A. So, it was a question that was posed whether or not I could do that and whether or not we've ever done that within ORM. And the answer was, no, we've actually never done that within operational risk management. But if you want to look at one, consider using an external, and I gave some -- some names at that point.

Q. So, --

A. And as to whether or not they did that -- Ian Mulligan was in at the time, so you'd have to check with CCO at that -- my understanding is that because they were moving control centers, that if they were looking at a human factors assessment, it would have been applied to the new control center.

Q. Okay.

A. Yeah.

Q. So, and you talk about the line custodians -- were previously performing the function of an MBS analyst.

A. Um-hum.

Q. But that workload was too much for them, so the MBS analyst position was created?

A. Yes.

Q. But the MBS analyst position is too broad to know all the details of all the lines that are being operated. It made me think that if a line custodian would have received an MBS -- the MBS alarm that came in from Marshall, because of their knowledge of the pipeline, would they have handled that differently and, you know --

A. I actually asked that question to the line custodian following Marshall.

Q. Okay.

A. And he went back and evaluated what was done. And based on the information that the analyst had and what was available in the models, he came up with exactly the same conclusion of column separation.

MR. NICHOLSON: Who was that person?

MS. HARRON: That was Ted Farquhar and he was already interviewed.

BY MR. PIERZINA:

Q. Um-hum, yeah. Yeah, obvious, I mean, in my mind, column separation is a pretty easy conclusion. That's the pressure at Point X is less than, you know, a certain value, you have column separation but --

A. Right. So, depending on, of course, the operational situation leading up to it, right. So, from an MBS analyst prospective they would take a look at the alarm and then it would indicate if a column separation had occurred.

It wouldn't necessarily have, you know, all the elevation profiles and things like that to say, should we have had a column separation at that location? That wasn't part of their responsibilities.

Q. I'm sorry.

A. So, their --

Q. That's not part of the --

A. That's not part of the MBS analyst's responsibility. So, the MBS analyst would take a look at the information that they have and determine whether or not, from a modeling prospective, there is something that was an indicator of what had occurred from an alarm.

Q. Okay. Would the line custodian have that information?

A. They have the same strengths.

Q. Okay. Who within Enbridge has the capabilities or resources to determine drain out from a point on a pipeline?

A. That I'm not sure. Like I said, I'm not the technical leak person. I was the manager of the people leak person. So, I would ask the control center that question, to see if they know, because that isn't my department.

MR. JOHNSON: You know, Brian there --

MS. HARRON: I'm not sure.

MR. JOHNSON: -- the Operational Risk Management group has a volume alt calculation.

MS. HARRON: Yeah.

MR. JOHNSON: Based on the time it took to shut a line down and close valves -- you know, on a running line. As far as a down line, it can literally go to -- a region engineer has got the line fill volumes by diameter and he would go to his profile maps and would do that calculation based on terrain. So, if you've got the valves closed, and you would basically look at that profile drawing on the alignment sheet and say, this much --

MS. HARRON: Right.

MR. JOHNSON: -- you know, from this station to this station is going to go to this spot, and they would do the calculation based on, you know, barrel per feet.

MS. HARRON: Uh-huh.

MR. JOHNSON: Whatever that calculation is, they have it in their handbook.

BY MR. PIERZINA:

Q. Okay. So, did I hear then that a region engineer could do that or an ORM?

MR. JOHNSON: ORM has a model for figuring out volume alts on a running line. As far as the drain out itself, a region engineer, pipeliners, depending on the pipeline supervisor --

MS. HARRON: Yeah.

MR. JOHNSON: -- can do that also.

BY MR. PIERZINA:

Q. All right. So, specifically if, on Line 6B, if you have a sectionalizing valve closed at Milepost 576.93 or whatever it is, and Stockbridge Milepost 650, and you've got a 6 foot split at Milepost 608, can -- you know, who can determine, you know, how much volume would be expected to drain out, for instance, over a 10-hour period that the pipeline is shut down?

A. Well, it wouldn't be the MBS analyst.

Q. No?

A. That's not their role. So, I would deflect to risk management region engineer.

MR. JOHNSON: In the case of Marshall, Vince Kolbuck, the --

MS. HARRON: Yeah.

MR. JOHNSON: -- region engineer, did that calculation.

MS. HARRON: Yeah.

MR. JOHNSON: Based on the valves. He said, this valve was closed, this valve was closed, so he assumed everything between there --

MS. HARRON: Total volume drain.

MR. JOHNSON: -- could have gotten out.

MS. HARRON: Yeah.

MR. PIERZINA: Right. The (indiscernible). I was aware of that. But to me, it's a little bit different if you've got say

75 miles of pipeline between closed valves and then the various elevation differences --

MR. JOHNSON: Yeah, then.

MS. HARRON: Uh-huh.

MR. PIERZINA: -- taking place.

MS. HARRON: Yeah.

BY MR. PIERZINA:

Q. I just -- I wondered whether that was something that a line custodian would be able to perform as part of their pipeline modeling?

A. That's something that I would expect ORM to do --

MR. JOHNSON: ORM.

MS. HARRON: -- based on the elevation profile that they have with the volume line calculations. So, my expectation is that that's --

BY MR. PIERZINA:

Q. Okay.

A. -- that's where that calculation would sit.

Q. So, ORM --

MR. JOHNSON: I still would fall back on our regional engineer and the pipeliner --

MS. HARRON: Yeah.

MR. JOHNSON: -- that are going to look at a profile drawing and say, you know, even though we have a valve closed here and here, we have some peaks here, so the oil outside of those --

MS. HARRON: Right.
MR. JOHNSON: -- is not going to drain in.
MS. HARRON: Is going to drain out. Exactly.
BY MR. PIERZINA:
Q. Exactly. So, so we could look to either a regional engineer or ORM?
MR. JOHNSON: Yes.
MS. HARRON: Uh-huh.
MR. JOHNSON: I know they utilized -- they asked ORM --
MS. HARRON: Uh-huh.
MR. JOHNSON: -- to give them the numbers to support their decision.
MS. HARRON: Right.
MR. JOHNSON: So, in Vince's case he ran his numbers and he asked ORM, what would you see here, operational risk management's ORM?
MR. PIERZINA: Right.
MS. HARRON: Yeah.
MR. JOHNSON: And, you know, what is your --
MS. HARRON: What does the model say?
MR. JOHNSON: -- you know, what does your model say for that?
MS. HARRON: Yeah.
MR. JOHNSON: But, like I say, the model is based on a running pipeline.

MS. HARRON: Uh-huh.

MR. JOHNSON: So, based on a running pipeline, it's saying that the flow is at this rate. They recognize --

MS. HARRON: Uh-huh.

MR. JOHNSON: -- that it's a release. It's going to take 5 minutes to close the valves based on valve travel. So, how much oil do you get out because the line is still flowing until -- and then the valves close and then they do drain out based on elevation.

MR. NICHOLSON: Yeah. That was done after Vince's --

MR. JOHNSON: Yes.

MS. HARRON: Right.

MR. NICHOLSON: -- the back of an envelope. Okay. That's how you got the final number, I assume --

MR. JOHNSON: Yeah, that's -- that and -- well, and they were -- you know, there's an original number that you pull out for estimating. And then there's one, in this case, where they're saying, okay, now we had to look at that because X amount of oil was assumed to have been pushed through there --

MR. NICHOLSON: Right.

MR. JOHNSON: -- not just when the valves closed.

MR. NICHOLSON: And that would have been the ORM group that did all that?

MR. JOHNSON: They would have assisted with that.

MS. HARRON: Uh-huh.

MR. JOHNSON: It was a group of people, or a group of departments that came up with that final number.

BY MR. PIERZINA:

Q. Now, when Marshall happened, you were part of ORM, right?

A. Pipeline Modeling.

Q. Pipeline modeling? Okay.

A. Exactly, yeah. So, I'd already --

Q. Right.

A. I'd left ORM April of 2010 and I was in that role for a few months and then we had Marshall occur. There you go.

Q. Okay.

A. Welcome to the group. Yeah.

Q. Have the MBS analyst procedures changed for MBSR?

A. When I was in the Pipeline Modeling group that became the Leak Detection group, there was an upgrade of procedures ongoing at that time to look at all of the procedures that we had for the MBS models, and working with the control center to evaluate theirs and ensure that there was alignment between the two. So, that was an ongoing process. And then the actual MBS flow chart that said, here's what you do. That was modified as well.

Q. Okay.

A. For the column separation on a particular --

Q. All right. Modified how?

A. For communication to ensure that we said to the -- to the operator -- to the shift lead that had contacted the analyst that the model was not reliable under column separation conditions and reinforced that, so that it would spur investigation of other potentially (indiscernible).

Q. Okay. And, I apologize, I haven't been able to find the procedure. I looked at it within the last couple weeks and it -- and this is a procedure for an MBS alarm. And what I'm recalling seeing -- correct me if I'm wrong -- is that if an MBS alarm clears, the MBS analyst was to enter -- there was column separation -- the MBS analyst was to report to the shift lead and it was up to them to decide whether or not to restart the pipeline. Does that ring a bell?

A. So, it -- I don't -- it wasn't worded that way, but it was to indicate that during a column separation that the model was not reliable. Then that would have spurred the shift lead to take a look at that column situation, that column separation situation and use other pieces of information that the operators have to determine if that column separation could potentially have been masking a leak.

Q. Okay.

A. Because that's -- what happens is that during column separation the model, indicating that it's column separation, could mask that a leak has occurred.

Q. All right. When a pipeline is shut down and there's an

MBS alarm, are there -- is there any situation that you can envision, where the MBS alarm would not clear?

A. Well, no, because it's time based. So, in a time based process if you have the same volume over periods of time then the MBS alarm clears. If you're getting continual drain, then the MBS model, if it's within that threshold, the 520 and 2R alarm thresholds, then it will lock, but it has to be that volume. And, of course, it's based on flowing volume not stagnant volume.

Q. Right. So, if the line is not flowing there's no imbalance?

A. There's a -- there's no imbalance unless it's draining from that line at such a volume that it would keep that alarm going.

Q. Right, which would have to be draining through a meter, right?

A. It would have to be draining where the one meter and the next meter did not -- and actually in a shutdown position its pressure that you use not meters. So, there's pressure monitoring and there's the meter volume.

So, MBS models are designed for running pipelines, so that as it's passing through one and goes to the other, you can determine if those slugs are equivalent, right. So, it's the mass balance at that point.

So, meter to meter works really well for a flowing pipeline system. But if you are in a non-flowing condition,

there's different types of alarms that you can get. So, there's the MBS alarms, there's some diagnostics that can alarm. There's a couple of different types of alarms, and you'd need to talk to an MBS analyst to tell you all the details of that, because like I said, I don't work specifically in that area.

But definitely the pressures dropping would have been something that would give a diagnostic potential --

Q. Okay. So, --

A. -- if there's two transmitters. But you need to have the difference.

MS. BUTLER: So, isn't it really true that we knew we had a leak, the pipeline was down and we didn't know -- hindsight we know that we had a leak?

MS. HARRON: Yeah.

MS. BUTLER: At that timeline the pipeline was draining?

MS. HARRON: Uh-huh, right.

MS. BUTLER: But the reason that it didn't indicate that it was draining was because some of our pressures transmitters were behind blockades and holding steady?

MS. HARRON: So, at the time when the line shutdown it put the flow into a column separation situation.

MS. BUTLER: Okay.

MS. HARRON: So, as a result of that, the model can't tell you anything other than the fact that it's in a column separation. Until the column gets pushed back together and then

starts flowing again and it's able to do its math balance, the model can't tell you if there's anything other than the fact that a column separation had occurred.

MS. BUTLER: Okay. So, we had columns that were no longer flowing?

MS. HARRON: Right.

MS. BUTLER: Because the pipeline's down. The model does know that the pipeline's down?

MS. HARRON: Yes.

MS. BUTLER: Okay. When the pipeline's down it would look at pressures, correct?

MS. HARRON: Well, there's -- that's where the control center operators monitor at that point. So, the model may have some diagnostics that come through.

MS. BUTLER: Um-hum.

MS. HARRON: But that would be all that you'd get because there's no meter to meter mass difference. So, maybe a diagnostic would come up but, again, I don't know what those values would look like.

MS. BUTLER: Those diagnostics -- that would be depending upon where the instrumentation is placed?

MS. HARRON: Yes.

MS. BUTLER: Correct?

MS. HARRON: Yes.

MS. BUTLER: So, as I recall, under the second shift --

MS. HARRON: Okay.
MS. BUTLER: -- when we had attempted to restart --
MS. HARRON: To restate, uh-huh.
MS. BUTLER: -- and we saw some alarms --
MS. HARRON: Uh-huh.
MS. BUTLER: -- and we were trying to determine on the MBS, whether it was a true alarm, valid alarm --
MS. HARRON: Right, right.
MS. BUTLER: -- or a -- and, I believe, that there was two scenarios that surfaced during that one -- was that we had a bypass station at Niles?
MS. HARRON: Uh-huh.
MS. BUTLER: And we had overridden some pressures at that location, correct?
MS. HARRON: And I'm not privy to that because I wasn't part of that.
MS. BUTLER: Okay, okay.
MS. HARRON: Yes.
MS. BUTLER: Yes. Does that sound --
MS. HARRON: It sounds reasonable.
MS. BUTLER: Okay, all right.
MS. HARRON: But, as I said, but I haven't -- but, as I said, I wasn't part of that.
MS. BUTLER: Okay, all right. So, if we could make sure Brian's done first and then I'll back up and take it through a

more fluid flow of questions.

MR. PIERZINA: Fluid flow.

MS. BUTLER: That's very good, right. I thought that was appropriate for our hydraulic model, so.

BY MR. PIERZINA:

Q. All right. So, did I hear -- I'll ask the question this way. Are there MBS alarms other than a 5 minute, 20 minute, and 2-hour alarm?

A. Those are the alarms, but there's diagnostics that happen in the background all the time on this system. So, I'm sure an MBS analyst could tell you all about what those look like. But, as I said, I don't work on the models.

Q. Okay. So, the --

A. But the alarms are 5 minute, 20 minute, and 2 hour.

Q. All right. So, there's diagnostics going on. But who sees -- who sees that?

A. That's a good question. And, at that point I'm assuming it's an MBS analyst, but we'd have to check with them.

MS. BUTLER: Wait. We also have transcripts that indicate shifting (indiscernible).

MS. HARRON: There you go.

MR. PIERZINA: Okay.

MS. HARRON: See, and that I wouldn't know. As I said, I don't work on the models directly.

BY MR. PIERZINA:

Q. Okay, yeah, if --

A. Yeah.

Q. If a pressure transmitter on a stagnant line showed pressure steadily dropping --

A. Uh-huh.

Q. -- well, that -- that may be normal or it may be abnormal, depending on the location, but --

A. Absolutely. They'd have to look at cooling effects and someone with that experience would have to take a look at that and determine.

Q. Okay. So, that would be --

A. That's traditionally the operator so --

Q. Right. So, that's going to be -- that would be -- and something I wondered. I know you're not the right person to ask. I'm just wondering if there would be type of alarm or if it would be up to an operator -- operator to recognize that?

A. Yeah. And I don't believe they alarm as such. So, there's diagnostics that happen in the background and the analyst would have to tell you how those diagnostics are presented in the model, because that I don't know.

I do know that there's diagnostics that go on all the time on the models as they evaluate, as part of their algorithm, all the different components and instrumentation.

Q. Are there instances of column separation on the pipeline where the MBS analyst is not involved?

A. So, where we would have a column separation occur -- and I'm trying to think of when an analyst would not be involved -- so do you have a scenario in mind that you're thinking of?

Q. Well, I'm just thinking that when a pressure at a certain point drops below the pressure, you know, that needs to be maintained --

A. Right.

Q. -- to maintain the column.

A. In flowing condition?

Q. No, maybe in a stagnant condition.

A. So, in stagnant condition the models are limited.

Q. Right. And there may not be an MBS alarm?

A. Right.

Q. But there could be column separation on the pipeline?

A. Yeah.

Q. And the MBS group would not be involved in evaluating that column separation?

A. If it has been -- the line has been shut down, at that point you very often would see a -- you know, or potentially see a column separation occur during a shutdown event. So, at that point, during the shutdown, they would likely see it. But if for some reason there's been a column separation type of event occur after the shutdown has occurred, I don't know if the analyst would be able to see that at all, because there's no flow to indicate that there's some.

Q. Okay. I think I will pass along. I want to try and find the procedure that I looked at and if I do I'll --

A. Right.

Q. -- ask it, because to me what I saw seemed to me to be, you know, a problem that I'm hoping has been corrected.

A. Right.

MR. JOHNSON: Maybe Ray can address it or --

MS. HARRON: Yeah, in the --

MR. JOHNSON: -- you know, we're a little -- we almost --

MS. HARRON: -- in what's happened since.

MR. JOHNSON: -- we're getting -- are we maybe getting off here where human factors --

MR. NICHOLSON: Yes.

MR. JOHNSON: -- I suppose, we're really diving down in the stuff with.

MR. NICHOLSON: That's a good point.

MS. HARRON: Yeah.

MR. JOHNSON: So, we don't have the details, people here, so to speak. Not that Lorna doesn't have it.

MR. NICHOLSON: No, she's doing pretty good.

MR. JOHNSON: We're just a hair off so --

MR. NICHOLSON: But, yeah, that's a good point.

MR. PIERZINA: Okay.

MR. NICHOLSON: We are here. This is human factors.

And I think we got a little time so I've let us go to operations, because it's an interesting line as well. But if we have to bring more than that, we might just have to do that to get the operations stuff addressed. So, with that, we'll move to Karen. But why don't you watch the time.

MS. BUTLER: Okay. So, I don't know what that means.

MR. NICHOLSON: I think you have 20 minutes.

MS. BUTLER: All right. Then I'm going to go fast.

MR. JOHNSON: We've got someone coming in, but I've told them we're running late so --

MR. NICHOLSON: Okay.

BY MS. BUTLER:

Q. Okay. Leak detection model.

A. Yes.

Q. Who makes it?

A. So, this is the American innovation. Sorry. This is the --

Q. Stoner?

A. Yes. Thank you. Stoner software.

Q. All right.

A. Yes.

Q. How long have they had a leak detection system here at Enbridge, do you know?

A. Many years. It's been the 1980s when they first came into play.

Q. Has it always been Stoner? Did they build their own?
A. It has always been Stoner.
Q. Okay. And with that, I've never seen a hydraulic model that didn't have an elevation profile that you put in.
A. Yes. We always put that into the model.
Q. Okay. So, is that also not in the mass -- the leak detection model?
A. Well, it's actually part of the Stoner for the algorithm calculations.
Q. Yes, yes. So, so when the pipeline goes down --
A. Uh-huh.
Q. -- the -- we don't do anything to actually shut the model down?
A. No.
Q. We keep it cranking. So, even though we -- the system is down -- it's sitting there running all those iterative --
A. Yes.
Q. -- calcs? Okay.
A. Yes.
Q. All right. And, it's my understanding that there were some inputs into the model that were not set up for picking operations, meaning that when the station is bypassed --
A. Um-hum.
Q. -- the pressure is locked in. Okay. Had they ever made you aware of that?

A. The line custodians were constantly updating the models and improving the models as we went forward. So, when there was no equipment that came into play, the line custodians would take a look at that and build them into the model. And, again, as they have the time to do that, they would upgrade the models. So, that was an ongoing process that they had.

Q. So, does upgrade the models mean that they would ask for instrumentation to be moved so that it would be more accurate?

A. Yes.

Q. Okay. All right.

A. Yes.

Q. And do you know if that had been asked for?

A. I wouldn't -- I wouldn't know. We'd have to ask a line custodian --

Q. Okay.

A. -- that particular question.

Q. When we build a model at Stoner, since it's a hydraulic model, and we're using it for leak detection, are we also using that same model for the risk analysis that's done?

A. No.

Q. Are they building their own hydraulic model?

A. I don't believe so. You'd have to ask the Risk group that. My understanding -- the models that are used by the Risk group, by the American innovations index space model -- and I know that they're in the process of looking at revamping that whole

area -- so I don't know what that looks like today.

Q. So, when you worked in ORM, if I've got that right?

A. Uh-huh.

Q. That model was not hydraulic based?

A. No, absolutely not.

Q. Okay.

A. There was an elevation profile in it but that was not --

Q. Okay.

A. -- there was a -- it's for the calculation of the (indiscernible).

Q. Okay. So, it was totally different just looking at --

A. Totally different.

Q. - - some, probably input manual values, and then it would crank relative risk --

A. Uh-huh.

Q. -- based on other factors?

A. Absolutely.

Q. So, alignment (indiscernible), that type of thing, for elevations?

A. Right.

Q. Have you ever modeled fatigue?

A. I have not modeled fatigue myself. And, but the Pipeline Integrity group actually has a -- has a crack management program.

Q. Uh-huh.

A. And pressure cycle -- for pressure cycling and monitoring, pressure monitoring --

Q. Okay.

A. -- is part of that. And they will actually trend over time to look at the aggressiveness of the cycle.

Q. So, that would be mental fatigue that they're modeling?

A. It is, absolutely.

Q. Have we ever, to your knowledge, bought a modeling tool for human fatigue?

A. Oh, for human fatigue? Not to my knowledge. I would check with CCO on that --

Q. Okay.

A. -- in case they have something that they've put in play.

Q. Did the controllers -- let me back up a second -- the leak detection analysts.

A. Yes.

Q. It's my understanding that the second shift, leak detection analysts, in the Marshall event, had been on five consecutive night shifts?

A. Yes.

Q. Is that typical?

A. No. We were actually understaffed at the time that the Marshall incident occurred. We had -- we were short by one analyst and for a while we were short two analysts due to movement within our group to other groups. So, there was a training that

was going on at the time to build that on, but the people weren't qualified to go by themselves yet, so they had the training responsibilities as well as doing the regular duties.

Q. How long had that been going on, do you know?

A. Let's see. Well, I started in April and in September I had the full complement in place.

Q. Okay. So, April to September, is that fair?

A. Yeah. It was a transition time for the people to come into place.

Q. Was management considering a (indiscernible) staff before they left people here?

A. It's part of the transition planning. So, one of the fellows who was brought into the role of an analyst who was being trained at the time was -- he came from Control Center Operations. So, we had quite an extended transition period. So, it took quite a while to get him trained, because we had to share the number of shifts that we had with him with CCO.

Q. Okay. You've mentioned drain out can be calculated through the Risk Managing group and the region engineers. Is it your thought that they would use a hydraulic model for that calculation, or were they running manual calcs.?

A. That I don't know. Do you know that one, Jay?

MR. JOHNSON: I don't.

MS. HARRON: Yeah.

BY MS. BUTLER:

Q. Okay. Okay. Do you know if, while you were in ORM, if any of their modeling or the leak detection modeling is used in the OPA worse case discharge calc. or number?

A. That I don't know. I didn't actually work on the volume (indiscernible) analysis.

Q. Okay.

A. I was the specialist for creating the tools and the processes.

Q. Do you know who would be a good person to ask that specific question of?

A. I would ask David Weir, who is the Supervisor of Operational Risk Management.

Q. Okay.

MR. JOHNSON: Or Shaun Kavajecz, who will be in here either later today or tomorrow.

MS. BUTLER: And Shaun because?

MR. JOHNSON: Compliance department files the OPA plan.

MS. HARRON: There you go.

MS. BUTLER: So, they know where the numbers come from?

MR. JOHNSON: He very possibly knows.

MS. HARRON: Great.

MR. JOHNSON: And I believe we have to re-file next year.

MS. BUTLER: Okay. All right.

BY MS. BUTLER:

Q. Are you familiar with API1130?

A. Uh-huh.

Q. And what do they do internal to the Leak Detection group to make sure it's compliant with API1130?

A. So, there has been API1149 calculations that are done and API1130 assessments have been done on all of the systems.

Q. Internal or within (indiscernible)?

A. We actually did it internally.

Q. Okay. And who would conduct those assessments?

A. One of the line custodians who has the regulatory background. He was actually tasked with that.

Q. And who would have that been for 6 -- Line 6B?

A. So, all of that would have been done by Ray Philipenko.

Q. And if I looked at the leak detection model itself, would be tags associated with instrumentation be the same as they would be on the SCADA screens?

A. That's a very good question. I think we'll need to ask one of the people who look for the screens.

MR. JOHNSON: That's part of the point -- point verification we're doing.

MS. BUTLER: Would Ray know that question?

MR. JOHNSON: I don't believe Ray will.

MS. BUTLER: Yeah. I need to know.

MR. JOHNSON: Les would have or would.

MS. HARRON: Yes.

MS. BUTLER: Les, okay.

MR. JOHNSON: Yes.

MS. HARRON: Yeah. He'd probably be the best contact.

BY MS. BUTLER:

Q. Okay. Well, let me rephrase it. I know I can get information on the SCADA stuff.

A. Right.

Q. So, what a particular piece of instrumentation you called -- is called an elite detection site --

A. Uh-huh.

Q. -- who would that be?

A. So, we actually used the SCADA group in order to -- and with all the tag numbers -- in order to work in the model and make sure that they're the same.

Q. Okay. So, there is -- there is an effort to make sure they're the same?

A. Yeah. And its --

Q. Or to make them the same?

A. -- part of the process when they find an instrumentation failure, they go back and evaluate that. It's one of the things they look at.

Q. Okay. All right. And you mentioned that it was isolated -- kind of they were -- the Leak Detection group was kind of shifted, if I got this right? And I think you used the word relocated and set up with a separate function or something to that

effect? Maybe I'm paraphrasing that very poorly. I thought there was an element to individualize it or separate it or --

A. So, the Leak Detection group itself did reorg. Is that what you're asking?

Q. Yes.

A. Okay. So, during their reorg. -- so we originally were part of the IT part of the organization.

Q. Um-hum.

A. Which is also where SCADA was located.

Q. Right.

A. So, that is where we were. When I came in April 2010 I took a look at that and said, we don't belong in IT.

Q. Right.

A. We're more of an engineering function. So, therefore, I was looking at moving us into a part of the engineering organization. So, I was well underway in the talks with that and then we had the Marshall incident.

And coming out of that Marshall incident was restructuring of Enbridge as a company. And part of that restructuring was taking both the SCADA aspect or the pipeline control systems, and then the leak detection portion, which was pipeline modeling, and spinning those off into its own separate department.

Q. Was there an intention in doing that to sell those services?

A. To sell the services?

Q. Right. To sell the leak detection services to say another operator that can't do it on their own or to sell the control center services?

A. Not to my knowledge. Not to my knowledge.

Q. And do you happen to know -- you mentioned that it had its own budget now?

A. Yes.

Q. And did it not have its own budget before?

A. We had sponsored projects before, so we would have engineering or the regions sponsor leak detection equipment, because it was -- it fell within the operating realm at that point.

So, now we actually had changed that, so that there was a full leak detection budget -- now that they were under that. The IT budget, as you can imagine, is focused on software and computer hardware, that sort of thing. So, it really didn't fit into what they were doing, so we would sponsor projects that would be on the budgets of other targets.

Q. Has there been any request for the leak detection software to go to a new version that you're aware of?

A. Absolutely.

Q. How long has that been?

A. So, we've been working on that process for -- let's see -- when I came in, in April 2010 we were looking at what the new

software version was going to be, the Windows version. After the team conference last year -- so 2010. That would have been September, October kind of timeframe.

At that point we got GL Noble Denton, who was managing the Stoner software, to provide some information on what it would take to move to the next level or to move to that level. The interim version had some very specific issues, so we didn't move to that version, knowing that they were going to fix those issues with the newest version.

Q. Uh-hum. Have they got permission to get the new version, do you know?

A. Absolutely. They've been actively working on that for a while. It's a configuration of screens and how that meshes in with the control center's information. With all of those details technically it is a challenge. So, that's what takes a while to get that organized.

Q. Did they -- in that process of looking at the new version and going over the details, did they identify for you as specialists or as that outside third party that sells that, what the limitations with your existing software were?

A. They talked about the improvements that we would see by moving to the new version. So, not necessarily the limitations of the existing, but what the enhancements are with the Windows version.

Q. Is that recorded anywhere?

A. There -- there was a meeting with GL Noble Denton. And Ray Philipenko will be able to talk about that. So, they had GL Noble Denton come in. They were just organizing all this as I was leaving the group, so he'll be able to tell you when they had them come in and what specific topics they discussed with them. And that was one of the things that was on the agenda.

Q. If I needed to find a list of instrumentation improvement requests, that maybe the leak detection analysts had made, where would that be and what would it be called?

A. So, there is a version control software on the models called SVN, and changes that have occurred as part of the changed management program. So, so anything that brought changes to the model is tracked in the SVN software.

Q. And that would include requests for field instrumentation or does that go elsewhere?

A. So, we help with the budget cycle. If it's something that's a capital item, it would be part of the capital budgeting process, and it would be part of the 2012 capital budget submissions that went to them.

MR. JOHNSON: And as far as just a basic repair of a field device, is that what you're asking, Karen? Because that would be a maximal repair work plan.

MS. BUTLER: Yes. Is it maximal or fact ground (indiscernible)?

MR. JOHNSON: It's maximal. Fact man talks to maximal.

MS. BUTLER: Okay.

MR. JOHNSON: So, to track that --

MS. BUTLER: Okay. Okay.

MR. JOHNSON: -- it would be in there.

MS. BUTLER: All right. Okay. I think you've clarified all my points. I just want to thank you for being so gracious.

MS. HARRON: Thank you very much.

MR. NICHOLSON: Jay?

MR. JOHNSON: No. I have no questions.

MR. NICHOLSON: Barry, do you want to follow-up?

MR. STRAUCH: Yeah, just a couple of follow-ups.

BY MR. STRAUCH:

Q. What are some of the expected improvements in the leak -- the new leak detection software?

A. So, the usability. User interface is a huge potential advantage. Working with a Windows based system. Everyone whose worked on, you know, Windows for many, many years is very familiar with that and the kind of drag capability versus the cold capability --

Q. Um-hum.

A. -- should definitely have an improvement from a user prospective. So, that's one of the main advantages that we see. One of the other reasons to look at moving to the Windows version is that the older versions don't get supported and enhanced by the companies.

So, if you don't move to the Windows version then you're pretty much stuck at a certain level, and that you could not progress past. So, that was a large impetus to move forward.

Q. I see. Now, this software is independent of the software drive on the SCADA displays, is that correct?

A. My understanding is, yes, because it's not solely based for the SCADA system. But you'd have to talk to Les Reschny about what it is that he uses.

Q. I see. Do you -- from a risk management viewpoint, (indiscernible) -- I'm not sure if I asked you this already or if you were asked this, did you look at the SCADA software as well as the SCADA displays?

A. I haven't looked at SCADA displays. Yeah.

Q. Okay.

A. Under the PCSLB umbrella, the management team coordinates everything that happens within those two parts of the organization.

Q. Okay. How many people did you supervise in this position?

A. I started at 11, moved up to 14, and I think the last count was 21. Then they split my position into three.

Q. Okay. So, of those 21, was that the max?

A. The max.

Q. Five were MBS analysts?

A. Yes, plus there was five MBS analysts and then there was

a new supervisor that was hired for that area, Tina Chikowski (ph.), who actually was one of the analysts and an engineer who was acting as an analyst. And then also a person to come in and focus on training, who actually came from the control center's training group. So, that group grew from five to eight, including the supervisor.

Q. Okay. That's all the questions I have.

A. Okay.

BY MR. PIERZINA:

Q. Lorna, you had talked about reducing the number -- one of the objectives was reducing the number of nuisance alarms --

A. Uh-huh.

Q. -- and increasing the sensitivity.

A. Um-hum. It's a balance of the two.

Q. Right.

A. Yes.

Q. Are you familiar with a release in Canada, I believe on Line 2. It was an MBS alarm.

A. Um-hum.

Q. But I think between the alarm, MBS analysts and the control center, they determined that it was an invalid MBS alarm. Are you familiar with this situation?

A. Do you know when that occurred?

Q. I don't. I know that it was the subject of an NEB report.

A. Yeah. Because I came into the group April 2010. So, if it happened prior to that, then I wouldn't have been involved.

Q. Okay.

A. So, any of the potential releases, for instance, that occurred after that time, I was part of -- of the communication network for that, so I'd have to go back and check on that one, because I don't know off the --

Q. It's not ringing a bell?

A. -- not off the top of my head. Not off the top of my head.

Q. Okay.

A. I'd have to take a look and see.

Q. I believe it was fairly recent and I was just curious, you know, because it's an example --

A. Um-hum.

Q. -- of a valid MBS alarm not being handled -- you know, not being treated as such.

A. Right.

Q. I would expect in the sense of -- you know, in the evaluation of sensitivity that, you know, you'd want to ensure that you don't, you know, miss those.

A. Absolutely. And I'm sure Ray will talk to it. There's alternate leak detection technologies that have been investigated and there's actually a pilot. My understanding is that it's going on this week. And I think we talked about it during the PHMSA on

it. And it was the negative pressure wave technology with the GIS based or JS guts, I guess, inside some pressure transmitters to timestamp those. And the sensitivity testing that was done in North Dakota was extremely, extremely good.

They weren't able to crack the valve to a small enough amount that they could not detect it with that system. So, there's a pilot going on to test that technology and looking at paralleling that, in particular in our high consequence areas, for the look that made the LP side on the mainline.

Q. Okay. This particular release was -- the reason -- I think the reason it was determined that the MBS alarm wasn't valid was because of a DRA, drug reducing agent injection.

A. Oh, there you go --

Q. Does that ring a bell now?

A. That's -- so, well, DRA has some patients --

MR. JOHNSON: If it doesn't let's let Ray answer it.

MS. HARRON: Yeah.

MR. JOHNSON: So, if you don't know, it's best.

MS. HARRON: Yeah. The line --

BY MR. PIERZINA:

Q. I think -- it seemed like it turned a light on.

A. Well, DRA turns a light on, not necessarily a Line 2 incident, so that's --

Q. Okay.

MR. JOHNSON: Yeah. So, it's best not to answer that.

MS. HARRON: Yeah. So, yeah, I'd rather that we -- if I knew the time of when it occurred, I could go back and look in my notes. But without that date it's really hard to know.

BY MR. PIERZINA:

Q. Okay. Yeah. I'm not -- I guess I would hope that in the goals and objectives of the Leak Detection group that you're in now that, you know, you're going -- you're looking, you know, at events, you know, prior --

A. Absolutely.

Q. Yeah.

A. And I tell you on the objectives. One of the line custodians that I had, in my previous role, was working specifically on DRA modeling. And that was one of the questions that we had for enhancements with Stoner software in the new version is what the DRA modeling would look like, to see if it has been enhanced from the version that we have.

A lot of work with our -- with our vendor, who actually supplies the DRA to us, to look at the DRA curves that they're looking at -- that they have provided -- make sure that we really understand what's happening with that to improve the modeling capability.

And there's been some great strides made by the line custodians in improving the modeling capability through greater understanding of what DRA does and how it affects an MBS model.

Q. Okay. In the review of alarm sensitivity and nuisance

alarms, is there a threshold that you're trying to -- trying to reach as far as --

A. So, the line custodians do that balance. So, part of their evaluation of their models incorporates a taking a look at the number of nuisance alarms that they get versus sensitivity values that they obtain.

And if increasing -- if increasing the sensitivity is going to lead to a step change in the number of nuisance alarms that are -- that are achieved, then they will not make that step change in sensitivity, because that's going to create human factor potential or complacency. Other things that could occur that are consequences that you don't want. So, that's that balancing act that they're constantly working on.

Q. Okay. So, did I hear you say -- so if an increase in sensitivity increase -- or results in --

A. Could.

Q. -- a step change increase and alarms --

A. It could.

Q. Okay. And if that increase in sensitivity resulted in the early detection of an X number of releases, at what point, you know, is it worth it?

A. So, it's a matter of, I said, balancing.

Q. Um-hum.

A. Whether or not you're increasing your risk of a human factors related failure while decreasing your risk of having an

undetectable leak through the software. So, it's a balancing act. I don't know if there's anyone in industry who can tell you what that magic number is, but it would sure be nice to know.

Q. Thank you.

MR. NICHOLSON: Nothing? Karen?

MS. BUTLER: I did my 20. I'm being good.

MR. NICHOLSON: All right, yeah. Jay, anything you want to?

MR. JOHNSON: No.

MR. NICHOLSON: No. I'll ask a couple of follow-ups here now.

BY MR. NICHOLSON:

Q. We had talked to both the MBS analyst and the line custodian and it seems like there was, I thought, a very large discrepancy between the knowledge base of each of those individuals.

And I'm just curious if you could kind of explain to me or expand on what the differences are maybe in the educational background, training, or experience in those two?

A. All right. The line custodians are engineering based backgrounds, so they're people who have chemical engineering backgrounds, that type of hydraulic knowledge through their education. So, they're BSEs. One is not a BSE in engineering. One is a BSE who came from upper to research kinds of line, did a bunch of modeling that way. So, he has a little bit different

skill set but very comparable to what we get with our engineering staff. So, they are engineers in the line custodian line.

In the MBS analyst role we have primarily drawn from control center operators. So, the million dollar question for me is, is that a good idea or is that a bad idea? So, there's, like everything, pros and cons. So, the pros are that they understand the system. They've worked on the system. They've got a good hydraulic background. They really understand how the system operates.

On the negative side, they've also seen through the operating experience that they have, some of the kind of commonplace things that would occur. And for an MBS analyst, you don't want them to think like an operator, you need them to think like an analyst.

So, that balance has always been something that we've managed through clear roles and responsibility, the training program, reinforcement with the line custodians. So, that is traditionally what we have hired into the analyst role.

Recently we've been moving that. I started with one of our analysts into an EIT position. So, we're actually getting some engineering expertise into that role, thinking that an EIT who spends, you know, 2 to 3 years in that role has a good understanding. We've seen very good results with having that technical capability in that role. And it's an excellent training run to then look at other positions within Enbridge and have that

background to be a valuable engineer elsewhere.

Q. Okay. So, it sounds like you're moving towards an engineering background for the analyst position?

A. Yeah. And I hope it's not because I'm an engineer and biased that way. I'm hoping it's not that, but I do value the technical expertise that either the control center operators or the engineers bring into that role.

Q. So, was it ever considered that maybe they could train an operator to be an MBS analyst instead of creating this new position?

A. So, that's actually what we really ended up doing, is by taking some control center operators and hiring them into the MBS analyst position, because of a workload and a potential workload increase, if they were to look at all the alarms that were occurring from the MBS models -- about 28 of them to 29 of them active at any time -- that's an awful lot of additional workload that you would be putting onto an operator.

So, it didn't make sense to increase their workload. It made sense, because of the volume of calls that were received, to spin that off into a separate position, and that's where the analyst came into play. And, again, we pulled from CCO initially to -- to fill that need.

Q. You said a line custodian is available as a backup technical resource, right?

A. Yes.

Q. Okay. Are they -- do they work on-call or how is that?

A. Yes. It's on an on-call basis and it's a rotation -- so a 7-day rotation.

Q. And how often are they utilized? Is it clear to the analyst that he can defer to this person at any time?

A. Absolutely, absolutely, and as part of their training program as well. So, they get trained that if they can't answer something that they go to the backup support, which is the engineers that are in the line custodian positions.

And there's a rotation. I think it's generally but one every -- when we had the number -- when I was the supervisor it was once every 4 to 5 weeks that you would have a person on- call for a week. But now there's additional line custodians, so I think that's more like 6 to 8 weeks.

Q. When you were talking earlier, you seemed to place an emphasis on the hydraulic side of the MBS analyst job?

A. Yes.

Q. And you said they do get some training in that.

A. Uh-huh.

Q. But I remember when we interviewed the MBS analyst on second shift and we asked him, are you considered the hydraulic expert in the control center he said, no.

A. Yeah. I don't think they'd call themselves experts.

Q. Okay.

A. Hydraulic training is part of understanding what the MBS

model is doing so that they can respond to alarms. So, that's the training that they get, is associated with what's happening hydraulically within the line, to understand what the alarms mean.

Q. So, who was considered the expert in a control center when there is a question about whether you've got line pack issues or drain up? Who defers to who? Is the operator the expert or --

A. So, in the control center you'd have to ask them because I don't know their structure --

Q. Okay.

A. -- and what the rules and responsibilities are. If the analyst doesn't know they contact the line custodians.

Q. Okay. Would it be outside their area of expertise to be talking about friction loss and line pack and reasons that there might be issues bringing a column back together or would it be normal for them to have that conversation or not?

A. Well, that's kind of a tough question because I don't sit down there to know what the conversations are with the operators as they're going through. It may be a little more normal for someone with a previous CCO experience, whose had to do that sort of thing, to have those type of conversations with another operator. So, it's someone who's in that role today.

Q. Um-hum.

A. But, someone like the EITs who've come in, that have not done that kind of role, I would not expect them to be discussing that type of thing. They wouldn't have that knowledge or

background.

Q. Okay. The individual you're referring to that was an EIT that was very successful, can you tell us who that was?

A. Yes. Ryan Madeley (ph.).

Q. Okay. And you mentioned earlier that there -- the MBS analyst does not have elevation profiles available to them?

A. We actually -- at the time that we had the incident, they weren't there. So, there's been new screens that have been added to enhance evaluation and column separation. And Ray will talk to you about those, I'm sure --

Q. Okay.

A. -- as the enhancements that have occurred since then.

MS. BUTLER: But it is programmed into the model?

MS. HARRON: Yeah. It's programmed into the model. So, it's part of the algorithm requirements for doing the mass balance. So, it's part of that calculation. But in terms of displays -- I think that's the difference -- if it's in the model versus if it's displayed in the model.

So, you can have numerical values versus a display screen and there has been some additional screens that have been added to the models, and one of those has -- uses elevation, to my knowledge.

BY MR. NICHOLSON:

Q. Yeah. So, you're saying they didn't have a graphical display of what the elevation was?

A. Not on all models. I think they were just -- they'd started this process.

Q. Okay.

A. But they weren't -- they hadn't completed it on all the lines. It was in progress. They thought it would be a good idea so they tested it, liked it, and they were starting that path but they hadn't got all the way through.

Q. Can an MBS analyst pull up the pressure trends from SCADA or the profiles from the SCADA screens?

A. I don't know.

Q. Okay.

A. You'd have to ask the analysts that. Like I said, I don't work on the lines.

Q. Okay. And were you interviewed as part of the internal investigation into Marshall?

A. Yes.

Q. You were. And what were you asked? What was your area of expertise in any questions?

A. That was leak detection at that time, yeah, because that was my role at the time of the incident for pipeline modeling.

Q. Who interviewed you, can you tell me?

A. Christine Neff, Dave Bryson.

MR. JOHNSON: Matt Faith.

MS. HARRON: Yeah, Matt. Matt was there, Matt Faith was there. And I think those were the only three that were -- no, Al

Baumgardner, I believe was there at the time as well.

BY MR. NICHOLSON:

Q. Okay. And you mentioned earlier -- I mean we had a little bit of discussion, it sounded like, about the MBS alarms and how they clear on a shutdown. So, that was widely known. That was understood, even by yourself?

A. Uh-huh, absolutely.

Q. Okay. So, that's no surprise. But there was nothing in the procedures that discussed an action that an MBS analyst was to take if it was cleared, right?

A. I'd have to go through the procedures to see that.

Q. Okay.

A. Because that I don't know off the top of my head.

Q. Okay. All right. That's all I've got for now.

A. Okay.

MR. NICHOLSON: Barry, do you have anything further?

MR. STRAUCH: Yes, several questions.

MR. NICHOLSON: Okay.

BY MR. STRAUCH:

Q. You also happen to have human factors expertise that no one else has, at least that we've talked to.

A. Uh-huh.

Q. In the course of the investigation, the internal investigation, were you able to provide -- asked to provide any human factors expertise to the investigation?

A. No.

Q. Okay. All right. An MBS alarm that came in on the shutdown, when the accident occurred, was that a valid MBS alarm, in your opinion?

A. See the valid, invalid thing, honestly confuses me as to what it means each time. I would -- I prefer the term explainable. So, it was explainable through the column separation that occurred at the shutdown. So, that's -- that's what I would say.

Q. Well, but the procedures require a determination of whether the alarm is valid or invalid.

A. And I'd -- yeah, I would have to look at what the definitions of valid or invalid is to actually say that, because that's not something that I ever do in my kind of role. So, I would have to -- I would default to the line custodian or to the MBS analyst to tell you if that was valid versus invalid. I would say that from the model it was explainable through the column separation.

Q. Okay. So, an explainable alarm -- is that a valid alarm?

MR. JOHNSON: No, no, no. She doesn't know.

MS. HARRON: I don't know.

BY MR. STRAUCH:

Q. Okay.

A. That's not my area (laughing).

Q. All right. Okay.
A. I manage people. I don't do modeling.
Q. Okay. Fair enough.
A. Yeah.
MR. NICHOLSON: Anything else?
MR. STRAUCH: No.
MR. NICHOLSON: I did have another question.
BY MR. NICHOLSON:
Q. When you were looking at these other softwares or mass balance systems, did you come across anything that would actually calculate a two phase flow? Is there a system out there that --
A. Hydraulically we haven't seen anything liquid wise that actually is good for two phase flow. That's one of the limitations of the hydraulic models on the market today.
And I think that if you look back at it, leak detection vendors, there's just a very limited market as to what they have available for people who are purchasing the software. So, innovation is driven by when we come to them and say, you know, we'd like this, we'd like that, to drive innovation within the vendors. There's not a lot of self-innovation that seems to happen within that -- that whole area of the industry. So, it is a challenge.
Q. So, the new software will still have limitations as to being valid or invalid, because you've got a column set commission?

A. So, that's one reason we were looking to something that was not flow meter based.

Q. I see.

A. To something that was pressure transmitter based. So, that way it's a different mode of failure.

Q. Um-hum.

A. So, if you had everything dependent on a flow meter functioning and a flow meter fails, then it doesn't matter if you have three systems in place, it's not going to do you any good.

So, having one flow meter based system, one pressure transmitter based system, something that's working on, you know, historic information from our pie system or whatever -- having those as layered opportunities is, I think, where the value comes in. And that's what we were exploring when I left the pipeline element of leak detection.

Q. And you're speaking of the negative pressure wave of technology, is that correct?

A. Yeah, so ATMOS weight.

Q. ATMOS. ATMOS weight?

A. ATMOS weight.

Q. Okay.

A. So, ATMOS pipe has been in the industry for a while. So, people are probably familiar with that. But ATMOS weight is a newer technology that they were testing. And our North Dakota system was one of the areas that they're -- that actually allowed

them to do some testing, and it was very successful.

Q. Okay.

MR. NICHOLSON: And one last thing. Anyone else have questions?

(No response.)

MR. NICHOLSON: We can go off the record now and end the interview.

(Whereupon, the interview was concluded.)

CERTIFICATE

This is to certify that the attached proceeding before the

NATIONAL TRANSPORTATION SAFETY BOARD

IN THE MATTER OF:	ENBRIDGE - LINE 6B RUPTURE IN MARSHALL, MICHIGAN Interview of Lorna Harron
DOCKET NUMBER:	DCA-10-MP-007
PLACE:	Edmonton, Alberta, Canada
DATE:	November 16, 2011

was held according to the record, and that this is the original, complete, true and accurate transcript which has been compared to the recording.

_____
Cheryl Farner Donovan
Transcriber