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Chair

Mr. David Sweet

Standing Committee on Industry, Science and Technology

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● (1530)

[*English*]

The Chair (Mr. David Sweet (Ancaster—Dundas—Flamborough—Westdale, CPC)): Good afternoon, ladies and gentlemen.

[*Translation*]

Good afternoon.

[*English*]

Welcome to the 25th meeting of the Standing Committee on Industry, Science and Technology.

We have before us five witnesses. From the Department of Natural Resources, we have Philippe Dauphin, director general of CanmetMATERIALS in the minerals and metals sector. From the National Research Council of Canada, we have John McDougall, president. From the Transportation Safety Board of Canada, we have Jean Laporte, chief operating officer; and Wendy Tadros, chair; and Kirby Jang, director for investigations for rail and pipeline. Three of these individuals will be giving opening remarks.

Just following the sequence listed in our orders of the day, I'll begin with you, Mr. Dauphin. How long are your remarks? Are they within 10 minutes?

Mr. Philippe Dauphin (Director General, CanmetMATERIALS, Minerals and Metals Sector, Department of Natural Resources): Oh, yes.

The Chair: Okay. Please begin.

Mr. Philippe Dauphin: Thanks, Mr. Chair.

[*Translation*]

Honourable Chair and members of the committee, good afternoon. Thank you for your invitation.

I am Director General of CanmetMATERIALS, a Natural Resources Canada laboratory.

[*English*]

I will provide you with an overview of our laboratory. I will then give you a description of the laboratory's research program on pipelines and give you examples of activities in this field.

I've prepared a deck, so for those of you who are following, I'm on the third slide.

[*Translation*]

CanmetMATERIALS' mandate is to perform applied research on advances materials.

[*English*]

The research focuses on the processing, which includes alloy and materials composition, casting, and forming; performance assessment, including testing of mechanical properties and assessing corrosion resistance; microstructural characterization, which allows us to explain the behaviour of materials; and computational engineering, which accelerates and reduces the cost of material development.

Our research supports value-added processing of our minerals and metal resources. It helps improve the competitiveness of our manufacturing sector. The materials we develop are used in energy production and distribution, and they contribute to improving energy efficiency and emissions in the transportation sector. Our scientists play a leadership role in the development of codes and standards, both in Canada and globally. Our equipment allows us to develop materials and procedures at the laboratory scale and then test them at the pilot, or semi-industrial, scale.

[*Translation*]

We have moved into a new laboratory in Hamilton, Ontario. We have a small team located in Calgary.

[*English*]

On the next slide we talk about our pipelines program.

[*Translation*]

Our Pipeline Program aims at developing and validating materials and technologies that will extend the life of pipelines, increase their capacity and improve the reliability and integrity of pipelines.

[*English*]

The research we perform generates scientific knowledge and information on performance of pipeline materials, which we communicate to the government, the industry, and the public. The science is disseminated through workshops, conferences, and peer-reviewed publications. Much of our research is done in collaboration with academia, other research groups, industry, and associations. Ultimately, our work is incorporated in industry practice by the pipeline industry and its suppliers of goods and services.

In summary, our work supports the development of consensus standards that are referenced in Canadian regulation. This helps to ensure the safety and integrity of our pipelines.

[*Translation*]

All of these contributions are aimed at ensuring the safety of the public and the environment and ensure continuity in getting oil and gas to markets.

[*English*]

On the last slide I have examples of key activities.

We perform work in two major areas. The first is materials performance, which is the mechanical properties of the steels used in line pipe, the welds joining the pipes together, and the integrity of the pipes under service conditions. The second area we are active in is corrosion of pipelines, from the point of view of understanding the conditions that lead to corrosion but also in preventing corrosion.

The materials performance area includes the development of advanced steels—alloys that can be used at higher pressures and transport greater volumes. We work on the development of standards for the toughness of pipelines and welds. We develop testing protocols that are simple and reproducible but that can also accurately represent field conditions. We develop welding standards to ensure that welds applied in the field will perform as required and to ensure that the welding will not adversely affect the pipe steel surrounding the weld.

Corrosion can occur inside the pipe—this rarely, if ever, leads to failure in the case of transmission pipelines—or outside the pipe, such as stress-corrosion cracking. Stress-corrosion cracking is the result of environmental conditions that may combine with stress, such as the pressure from the oil or gas being transported. Pipe protection comes from coatings to prevent water and soil from making contact with the steel, which is combined with cathodic protection, where a small current is applied to a section of pipe to counter any effect from the environment.

● (1535)

Our scientists work at understanding the conditions that lead to corrosion. They research corrosion inhibitors, coatings, and cathodic protection.

In conclusion, CanmetMATERIALS plays a key role in developing materials for pipelines and understanding how these materials will perform in the field when they're used to transport oil and gas. This contributes to maintaining access to markets for Canadian oil and gas while protecting Canadians and the environment.

Thank you. Merci.

The Chair: Thank you very much, Mr. Dauphin.

Now we will go to Mr. McDougall, please.

Mr. John R. McDougall (President, National Research Council of Canada): Thank you, Mr. Chairman.

We see two major realities confronting us in the world today. A fourfold increase in global population over the past century, from about 1.7 to 7 billion people, together with rising prosperity and the demand for heating, cooling, lighting, transportation, food, clothing, and industrial goods, has led to an overall tenfold increase in the demand for energy over that same period.

[*Translation*]

Today, the world relies heavily on energy. To move energy cost effectively, the emergence of oil and gas triggered a significant expansion of pipelines across North America, connecting sources of production to places of use. Canada has the opportunity to build upon new and innovative technologies to increase pipeline safety and reliability and improve our economic performance at the same time.

[*English*]

Pipelines handle a range of products, not only oil and gas but particularly water, sewage, LPGs, chemicals, and slurries as well. They range in age from brand new to over a century old. Existing pipelines are made of wood, cast iron, concrete, steel, and plastics, and they all have a range of performance and design criteria.

For this discussion, I believe that your major interest is in the oil and gas pipeline, so I'm going to focus on that aspect.

Today in Canada there is approximately 840,000 kilometres of oil and gas pipelines, from gathering to feeder, transmission, and distribution lines. Natural gas pipelines make up over 75,000 kilometres and oil transmission pipelines almost 40,000 kilometres. This network has allowed Canada to evolve from a net oil and gas importer to a major net exporter, with associated economic benefits. So the need for pipelines is likely to continue.

The International Energy Agency projects global energy demand will grow by more than a third by 2035, and even under its most optimistic scenario projects that fossil fuels will dominate energy supply, meeting more than 60% of global energy demand. Of course, we know the Canadian oil sands are one of the largest energy sources and will undoubtedly be filling part of that demand.

Energy of all kinds is going to need to be moved from where it is produced to where it's needed. Canada certainly has resources to supply the world in a way that is acceptable, by investing in technological innovations that would increase public confidence in design, manufacturing, operation, and monitoring of pipelines. To do so, we need to maximize safety and economic benefits while minimizing and mitigating the potential impacts on the environment and human health.

The first challenge we face is an aging pipeline system. R and D opportunities associated with this part of the system include developing methods to determine existing levels of stress and strain in operating pipelines; ensuring that the strength of the girth welds remains greater than that of the pipe materials; and understanding the effects of bending, misalignment, material anisotropy, and so on.

We know that while a pipeline, relative to the volume handled, is one of the safest and most economical modes of transporting oil and gas, there are still failures. Pipeline leaks and ruptures can result in significant negative consequences and, as we've seen, make new pipeline proposals quite contentious. As has already been mentioned, cracking and corrosion account for 60% of all pipeline ruptures.

The growth of population means that many older buried pipelines are now passing through populated areas, with increased risks to human health and the need for improved mitigation in the event of failures. There's a need for continuous inspection and monitoring so that potential failures can be detected before they occur. It's important to figure out how to do this in a cost-effective manner and to develop the means to minimize the damages from any failures that do occur.

● (1540)

The second challenge is to develop technologies that will improve pipelines, particularly new ones, such as enhancing the fracture resistance of pipe materials, new joining techniques for mixed material pipelines, reducing the environmental impacts as a result of the footprint and noise during construction, and so on.

There's also the need for technologies that can significantly improve pipeline operations and monitoring, such as detecting internal and external corrosion and defects, continuous in-line inspection, and ultrasonic testing.

Some options for this include robotics, locating defects using on-line intelligent inspection pigs that you can run through the pipe with ultrasonic tools, and even electrorheology, where you would apply perhaps electric currents to significantly reduce crude oil viscosity. There are many ways of changing the performance.

[*Translation*]

In order to make a step change in our pipeline system, we need to build consensus among governments, industry and citizens on the investment we need to make to achieve an acceptable level of safety and reliability, return on investment and contribution to economic growth and quality of life.

This brings us to our third and possibly biggest challenge, and that is the level of risk we are prepared to accept. How will we determine the level of risk we are prepared to tolerate as a condition for investing in new pipelines? What level of performance should pipelines deliver relative to other transportation modes and infrastructure, for example airplanes, railways, cars, trucks and ships? How much investment should be made and by whom to develop the technology that can achieve this level of performance?

[*English*]

Organizations such as NRC play a critical role in de-risking technology for governments and industry with the end goal of creating social and economic benefits for Canada. For example, NRC delivers expertise and benefits in many scientific and engineering disciplines that can be applied to pipeline safety and innovation, including: structural and material health monitoring; event sensors for solids, liquids and gases, including sensors on unmanned vehicles, for example; advanced material substitution and fabrication; wear and corrosion mitigation; bio-monitoring and bio-remediation of hydrocarbon contamination, just to name a few.

Our new NRC model is specifically designed to focus on critical challenges important to government and industry, and this may form the basis for a strong program that we might participate in delivering.

In conclusion, Canada certainly has expertise to bring to bear to overcome the technological challenges associated with increasing the safety and reliability of pipelines, and also has the opportunity to address these challenges, so that Canadians can continue to benefit from resource development such advancements would enable.

Thank you.

● (1545)

The Chair: Thank you very much, Mr. McDougall.

Ms. Tadros.

Ms. Wendy Tadros (Chair, Transportation Safety Board of Canada): Thank you, Mr. Chair. Good afternoon, committee members.

We appreciate the opportunity to appear before the Standing Committee on Industry, Science and Technology. We will provide you with a brief overview of the Transportation Safety Board of Canada and the work we do, with a particular emphasis on pipeline statistics, investigations, and their findings.

I have with my today two colleagues who have a great deal of experience. Mr. Jean Laporte is the chief operating officer of the TSB. He's been with the TSB since its inception in 1990 and has a broad understanding of our mandate and the processes we follow. Mr. Kirby Jang is our director for rail and pipeline investigations. He is well-placed to discuss particular pipeline investigations, the responses to our recommendations, and the statistics we hold on pipeline accidents and incidents.

So let me begin by briefly talking about our mandate. The TSB was created by Parliament in 1990 and our sole purpose is to advance transportation safety. We do this by investigating no matter whether the accident occurred on our waterways, along our pipelines, or railways, or in our skies. In the course of our work we also gather statistics on accidents and incidents and we use these statistics to determine if there's a systemic issue that may warrant further investigation. The TSB does not keep a constant scan on industry to ensure the safety of pipelines. That is the role of the regulator, the National Energy Board.

We at the TSB speak through our investigations. The investigations, if you will, are our lens. And when our investigations are complete, we inform the public about what happened and why, and we make suggestions about what needs to be done to help ensure it will not happen again. With proposals for new pipelines and news of spills south of the border, pipeline safety is on the radar. So what have we found through our lens? In 2013, 129 pipeline occurrences were reported in accordance with TSB's mandatory reporting requirements. They ranged from minor releases to the kinds of things you hear about in the news, like the pipe rupture near the town of the Otterburne, Manitoba, in January 2014 resulting in a fireball from ignition of sweet natural gas. Fortunately most pipeline occurrences are incidents involving minor releases. Only 11 of the reported occurrences in 2013 were accidents.

When we are notified of an occurrence, we collect the initial data and decide if a full investigation is warranted. Generally speaking we investigate only those occurrences where we have the very most to learn. In making this determination we follow an occurrence classification policy, a policy that's in place for all of our investigations. The policy guides the decision, which hinges on whether there is a significant potential for reducing future risk and, consequently, whether there is a high probability that transportation safety will be advanced.

When we do investigate we take a systemic approach to all of our investigations. We run the gamut of issues from the immediate causes of the accident to the risks Canadians may encounter. And we do all of this to learn lessons to make the system safer. Along the way if we find unsafe conditions, we do not wait for our final report to make them known. We act immediately, communicating with those who can make the transportation system safer.

There are a number of tools we use to communicate risk. We may send out safety advisories, safety information letters, or issue safety recommendations. This being said, when we make recommendations, we do not impose changes on the transportation industry or on regulators. Solutions to safety are a shared responsibility among many players and our job is to make a convincing case for change.

In comparison with the other modes we investigate, the number of pipeline occurrences is relatively low and, therefore, so are the number of investigations. Of the 50 to 60 investigations we undertake every year, only 1 or 2 are pipeline investigations. To give you a snapshot, over a 23-year period, since our inception in 1990, the TSB has investigated 45 pipeline occurrences. There were 42 of those that were completed, and three are still under investigation.

● (1550)

Since 1990, we've issued 20 pipeline safety recommendations. All have led to concrete actions by industry and regulators to mitigate the risks and thereby improve safety. All of the responses, 100%, have received our highest rating of fully satisfactory. This means that the action taken has substantially reduced or eliminated the safety deficiency we found. This compares with about 74% for the whole body of our recommendations.

I think you can see that the pipeline sector's response has been very impressive. The positive response rate by industry and regulators to our recommendations speaks to a proactive pipeline industry with a generally strong safety culture and ongoing investments in inspection and maintenance of infrastructure.

However, our recommendations are only part of the picture. Another thing we look at through our lens are statistical data and incident data. As I mentioned previously, 11 pipeline accidents were reported to the TSB in 2013. This compares with an average of eight accidents per year for the period 2004 to 2013, and an average of 21 accidents per year for the period 1990 to 2003. Since 2003, the number of accidents has come down significantly, and it has remained fairly stable year over year.

We also note that approximately two-thirds of the accidents involve the transportation of gas, which means that only two or three accidents per year involve the transportation of oil. A total of 118 incidents were also reported in 2013. These are the minor events. This compares with 173, in 2012, and an average of 137 incidents per year for the period 2008 to 2012. Our analysis of the data revealed that the vast majority of these incidents involved the release of less than one cubic metre of product, primarily at facilities and not from transmission pipes.

This is what we know today based on 20 plus years of work. But what can we say about the future? If pipelines in Canada have by and large been safe in the past 20 years, will they be safe in the future? Will new pipelines meet the highest standards? Will older pipelines withstand the rigours of nature and continue to hold their products?

I can't tell you with absolute certainty. That's where the limitations of our lens come in because the Transportation Safety Board, by its very nature, looks back. We analyze what has happened, and we try to ensure that the problems we find are fixed. If new problems emerge, the TSB will pick them up on subsequent investigations. That is our role.

I can tell you that we will continue to investigate, that we will continue to find the causes and contributing factors of pipeline accidents, and that we will not hesitate to make recommendations when we think improvements need to be made.

I hope the information we've provided will be helpful in defining the scope of your study, and we look forward to answering your questions.

The Chair: Thank you very much, Ms. Tadros.

Colleagues, I think the bells are going to go imminently. At this point, to be fair, we'll have one question from the Conservative side and then we'll go directly to the NDP side, until we actually see these light up.

One quick question, please, Mr. Lake.

Hon. Mike Lake (Edmonton—Mill Woods—Beaumont, CPC): Thanks, Mr. Chair.

Thanks to the witnesses for coming.

I'll ask a really quick question for Wendy.

You were talking about accidents and incidents and occurrences. When you say only 11 of the reported occurrences in 2013 were accidents, what is the definition of accident?

Ms. Wendy Tadros: In broad terms, it's the more serious things that happen. An occurrence can be an accident or an incident; that's the definition. An accident is something more serious, and an incident is something less serious. There are more technical definitions in our regulations, but that's the basic dividing line.

● (1555)

The Chair: Okay.

Ms. Nash.

Ms. Peggy Nash (Parkdale—High Park, NDP): On a point of order, Mr. Chair, can I clarify whether we are coming back after the vote, and will we—?

The Chair: I discussed it with both parties, and it seemed that an adjournment of the meeting was best.

Ms. Peggy Nash: No one talked to me about it as the critic, so I didn't know.

The Chair: I talked to you briefly when you came back, that there was an agreement, and you seemed to assent to that.

Ms. Peggy Nash: Okay, sorry. I didn't get that.

So you're adjourning for the votes now.

The Chair: I think with the time frame we're talking about, yes,

Ms. Peggy Nash: Will we have another opportunity to ask questions of the officials?

The Chair: That would have to be determined. If you want to call them back, okay.

Ms. Peggy Nash: Okay. I'm sorry for the misunderstanding.

The Chair: No, that's okay.

Ms. Peggy Nash: So I just get one question.

We're dealing with a subject that doesn't often come before the industry committee because we have here transportation officials and natural resources officials, so I want to just ask a general question about the resource sector.

Can anybody tell me what percentage of Canada's non-renewable resources are exported each year as opposed to being used for our domestic needs?

The Chair: Can anybody tackle that?

No one?

Ms. Peggy Nash: Good.

The Chair: Ms. Nash, you managed to stump the witnesses with only one question.

Now the bells are ringing, colleagues.

Ms. Peggy Nash: Chair, could I just ask if someone could find out and get back to the committee through the chair?

The Chair: Yes, and if we're going to have them back, then they can actually respond to that when they come back.

Ms. Peggy Nash: I actually would like to know the answer.

Thank you.

The Chair: All right, colleagues, we are needed in the chamber.

The meeting is adjourned.