

REPORT

**Pipeline Safety Trust:
Canadian Pipeline Safety Indicator Survey**

March, 2016

Prepared for the Pipeline Safety Trust by
Applied Research Northwest



APPLIED RESEARCH NORTHWEST, LLC
P.O. Box 1193
Bellingham, Washington 98227
360.647.6067
www.arnorthwest.com

EXECUTIVE SUMMARY

The Pipeline Safety Trust (PST) promotes pipeline safety in North America through education and advocacy, increased access to information, and partnerships with residents, safety advocates, government, and industry, resulting in safer communities and a healthier environment. The PST asked Applied Research Northwest to assist in fielding a survey of Canadians with knowledge of and interest in pipeline safety in Canada. The results of this project will inform an upcoming forum of pipeline stakeholder groups. The end goal is the designation of pipeline safety indicators in Canada that will allow people to easily see how safe pipelines are, and whether safety is improving or getting worse.

The PST sent out an email invitation to a list of staff from conservation and environmental groups, landowner groups and municipal associations as well as citizens with known interests and activities related to pipeline safety efforts. The invited respondents were given a link to an online survey and asked to forward the invitation to other friends or colleagues who might be interested in the subject. This form of recruitment is called snowball sampling, which is a form of convenience sampling. The results are not representative of the greater Canadian population as a whole, but rather provide insights into the opinions and interests of people who have some awareness of pipelines and pipeline safety issues, and may have previously voiced concerns.

A total of 134 respondents completed the twelve-minute online survey.

Respondent profile

Survey participants were asked to identify their primary interest in pipeline safety. The largest segments were those who self-selected into these categories:

- **Global environment** (28%): “I have concerns that pipelines enable greater production of fossil fuels, and that such production can have serious impacts on our health, waters or climate”
- **Local environment** (22%): “I have concerns about the fuels pipelines carry and the potential effects on the public and environment should they be released local environment”
- **Landowner** (19%): “I am a landowner with a pipeline on my land, or proposed to be on my land”
- **Energy production** (14%): “I think greater pipeline safety is key to being able to expand energy production, which is important to the economy in Canada”

Just over one-third of the completed surveys came from respondents invited directly by the Pipeline Safety Trust, and nearly two thirds (66%) resulted from those respondents forwarding the survey to others or publicizing the link in some way. Analysis found that

respondents who received the invitation indirectly (forwarded email) had a slightly higher proportion of respondents with a primary interest in energy production.

Completed surveys came from nine different provinces. The largest came from Ontario with 42% of responses, followed by 19% of responses coming from British Columbia. The remainder was fairly evenly split between Alberta, New Brunswick, Nova Scotia, Manitoba and Quebec.

Information needs

Respondents were asked to rate twelve different categories of information that can help to assess the safety of a pipeline. Top ratings went to “causes of pipeline failures” and “maps of where pipelines are in the community.” Overall, respondent gave the lowest ratings to “how much a company is spending on pipeline testing, maintenance and repairs” and “the quantity of the fuel moved nationally and by individual companies.”

Analysis found that the segments based on primary interest demonstrated some differential propensities in responding to the types of information.

- While 61% of all respondents thought maps of pipelines in the community were *extremely helpful*, this was only true for 42% of the segment with a primary interest in energy production.
- Two-thirds (68%) of global environment interest segment said that the quantity of fuel spilled is *extremely helpful* information, significantly more than the 32% of the energy production segment.
- Landowners were the group most likely to give a high helpfulness rating to information about the number of enforcement actions taken by regulators (68%).

Defining failure

Nearly all (93%) thought an unplanned spill or leak of fuel should be considered a failure. A slightly smaller proportion (79%) thought that a spill that requires an evacuation constitutes a failure. Among all the scenarios presented, only one garnered agreement of less than three-quarters -- unplanned operating factors that require the pipeline be shut down.

Participants were also asked about criteria for exceptions to the definition of failure. One-third (33%) thought that spills under some defined limit should not be counted as a failure. A similar proportion (32%) said that spills contained within pipeline facilities should not be considered a failure. Just over half (54%) said that none of the criteria offered as examples should be considered as exceptions.

Indicator preferences

Participants were asked to consider five different potential types of high-level indicators and to rank them according to their interest. The highest proportion of respondents (36%) said they were most interested in “indicators specific to the safety of the pipelines in their community.” “Indicators that show how well regulators are paying attention” was ranked second. However, analysis found that this ranking was reversed for the global environment interest group.

“Indicators regarding national trends” was the option ranked last overall, however within the energy production segment, this indicator ranked second.

Defining property damage

Nearly all (98%) agreed that the cost to repair property that does not belong to the pipeline company should be included in “property damage.” A slightly smaller proportion, but still a sizable majority, said the measure should include the cost to clean up or remediate the areas impacted. Several items garnered substantially less interest and were favored by less than a third of respondents: fines the pipeline company may face, the legal costs incurred by the pipeline company and the cost of the lost fuel..

Preferences for graphic representations

Respondents were presented with five different graphical representations of data and asked to select their preferred style. Over half (54%) selected a column chart with a directional arrow to indicate overall trends. Very few respondents (5%) preferred straight text to represent findings.

Trusted publisher of pipeline safety indicators

Respondents were asked about who they would trust to create, update and publish pipeline safety data. The highest overall ratings went to “an independent non-profit organization focused on safety” (65% favorable). The second ranked option was an environmental organization (40%), driven by high favorability among the global environment interest segment.

The Transportation Safety Board as a trusted source of pipeline safety information found strongest support amongst the energy production segment (42%, significantly higher than 4% of landowners). An Association of Municipalities also yielded a wide range of support, with 40% of the global environment segment, compared to 0% of the energy production segment.

Current satisfaction and sense of importance

The vast majority of respondents said they think it is *extremely* or *very important* to have access to information about pipeline safety in Canada (84%). However only a small portion (7%) said they are *extremely* or *very satisfied* with the access they currently have. Segment analysis found that:

- The global environment segment was the group most likely to say that this access to this information is *extremely important*
- The energy production segment was more likely than those with other interests to say that they *don't know* how satisfied they are with the kinds of information they can easily access

TABLE OF CONTENTS

Introduction	1
Findings	3
Respondent profile.....	3
Information needs	6
Defining failure.....	8
Indicator preferences	10
Defining property damage	12
Preferences for graphic representations.....	13
Trusted publisher of pipeline safety indicators.....	14
Current satisfaction and sense of importance	15
Conclusion	17
Appendix A: Letter of invitation	18
Appendix B: Survey questions	19
Appendix C: Frequencies	23
Appendix D: Open-ended verbatim responses	33

TABLE OF FIGURES AND TABLES

Table 1. Which one of the following best describes why you are interested in pipeline safety?	3
Figure 1. Which province or territory do you live in?	5
Figure 2. Please rate each of the following informational categories in terms of how helpful it is to you in understanding a pipeline's safety (sorted by <i>extremely</i> and <i>very helpful</i>)	6
Figure 3. Informational categories rated as <i>extremely helpful</i> , by interest segment	7
Figure 4. Different regulatory agencies use different definitions of what constitutes a pipeline "failure". Which of the following do you think should be included in such a definition?	8
Figure 5. Criteria for exceptions	9
Figure 6. Indicator rankings, sorted by first and second choice	10
Figure 7. First choice of indicators, by segment	11
Figure 8. When you think of "property damage" which of the following do you think should be included in such a measurement?	12
Figure 9. Which do you think does the best job of conveying the message accurately and easily?	13
Figure 10. If indicators like we have been discussing were established and used to track pipeline safety over time, who would you most trust to create, update, and publish such indicators?	14
Figure 11. How important is it to you to have access to information about pipeline safety in Canada? Overall how satisfied are you with the kinds of information you can currently easily access regarding pipeline safety in Canada?	15

INTRODUCTION

The Pipeline Safety Trust (PST) promotes pipeline safety in North America through education and advocacy, increased access to information, and partnerships with residents, safety advocates, government, and industry, resulting in safer communities and a healthier environment. The Canadian Pipeline Safety Indicator Survey was undertaken in order to identify and prioritize a set of ongoing pipeline safety indicators that will allow Canadians to easily see how safe pipelines are and whether safety is improving or getting worse. In order for such indicators to be trusted the information and data they are based on needs to be easily accessible by the public. To ensure the indicators meet the needs of the public, the PST would like to better understand what metrics or indicators related to pipeline safety Canadians would be most interested in. The goal of the overall project is to generate information for a report that will help inform the discussion at a forum on how to create and move forward on better pipeline safety indicators and transparency to be held in Calgary in May, 2016. The forum will include Canadian provincial and national pipeline regulators, industry representatives, and members of a variety of other public stakeholder groups

The PST asked Applied Research Northwest to assist in fielding a survey of Canadians with knowledge of and interest in pipeline safety in Canada. An email invitation was sent out to a list of 263 individuals – primarily staff from conservation and environmental groups, landowner groups, and municipal associations as well as citizens with known interests and activities related to pipeline safety efforts. The invited respondents were given a link to an online survey and asked to forward the invitation to other friends or colleagues who might be interested in the subject. This form of recruitment is called snowball sampling which is a form of convenience sampling. The results are not representative of the greater Canadian population as a whole but rather provide insights into the opinions and interests of people who have some awareness of pipelines and pipeline safety issues and may have previously voiced concerns. The text of that invitation is included in Appendix A.

The survey included approximately 24 questions (included in Appendix B). Respondents were asked to:

- Rank and rate particular types of information
- Give input on how to graphically represent data,
- Define what constitutes a pipeline failure, and
- Define what should be included in a measure of property damage.

They were also asked about their satisfaction with their current access to pipeline safety information, how important that access is to them, and who they would trust to publish pipeline safety indicators.

The survey was available from February 22 through March 7, 2016. A total of 134 respondents completed the survey, with a median completion time of 12 minutes. Forty-six (46) said they received an email directly from the Pipeline Safety Trust, yielding a 27% response rate from the original invitation.

The frequency tables showing the counts and percentages of each response are included in Appendix C.

FINDINGS

This section describes how the respondents answered survey questions using both text and graphic format. Analyses of particular segments are noted where relevant.

RESPONDENT PROFILE

Respondents were asked about their personal interest in pipeline safety, how they heard about the survey, and where they live.

Interest in pipeline safety

Survey participants were asked to identify their primary interest in pipeline safety from among eight options. Table 1 shows that the largest segment of respondents (28%) said they were concerned that pipelines enable greater production of fossil fuels, followed by 22% who have concerns about potential effects of the fuels transported through the pipelines. Nineteen percent (19%) said they were landowners with a pipeline on their land or proposed to be on their land.

Table 1. Which one of the following best describes why you are interested in pipeline safety?

	n	%
I have concerns that pipelines enable greater production of fossil fuels, and that such production can have serious impacts on our health, waters or climate	38	28
I have concerns about the fuels pipelines carry and the potential effects on the public and environment should they be released	29	22
I am a landowner with a pipeline on my land, or proposed to be on my land	26	19
I think greater pipeline safety is key to being able to expand energy production, which is important to the economy in Canada	19	14
There is a new pipeline proposed nearby, and many concerns have been raised	7	5
I live or work very near a pipeline	6	4
I work for a local government that needs to ensure the safety of our citizens	1	1
I am concerned about effects pipelines may have on First Nations rights and cultural heritage	1	1
Other	7	5

n=134

For the current analysis, the top four categories above were identified as primary segments based on interest in pipelines. For the purposes of this analysis, these segments will be referenced throughout the report in terms of their primary interest:

- global environmental
- local environment
- landowner
- energy production

How they heard about the survey

Respondents were encouraged to forward the survey link to friends and colleagues with an interest in pipeline safety. At the conclusion of the survey, respondents were asked to identify how they learned about the survey. Just over one-third of the completed surveys came from respondents invited directly by the Pipeline Safety Trust and nearly two thirds (66%) resulted from those respondents forwarding the survey to others or publicizing the link in some way. Some respondents (27) volunteered information about where they received the forwarded the survey from; most mentioned the Canadian Association of Energy and Pipeline Landowner Associations (CAEPLA) and on the east coast, a local chambers of commerce.

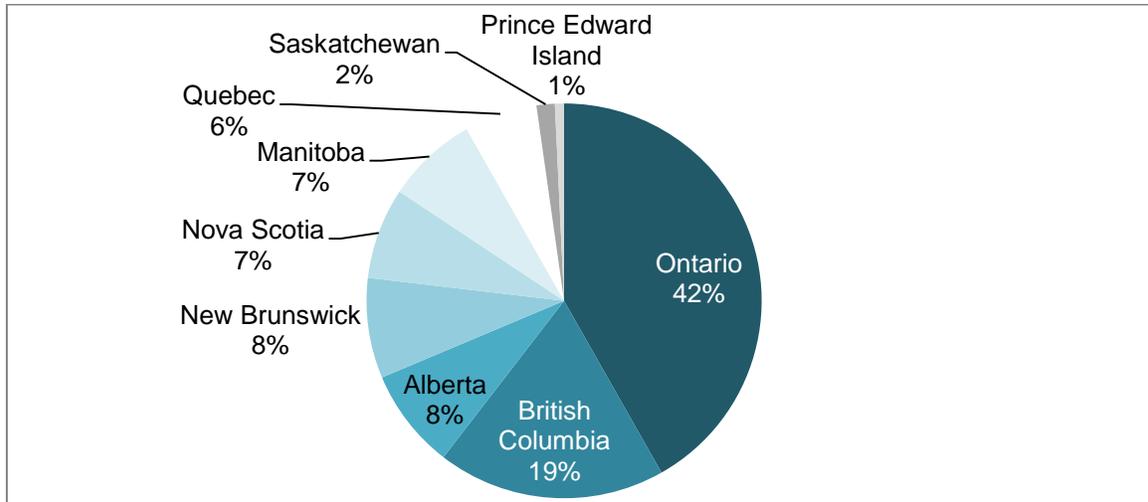
Analysis looked at whether the respondents from the original email invitation offered significantly different ratings and responses compared to those who received the link through forwarded email. These findings were negligible.

However, the analysis uncovered one finding that is worth noting. Respondents who received the invitation indirectly (forwarded email) included a slightly higher proportion of respondents with a primary interest in energy production ($p < .1$).

Where they live

Completed surveys came from nine different provinces, illustrated in Figure 1. Forty-two percent (42%) came from Ontario, followed by 19% from British Columbia. The remainder was fairly evenly split between Alberta, New Brunswick, Nova Scotia, Manitoba and Quebec. Together, New Brunswick and Nova Scotia represented 15% of respondents.

Figure 1. Which province or territory do you live in?



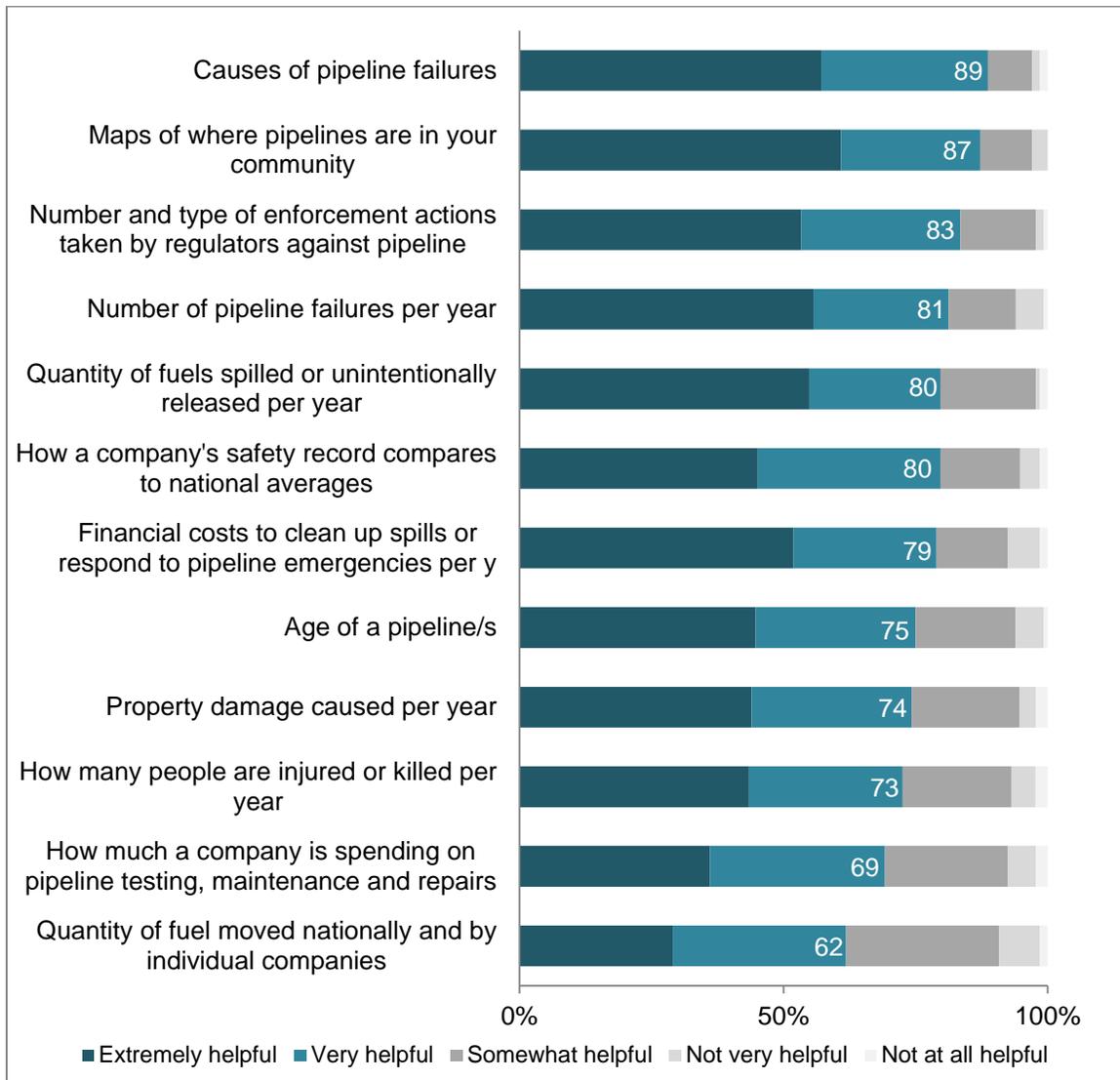
n=134

We were interested in whether the respondents from the various provinces offered differential ratings. Analysis found that respondents from certain provinces (most notably Nova Scotia) were more likely to say that they heard about the survey through a friend or colleague (versus a direct email from the PST). There was also a relationship between the province and the respondent’s primary interest in pipeline safety (for example a higher proportion of landowners came from BC than other provinces). This is likely due in part to the sampling approach; the forwarded emails resulted in some conflation of geography and primary interest. Analyses concluded that the key driver in differential findings was primary interest, and that any significant findings based on province were more likely an effect of email circulating among like-minded individuals in particular regions. Because of this, the following analysis highlights variation in findings based on primary interest but omits discussion of variation by region.

INFORMATION NEEDS

Respondents were presented with twelve different categories of information that can help to assess the safety of a pipeline. They were asked to rate each category in terms of how helpful that information is to them in understanding a pipeline’s safety. Figure 2 shows the categories, sorted by the proportion who called the information *extremely* or *very helpful*. At the high end, 89% said that information about the “causes of pipeline failures” is *extremely* or *very helpful*. This was followed closely by “maps of where pipelines are in the community.” At the low end, 62% said that it is *extremely* or *very helpful* to know “the quantity of the fuel moved nationally and by individual companies.”

Figure 2. Ratings of informational categories in terms of how helpful it is to understand a pipeline’s safety (sorted by *extremely* and *very helpful*)



n=134¹

¹ Actual number of respondents for each item ranged from 131 to 134

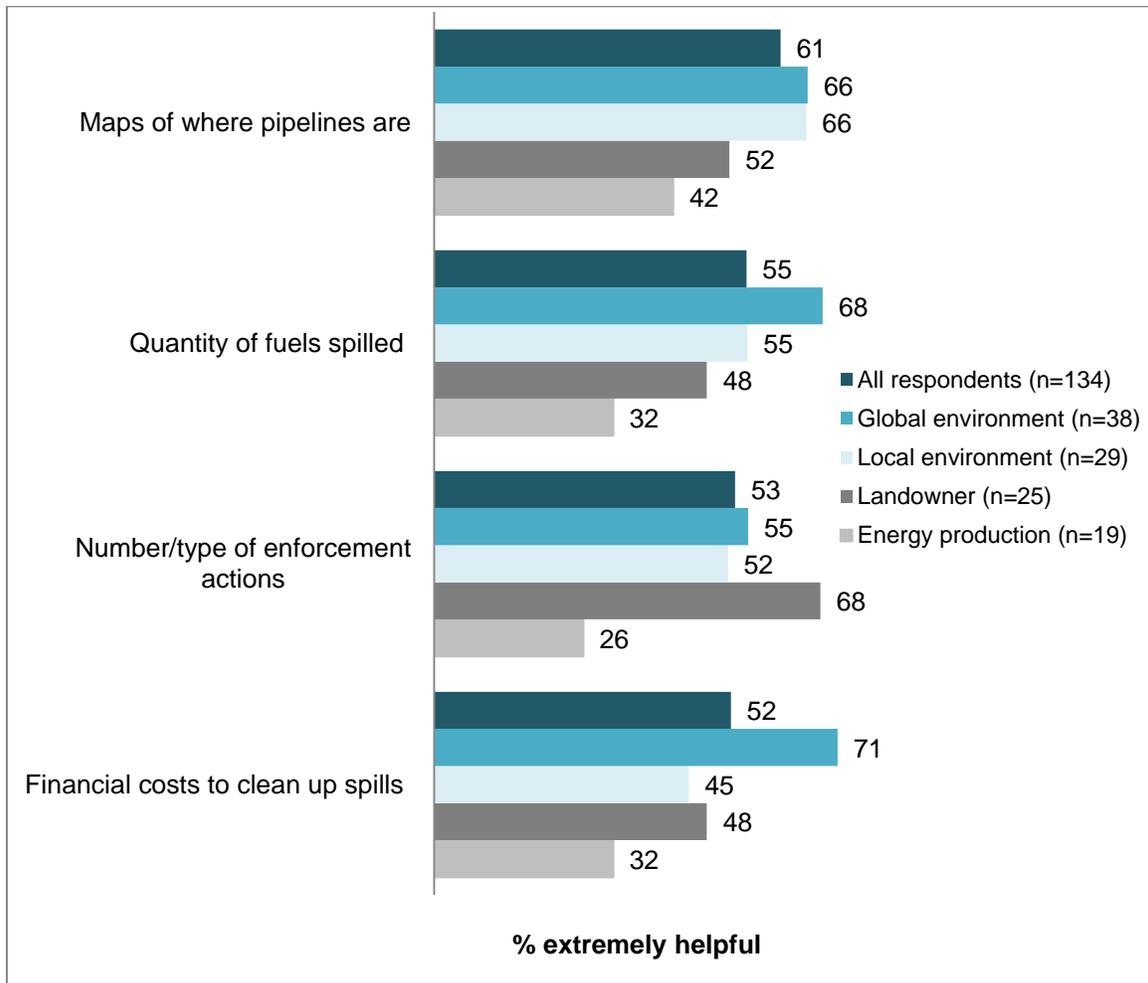
Segment analysis

Analysis found that the segments based on primary interest demonstrated some differential propensities in responding to the types of information. These findings were statistically significant for four of the informational categories, illustrated below. Figure 3 shows that while 61% of all respondents thought maps of pipelines in the community were *extremely helpful*, this was only true for 42% of the segment with a primary interest in energy production.

Two-thirds (68%) of global environment segment said that the quantity of fuel spilled is extremely helpful information, significantly more than the 32% of the energy production segment.

Landowners were the group most likely to give a high helpfulness rating to information about the number of enforcement actions taken by regulators (68%).

Figure 3. Informational categories rated as *extremely helpful*, by interest segment

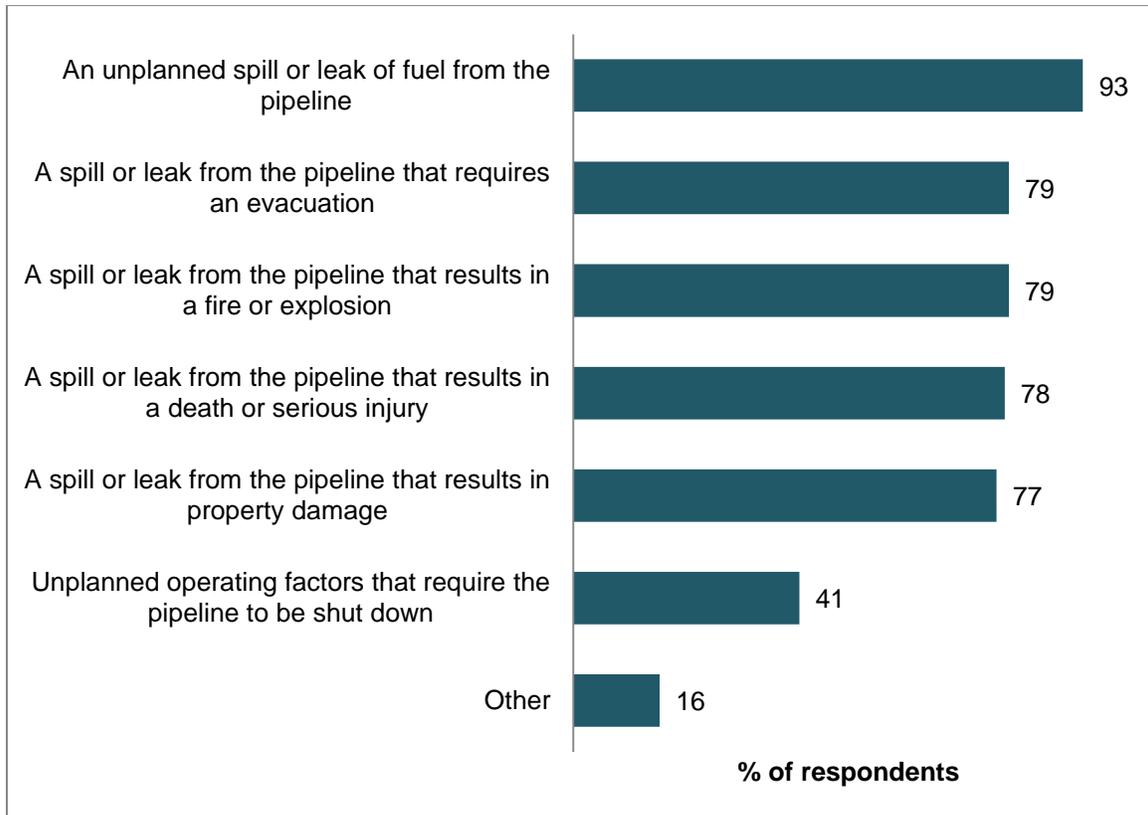


Respondents were also asked if there are other types of information that are helpful in understanding pipeline safety. These responses were unique and diverse. They are included in verbatim form in Appendix D.

DEFINING FAILURE

Participants were asked to consider how a pipeline failure should be defined. Figure 4 shows that nearly all (93%) thought “an unplanned spill or leak of fuel from the pipeline” would be considered a failure. A slightly smaller proportion (79%) thought that “a spill or leak that requires an evacuation” constituted a failure. Among all the scenarios presented, only one garnered agreement of less than three-quarters – “unplanned operating factors that require the pipeline be shut down.”

Figure 4. Different regulatory agencies use different definitions of what constitutes a pipeline "failure". Which of the following do you think should be included in such a definition?

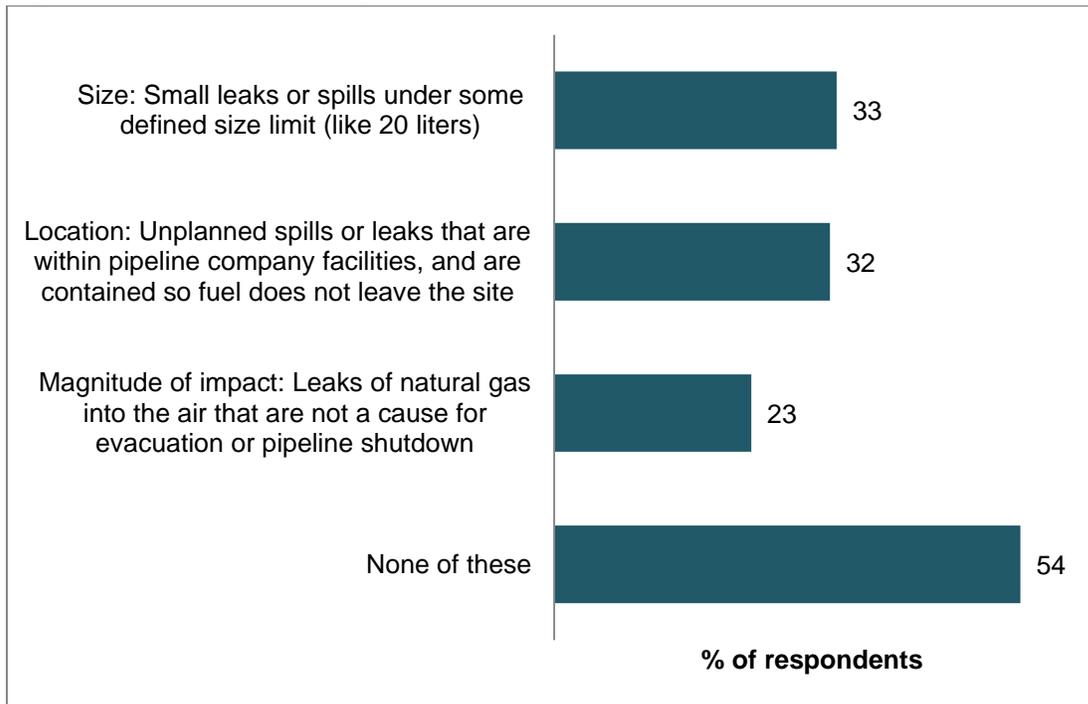


n=134 Multiple responses permitted; figures may exceed 100%

Exceptions

Participants were asked about criteria for exceptions to the definition of failure; they were asked whether the size or location of the leak or the magnitude of the impact would be criteria that should be considered in defining a failure. Figure 5 shows that one-third (33%) thought that “small leaks or spills under some defined size limit” should not be counted as a failure. A similar proportion (32%) said that “unplanned spills contained within pipeline facilities...” should not be considered a failure. Just over half (54%) said that none of the criteria should be considered as exceptions.

Figure 5. Criteria for exceptions



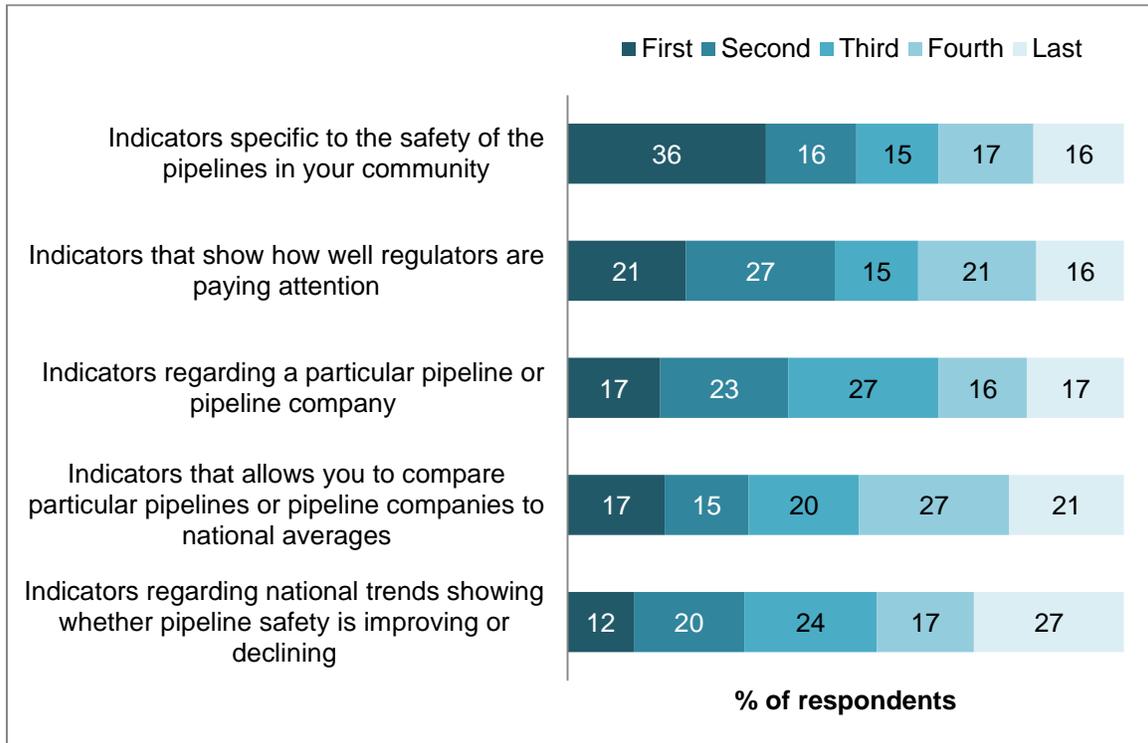
n=134 Multiple responses permitted; figures may exceed 100%

There were no differences detected between the segments based on primary interest in pipelines.

INDICATOR PREFERENCES

Participants were asked to consider five different potential types of high-level indicators and to rank them according to their interest. Figure 6 shows that over one third of respondents (36%) said they were most interested in “indicators specific to the safety of the pipelines in their community.” “Indicators that show how well regulators are paying attention” was ranked second, with 21% choosing it as a first choice. “Indicators regarding national trends” was the option ranked last by 27% of respondents (and first by 12%).

Figure 6. Indicator rankings, sorted by first and second choice



n=129²

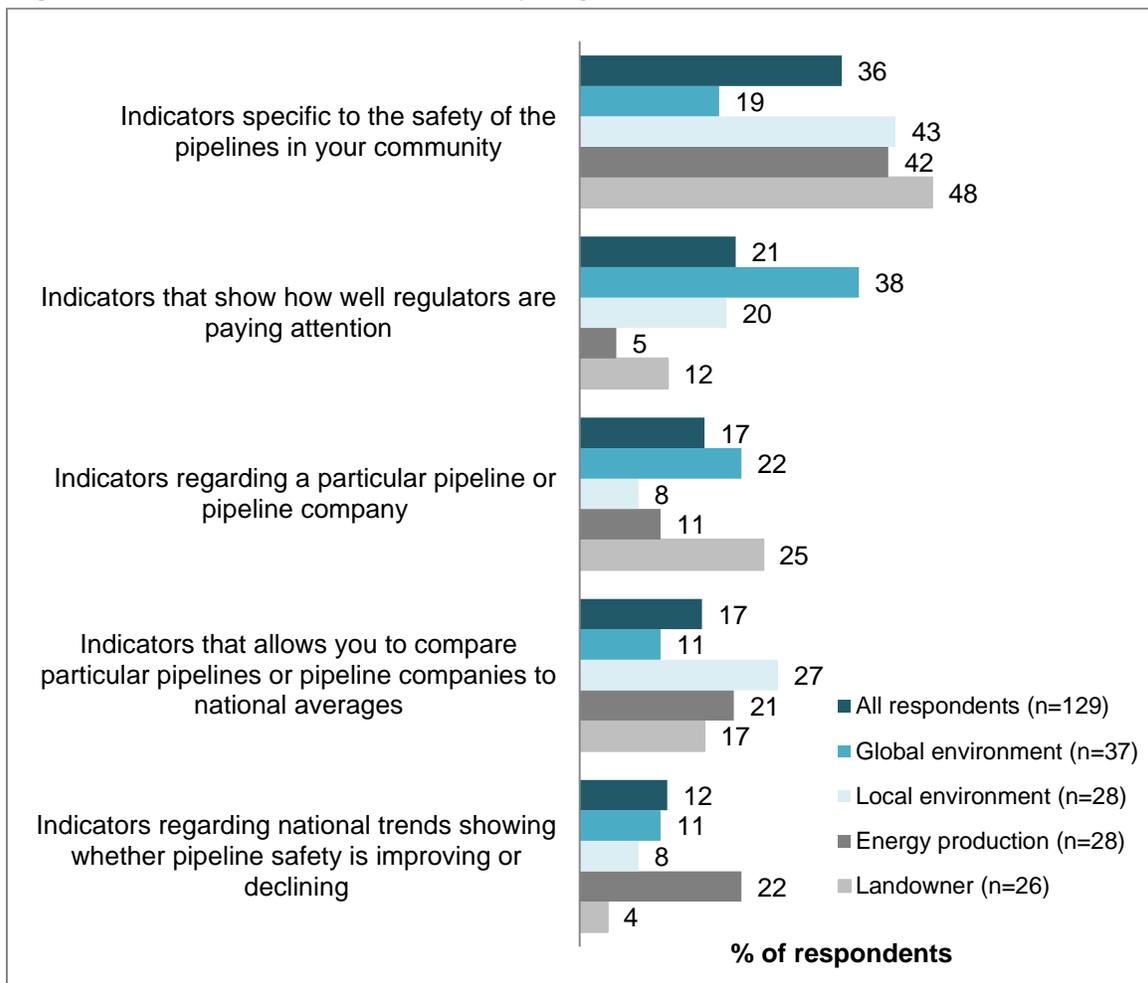
² Actual response to each item ranged from 126 to 129

Segment analysis

Analysis found some differences among the segments based on primary interest of the respondent. Figure 7 shows the proportion of each segment that selected each indicator as a first choice. For example, 36% of all respondents (taken together) selected “indicators specific to pipelines in your community” as the top choice. Figure 7 shows that this was the top choice for three of the segments, but not for the respondents with a primary interest in global environment. The global environment segment selected “indicators that show how well regulators are paying attention” as a top indicator (38%).

Figure 7 also shows that while “indicators regarding national trends” was ranked last overall, the energy production segment ranked this second.

Figure 7. First choice of indicators, by segment

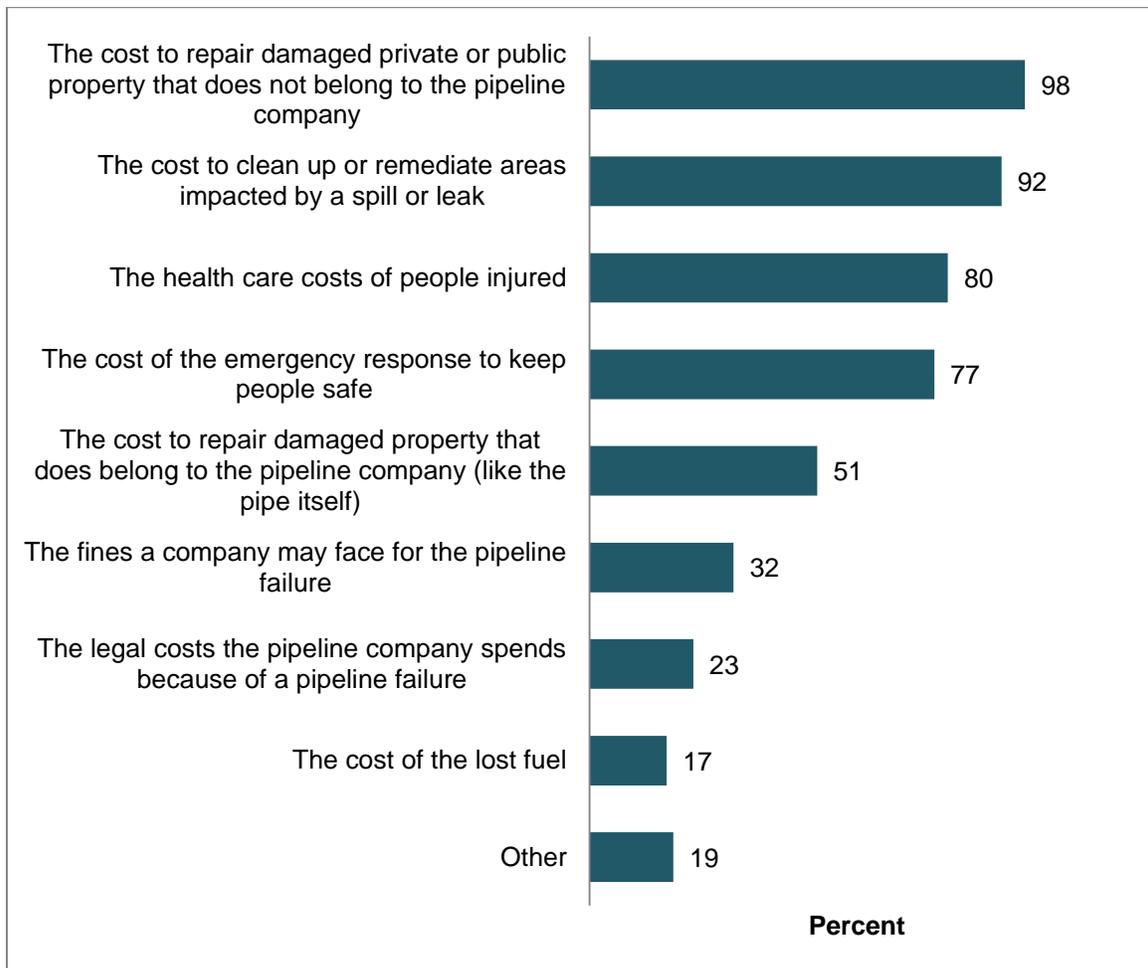


*Because these items were rated independently, segments will not total 100%

DEFINING PROPERTY DAMAGE

Respondents were asked about what types of damage should be included in the measurement of property damage. Figure 8 shows that nearly all (98%) agreed that the cost to repair property that does not belong to the pipeline company should be included in “property damage.” A slightly smaller proportion, but still a sizable majority, said the measure should include the cost to clean up or remediate the areas impacted. Several items garnered substantially less interest: fines the pipeline company may face, the legal costs incurred by the pipeline company and the cost of the lost fuel were favored by less than a third of respondents.

Figure 8. When you think of “property damage” which of the following do you think should be included in such a measurement?



n=133 Multiple responses permitted; figures may exceed 100%

There were no differences detected between the segments based on primary interest in pipelines.

PREFERENCES FOR GRAPHIC REPRESENTATIONS

Respondents were presented with five different representations of data and asked to select their preferred style (numbered and shown below). Over half (54%) selected a column chart with a directional arrow to indicate overall trends (graphic #4). The second most popular style was a bar chart with no directional arrow (19%, graphic #1).

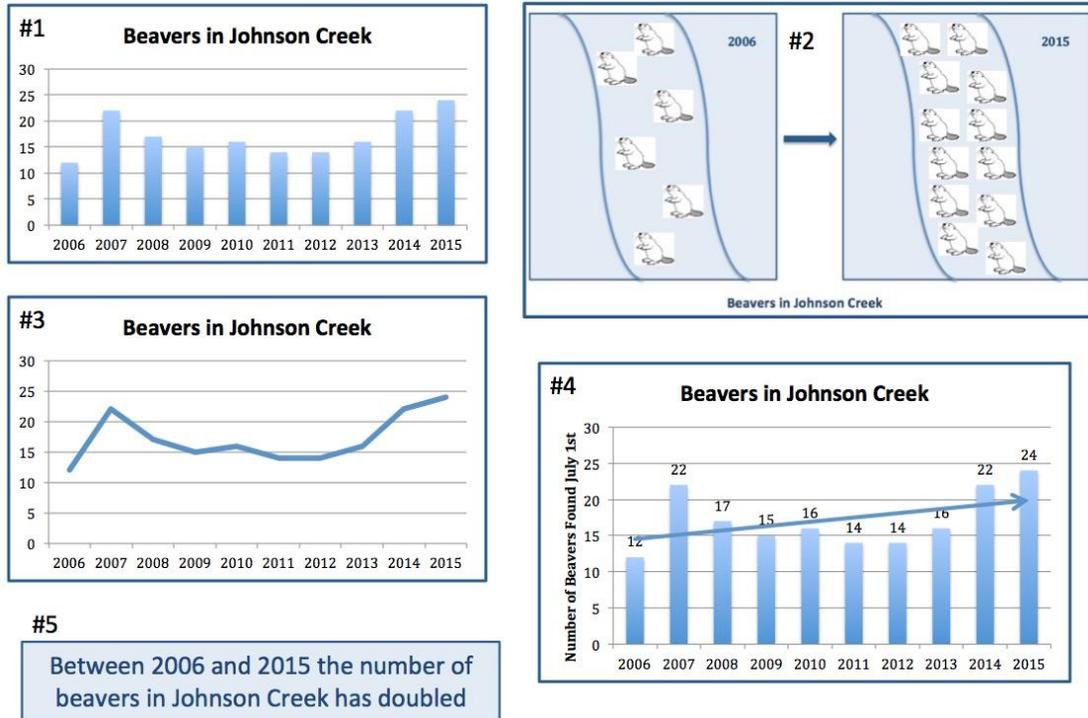
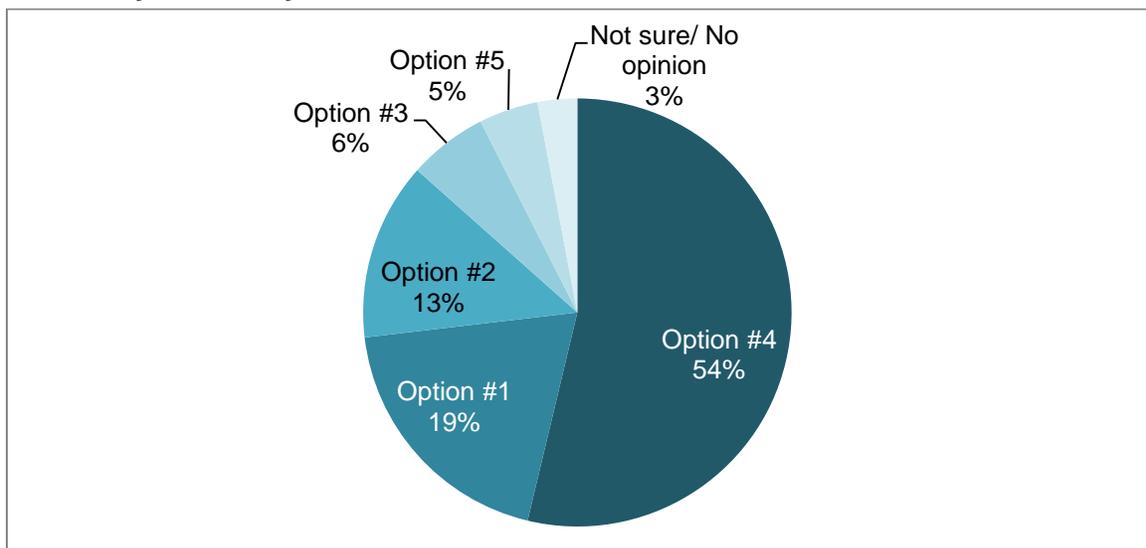


Figure 9. Which do you think does the best job of conveying the message accurately and easily?



n=134

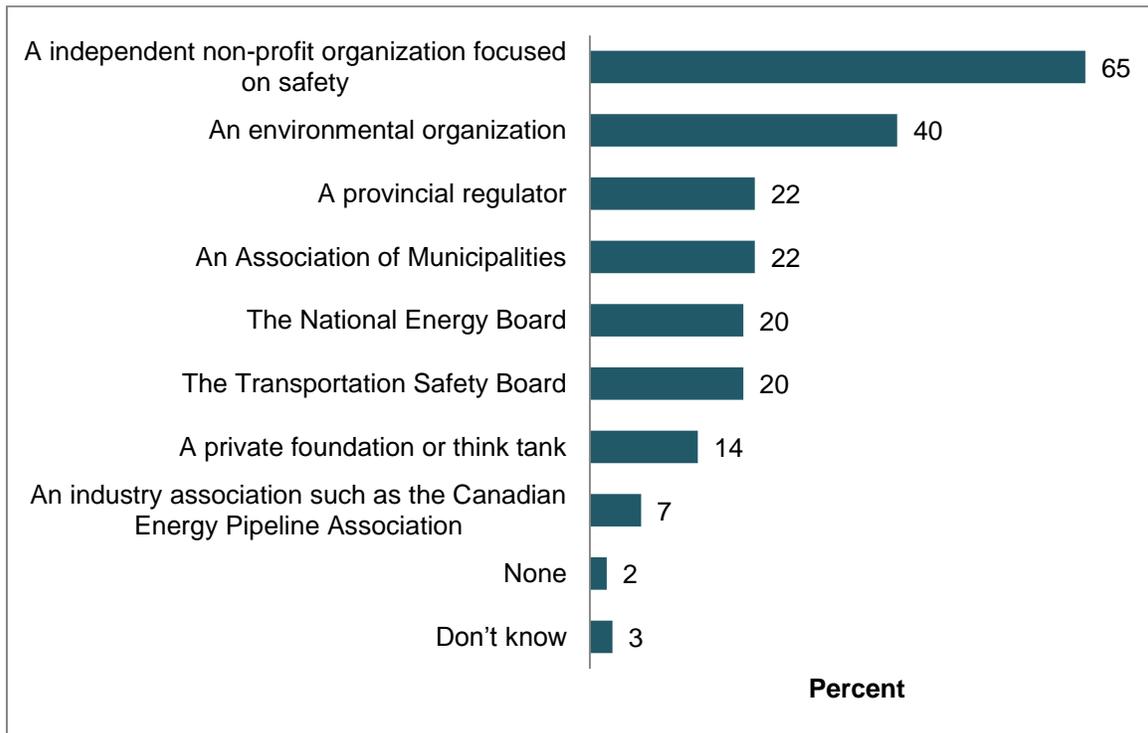
Very few respondents (5%) preferred straight text to represent findings.

There were no differences detected between the segments based on primary interest in pipelines.

TRUSTED PUBLISHER OF PIPELINE SAFETY INDICATORS

Respondents were asked about who they would trust to create, update and publish pipeline safety data. Figure 10 shows that nearly two-thirds (65%) said they would trust an “independent non-profit organization focused on safety.” A fairly distant second place was “an environmental organization” (trusted by 40%).

Figure 10. If indicators like we have been discussing were established and used to track pipeline safety over time, who would you most trust to create, update, and publish such indicators?



n=134 Multiple responses permitted; figures may exceed 100%

Segment analysis

The suggestion of an environmental organization as a publisher of public safety information for pipelines found strongest support among the global environment segment (58%). This was significantly higher than the ratings from the energy production segment (26% favorable).

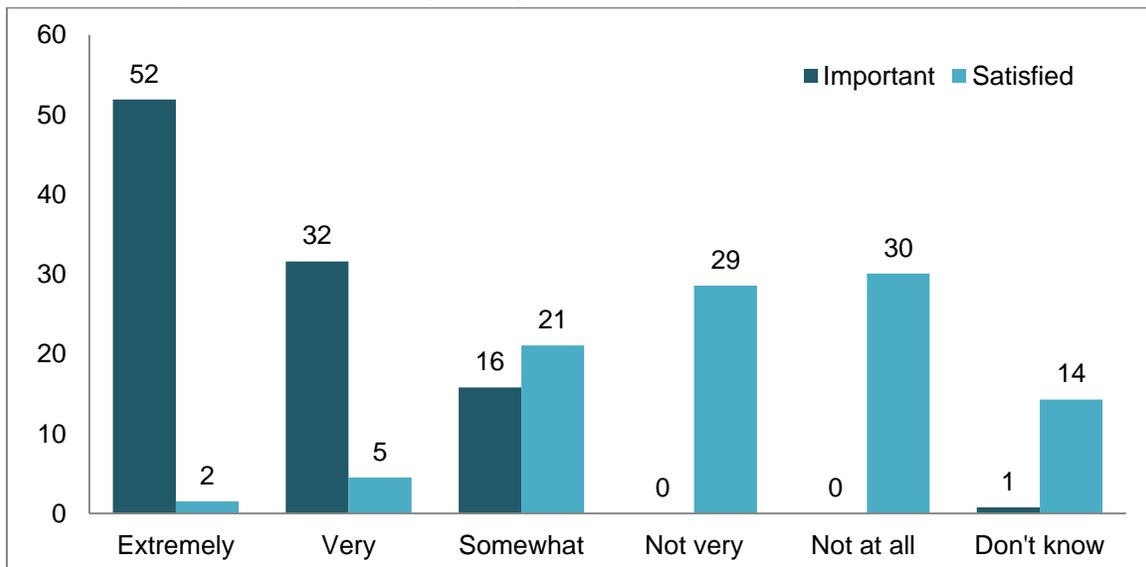
The Transportation Safety Board as a trusted source of pipeline safety information found strongest support amongst the energy production segment (42%, significantly higher than 4% of landowners). An Association of Municipalities also yielded a wide range of support, with 40% of the global environment segment, compared to 0% energy production segment.

The idea of an industry association such as the Canadian Energy Pipeline Association as a trusted publisher of pipeline safety information was ranked last, receiving most of its support from the segments interested in energy production (16%) and the local environment (10%). None of the global environment segment supported this idea, and only 4% of landowners.

CURRENT SATISFACTION AND SENSE OF IMPORTANCE

Respondents were asked to rate their own level of satisfaction with the kinds of information that they can currently easily access regarding pipeline safety in Canada. They were also asked to rate the importance of access to this kind of information. Figure 11 shows that most respondents think it is *extremely* or *very important* (84%). However only a small portion (7%) are *extremely* or *very satisfied* with the access they currently have.

Figure 11. How important is it to you to have access to information about pipeline safety in Canada? Overall how satisfied are you with the kinds of information you can currently easily access regarding pipeline safety in Canada?



n=133

Segment analysis

Analysis found that those with an interest in pipeline safety as it relates to energy production were more likely than those with other interests to say that they *don't know* how satisfied they are with the kinds of information they can easily access (47%).

Those with an interest in the impacts of pipeline safety on the global environment were most likely to say that this access to this information is *extremely important* (73%), followed by 57% of those with a primary interest in the local environment, and 44% of landowners. Just over one-fifth of the energy production segment (21%) said they thought access to information was *extremely important*.

CONCLUSION

The survey was successful in reaching a broad group of citizens with varying interests in pipeline safety issues. Overall, respondents were very interested in pipeline safety and not very satisfied with the information currently available to them. This is exactly the target that the PST was hoping to connect with and solicit feedback from.

The diversity of reasons for personal interest in pipeline safety had a clear impact on the types of information respondents wanted to have access to. For example, respondents with a key interest in global environment want to know about financial costs to clean up spills and the quantity of fuels spilled and they want to see indicators that show how well regulators are paying attention. This is a contrast to the segment that is driven by an interest in energy production; this group gave lower ratings for the helpfulness of informational categories in general and they want to see indicators that show national trends. In a third segment, landowners are most interested in data regarding the numbers and types of enforcement actions taken against pipeline companies, and indicators specific to the safety of their own community.

Reasons for personal interest also had a clear influence over what type of organization respondents would trust to produce this kind of information. There was relatively wide support for using an independent non-profit that is focused on safety. Other possibilities met with much less consensus. For example, the global environment segment favored an environmental organization, but this was ranked low among the energy production segment.

The feedback presented should provide good fodder for discussion among key stakeholders.

APPENDIX A: LETTER OF INVITATION

Greetings. We are the Pipeline Safety Trust and we are emailing you today to ask for your input on a pipeline safety indicator project.

A little bit about us... The Pipeline Safety Trust is the only non-profit organization in North American that focuses on improving pipeline safety from a public interest point of view. We were born out of a criminal settlement of a pipeline disaster in Bellingham, Washington where a pipeline killed three children playing in a park. You can learn more about us at <http://www.pstrust.org>.

Because of heightened public interest in existing pipelines, proposals to build new pipelines, and associated issues such as climate change and fracking, the industry and regulators are struggling to understand their apparent loss of social license, and have slowly come to recognize the need for greater transparency of accurate information. We want to use this opportunity to establish indicators of pipeline safety that are meaningful to the Canadian public. The National Energy Board (NEB) and the Canadian Energy Pipeline Association (CEPA) have both agreed to consider adopting the indicators we recommend, along with working to produce all the data necessary to compile the indicators and make them easily available to the public.

Our first step in establishing the pipeline safety indicators is to get input from interested members of the public. We want to identify what basic information people are interested in knowing about when it comes to the safety of the large transmission pipelines in their communities.

We hope you will take a few minutes to complete this survey so we can help push for greater transparency of information regarding pipelines in Canada and provide that information in ways that are helpful to citizens that want to better understand pipelines and increase pipeline safety. We have asked an independent research firm to host this survey. Your responses will be anonymous and tabulated with other respondents as a group.

Here is the link to the survey: <http://arnorthwest.com/pipelinesafety>

In addition to taking the survey, we would also like to ask you to forward this email to colleagues and friends who you think may have feedback to contribute.

Thanks so much for your help!

Carl Weimer, Executive Director
Pipeline Safety Trust
<http://pstrust.org>
carl@pstrust.org

APPENDIX B: SURVEY QUESTIONS

1. Which one of the following best describes why you are interested in pipeline safety? (ROTATE)
 - I am a landowner with a pipeline on my land, or proposed to be on my land
 - I live or work very near a pipeline
 - I think greater pipeline safety is key to being able to expand energy production, which is important to the economy in Canada
 - I work for a local government that needs to ensure the safety of our citizens
 - I have concerns about the fuels pipelines carry and the potential effects on the public and environment should they be released
 - I have concerns that pipelines enable greater production of fossil fuels, and that such production can have serious impacts on our health, waters or climate
 - There is a new pipeline proposed nearby, and many concerns have been raised
 - I am concerned about effects pipelines may have on First Nations rights and cultural heritage
 - Other (please specify)

2. There are many types of information which may help you to assess the safety of a pipeline. Please rate each of the following informational categories in terms of how helpful it is to you in understanding a pipeline's safety. (Response options: Extremely helpful, very helpful, somewhat helpful, not very helpful, not at all helpful, Don't know). (ROTATE)
 - a. Number of pipeline failures per year
 - b. Quantity of fuels spilled or unintentionally released per year
 - c. How many people are injured or killed per year
 - d. Age of a pipeline/s
 - e. Property damage caused per year
 - f. Financial costs to clean up spills or respond to pipeline emergencies per year
 - g. Number and type of enforcement actions taken by regulators against pipeline companies
 - h. How a company's safety record compares to national averages
 - i. How much a company is spending on pipeline testing, maintenance and repairs
 - j. Causes of pipeline failures
 - k. Quantity of fuel moved nationally and by individual companies
 - l. Maps of where pipelines are in your community

3. Are there other types of safety information that you think are helpful in understanding the safety of pipelines? If so, please describe: (open ended)

4. Different regulatory agencies use different definitions of what constitutes a pipeline "failure". Which of the following do you think should be included in such a definition? Select all that apply.
 - An unplanned spill or leak of fuel from the pipeline
 - Unplanned operating factors that require the pipeline to be shut down
 - A spill or leak from the pipeline that results in a death or serious injury
 - A spill or leak from the pipeline that results in property damage
 - A spill or leak from the pipeline that requires an evacuation
 - A spill or leak from the pipeline that results in a fire or explosion
 - Other, please specify:

4b. Should the type of fuel or the location and quantity of the spill or leak be considered among criteria for defining a pipeline failure? Which of the following statements do you agree with?

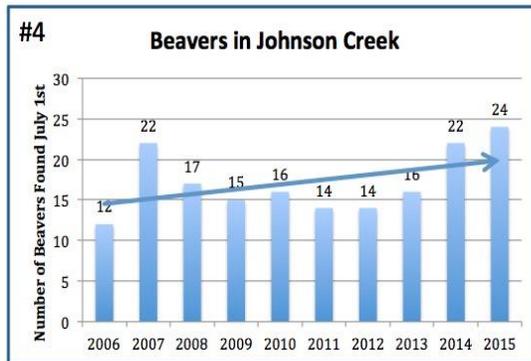
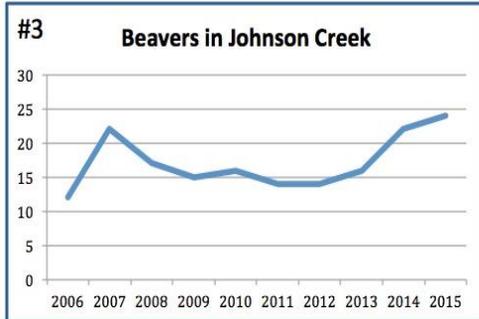
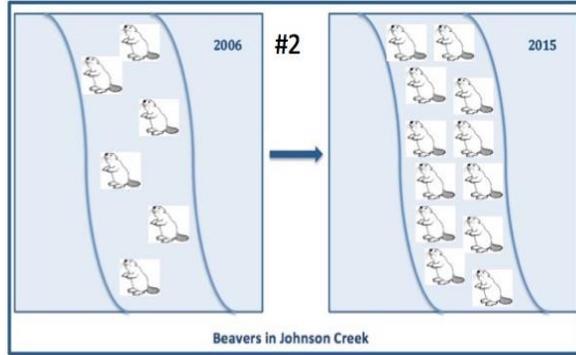
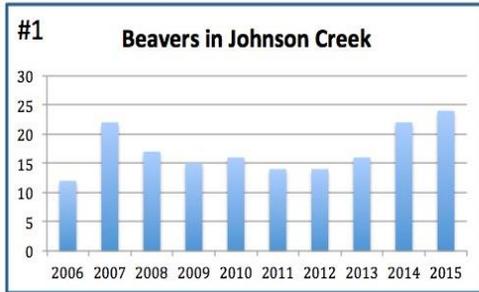
- Unplanned spills or leaks that are within pipeline company facilities, and are contained so fuel does not leave the site, should not count as a failure.
- Small leaks or spills under some defined size limit (like 20 liters) should not be considered a failure
- Leaks of natural gas into the air that are not a cause for evacuation or pipeline shutdown should not be considered a failure.
- None of these

5. Below are five different potential indicators that you might be interested in. Please rank how interested you would be in these indicators, with a "1" to show which you would be the most interested in, a "2" to show your second choice, and so on.

- a. Indicators regarding national trends showing whether pipeline safety is improving or declining
- b. Indicators regarding a particular pipeline or pipeline company
- c. Indicators that allows you to compare particular pipelines or pipeline companies to national averages
- d. Indicators specific to the safety of the pipelines in your community
- e. Indicators that show how well regulators are paying attention

6. Some regulators measure "property damage" from pipeline failures. When you think of "property damage" which of the following do you think should be included in such a measurement? Select all that apply. (ROTATE)

- The cost to repair damaged private or public property that does not belong to the pipeline company
- The cost to repair damaged property that does belong to the pipeline company (like the pipe itself)
- The cost of the emergency response to keep people safe
- The cost of the lost fuel
- The cost to clean up or remediate areas impacted by a spill or leak
- The legal costs the pipeline company spends because of a pipeline failure
- The health care costs of people injured
- The fines a company may face for the pipeline failure
- Other (please specify) _____



#5
Between 2006 and 2015 the number of beavers in Johnson Creek has doubled

7. Data can be represented visually in many different ways. Of the 5 graphics above, which do you think does the best job of conveying the message accurately and easily?

- #1
- #2
- #3
- #4
- #5
- Not sure/No opinion

8. If indicators like we have been discussing were established and used to track pipeline safety over time, who would you most trust to create, update, and publish such indicators? Please check all that apply. (ROTATE)

- The National Energy Board
- An industry association such as the Canadian Energy Pipeline Association
- A provincial regulator
- An environmental organization
- The Transportation Safety Board
- An Association of Municipalities
- A private foundation or think tank
- A independent non-profit organization focused on safety
- None
- Don't know

9. If you have a suggestion for a specific organization that you would trust to publish pipeline safety indicators, please comment: (open end)
10. How did you hear about this survey?
- I received an email directly from Carl Weimer at Pipeline Safety Trust
 - A friend or colleague forwarded an email to me with the link and information
 - Other, please specify: _____
11. Which province or territory do you live in?
- Alberta
 - British Columbia
 - Manitoba
 - New Brunswick
 - Newfoundland and Labrador
 - Northwest Territories
 - Nova Scotia
 - Nunavut
 - Ontario
 - Prince Edward Island
 - Quebec
 - Saskatchewan
 - Yukon
 - I live outside Canada but my work is primarily in Canada
 - I don't live or work in Canada
12. Overall how satisfied are you with the kinds of information you can currently easily access regarding pipeline safety in Canada? (Response options: Extremely satisfied, very, somewhat, not very, not at all, don't know)
13. Overall how important is it to you to have access to information about pipeline safety in Canada? (Response options: Extremely important, very, somewhat, not very, not at all, don't know)
14. As we create these pipeline safety indicators are you interested in reviewing and providing feedback on what we come up with? If so please provide your name and email address.
15. Is there anything else you would like to tell us about pipeline safety indicators, greater pipeline safety transparency, or pipeline safety information you are interested in?

APPENDIX C: FREQUENCIES

Q1 Which one of the following best describes why you are interested in pipeline safety?

		Frequency	Valid Percent
Valid	I am a landowner with a pipeline on my land, or proposed to be on my land	26	19.4
	I live or work very near a pipeline	6	4.5
	I think greater pipeline safety is key to being able to expand energy production, which is important to the economy in Canada	19	14.2
	I work for a local government that needs to ensure the safety of our citizens	1	.7
	I have concerns about the fuels pipelines carry and the potential effects on the public and environment should they be released	29	21.6
	I have concerns that pipelines enable greater production of fossil fuels, and that such production can have serious impacts on our health, waters or climate	38	28.4
	There is a new pipeline proposed nearby, and many concerns have been raised	7	5.2
	I am concerned about effects pipelines may have on First Nations rights and cultural heritage	1	.7
	Other, please specify:	7	5.2
	Total	134	100.0

Q2a Number of pipeline failures per year

		Frequency	Valid Percent
Valid	Extremely helpful	74	55.2
	Very helpful	34	25.4
	Somewhat helpful	17	12.7
	Not very helpful	7	5.2
	Not at all helpful	1	.7
	Don't know	1	.7
	Total	134	100.0

Q2b Quantity of fuels spilled or unintentionally released per year

		Frequency	Valid Percent
Valid	Extremely helpful	73	54.5
	Very helpful	33	24.6
	Somewhat helpful	24	17.9
	Not very helpful	1	.7
	Not at all helpful	2	1.5
	Don't know	1	.7
	Total	134	100.0

Q2c How many people are injured or killed per year

		Frequency	Valid Percent
Valid	Extremely helpful	57	42.5
	Very helpful	38	28.4
	Somewhat helpful	27	20.1
	Not very helpful	6	4.5
	Not at all helpful	3	2.2
	Don't know	3	2.2
	Total	134	100.0

Q2d Age of a pipeline/s

		Frequency	Valid Percent
Valid	Extremely helpful	59	44.0
	Very helpful	40	29.9
	Somewhat helpful	25	18.7
	Not very helpful	7	5.2
	Not at all helpful	1	.7
	Don't know	2	1.5
	Total	134	100.0

Q2e Property damage caused per year

		Frequency	Valid Percent
Valid	Extremely helpful	58	43.3
	Very helpful	40	29.9
	Somewhat helpful	27	20.1
	Not very helpful	4	3.0
	Not at all helpful	3	2.2
	Don't know	2	1.5
	Total	134	100.0

Q2f Financial costs to clean up spills or respond to pipeline emergencies per year

		Frequency	Valid Percent
Valid	Extremely helpful	69	51.5
	Very helpful	36	26.9
	Somewhat helpful	18	13.4
	Not very helpful	8	6.0
	Not at all helpful	2	1.5
	Don't know	1	.7
	Total	134	100.0

Q2g Number and type of enforcement actions taken by regulators against pipeline companies

		Frequency	Valid Percent
Valid	Extremely helpful	71	53.0
	Very helpful	40	29.9
	Somewhat helpful	19	14.2
	Not very helpful	2	1.5
	Not at all helpful	1	.7
	Don't know	1	.7
	Total	134	100.0

Q2h How a company's safety record compares to national averages

		Frequency	Valid Percent
Valid	Extremely helpful	60	44.8
	Very helpful	46	34.3
	Somewhat helpful	20	14.9
	Not very helpful	5	3.7
	Not at all helpful	2	1.5
	Don't know	1	.7
	Total	134	100.0

Q2i How much a company is spending on pipeline testing, maintenance and repairs

		Frequency	Valid Percent
Valid	Extremely helpful	48	35.8
	Very helpful	44	32.8
	Somewhat helpful	31	23.1
	Not very helpful	7	5.2
	Not at all helpful	3	2.2
	Don't know	1	.7
	Total	134	100.0

Q2j Causes of pipeline failures

		Frequency	Valid Percent
Valid	Extremely helpful	76	56.7
	Very helpful	42	31.3
	Somewhat helpful	11	8.2
	Not very helpful	2	1.5
	Not at all helpful	2	1.5
	Don't know	1	.7
	Total	134	100.0

Q2k Quantity of fuel moved nationally and by individual companies

		Frequency	Valid Percent
Valid	Extremely helpful	38	28.4
	Very helpful	43	32.1
	Somewhat helpful	38	28.4
	Not very helpful	10	7.5
	Not at all helpful	2	1.5
	Don't know	3	2.2
	Total	134	100.0

Q2l Maps of where pipelines are in your community

		Frequency	Valid Percent
Valid	Extremely helpful	81	60.9
	Very helpful	35	26.3
	Somewhat helpful	13	9.8
	Not very helpful	4	3.0
	Total	133	100.0
Missing	Don't know	1	
Total		134	

**Q4 Different regulatory agencies use different definitions of what constitutes a pipeline "failure". Which of the following do you think should be included in such a definition?
Select all that apply.**

		Responses	Percent of Cases
		N	
\$Q4a	Q4_1 An unplanned spill or leak of fuel from the pipeline	124	92.5%
	Q4_2 Unplanned operating factors that require the pipeline to be shut down	55	41.0%
	Q4_3 A spill or leak from the pipeline that results in a death or serious injury	105	78.4%
	Q4_4 A spill or leak from the pipeline that results in property damage	103	76.9%
	Q4_5 A spill or leak from the pipeline that requires an evacuation	106	79.1%
	Q4_6 A spill or leak from the pipeline that results in a fire or explosion	106	79.1%
	Q4_7 Other, please specify:	21	15.7%
Total		620	462.7%

Q4b Should the type of fuel or the location and quantity of the spill or leak be considered among criteria for defining a pipeline failure? Which of the following statements do you agree with?

		Responses	Percent of Cases
		N	
\$Q4b	Q4b_1 Unplanned spills or leaks that are within pipeline company facilities , and are contained so fuel does not leave the site, should not count as a failure.	42	32.1%
	Q4b_2 Small leaks or spills under some defined size limit (like 20 liters) should not be considered a failure	43	32.8%
	Q4b_3 Leaks of natural gas into the air that are not a cause for evacuation or pipeline shutdown should not be considered a failure.	30	22.9%
	Q4b_4 None of these	71	54.2%
Total		186	142.0%

Q5_1 Indicators regarding national trends showing whether pipeline safety is improving or declining

		Frequency	Valid Percent
Valid	1	15	11.9
	2	25	19.8
	3	30	23.8
	4	22	17.5
	5	34	27.0
	Total	126	100.0
Missing	System	8	
Total		134	

Q5_2 Indicators regarding a particular pipeline or pipeline company

		Frequency	Valid Percent
Valid	1	21	16.7
	2	29	23.0
	3	34	27.0
	4	20	15.9
	5	22	17.5
	Total	126	100.0
Missing	System	8	
Total		134	

Q5_3 Indicators that allows you to compare particular pipelines or pipeline companies to national averages

		Frequency	Valid Percent
Valid	1	22	17.5
	2	19	15.1
	3	25	19.8
	4	34	27.0
	5	26	20.6
	Total	126	100.0
Missing	System	8	
Total		134	

Q5_4 Indicators specific to the safety of the pipelines in your community

		Frequency	Valid Percent
Valid	1	46	35.7
	2	21	16.3
	3	19	14.7
	4	22	17.1
	5	21	16.3
	Total	129	100.0
Missing	System	5	
Total		134	

Q5_5 Indicators that show how well regulators are paying attention

		Frequency	Valid Percent
Valid	1	27	21.3
	2	34	26.8
	3	19	15.0
	4	27	21.3
	5	20	15.7
	Total	127	100.0
Missing	System	7	
Total		134	

Q6 Some regulators measure “property damage” from pipeline failures. When you think of “property damage” which of the following do you think should be included in such a measurement? Select all that apply.

		Responses	Percent of Cases
		N	
\$Q6	Q6_1 The cost to repair damaged private or public property that does not belong to the pipeline company	130	97.7%
	Q6_2 The cost to repair damaged property that does belong to the pipeline company (like the pipe itself)	68	51.1%
	Q6_3 The cost of the emergency response to keep people safe	103	77.4%
	Q6_4 The cost of the lost fuel	23	17.3%
	Q6_5 The cost to clean up or remediate areas impacted by a spill or leak	123	92.5%
	Q6_6 The legal costs the pipeline company spends because of a pipeline failure	31	23.3%
	Q6_7 The health care costs of people injured	107	80.5%
	Q6_8 The fines a company may face for the pipeline failure	43	32.3%
	Q6_9 Other, please specify:	25	18.8%
Total		653	491.0%

Q7 Data can be represented visually in many different ways. Of the 5 graphics above, which do you think does the best job of conveying the message accurately and easily?

		Frequency	Valid Percent
Valid	#1	26	19.4
	#2	18	13.4
	#3	8	6.0
	#4	72	53.7
	#5	6	4.5
	Not sure/ No opinion	4	3.0
	Total	134	100.0

**Q8 If indicators like we have been discussing were established and used to track pipeline safety over time, who would you most trust to create, update, and publish such indicators?
Please check all that apply**

		Responses	Percent of Cases
		N	
\$Q8	Q8_1 The National Energy Board	27	20.1%
	Q8_2 An industry association such as the Canadian Energy Pipeline Association	9	6.7%
	Q8_3 A provincial regulator	29	21.6%
	Q8_4 An environmental organization	54	40.3%
	Q8_5 The Transportation Safety Board	27	20.1%
	Q8_6 An Association of Municipalities	29	21.6%
	Q8_7 A private foundation or think tank	19	14.2%
	Q8_8 A independent non	87	64.9%
	Q8_9 None	3	2.2%
	Q8_10 Don't know	4	3.0%
Total		288	214.9%

Q10 How did you hear about this survey?

		Frequency	Valid Percent
Valid	I received an email directly from Carl Weimer at Pipeline Safety Trust	46	34.3
	A friend or colleague forwarded an email to me with the link and information	61	45.5
	Other, please specify:	27	20.1
	Total	134	100.0

Q11 Which province or territory do you live in?

		Frequency	Valid Percent
Valid	Alberta	11	8.2
	British Columbia	25	18.7
	Manitoba	10	7.5
	New Brunswick	11	8.2
	Nova Scotia	10	7.5
	Ontario	56	41.8
	Prince Edward Island	1	.7
	Quebec	8	6.0
	Saskatchewan	2	1.5
	Total	134	100.0

Q12 Overall how satisfied are you with the kinds of information you can currently easily access regarding pipeline safety in Canada?

		Frequency	Valid Percent
Valid	Extremely satisfied	2	1.5
	Very satisfied	6	4.5
	Somewhat satisfied	28	21.1
	Not very satisfied	38	28.6
	Not at all satisfied	40	30.1
	Don't know	19	14.3
	Total	133	100.0
Missing	System	1	
Total		134	

Q13 Overall how important is it to you to have access to information about pipeline safety in Canada?

		Frequency	Valid Percent
Valid	Extremely important	69	51.9
	Very important	42	31.6
	Somewhat important	21	15.8
	Don't know	1	.8
	Total	133	100.0
Missing	System	1	
Total		134	

APPENDIX D: OPEN-ENDED VERBATIM RESPONSES

Q 1 Which one of the following best describes why you are interested in pipeline safety? Other, please specify:

- environmental concerns and looking for transparency
- I am an energy sector stakeholder working for civil society focused on building energy literacy
- Improved pipeline safety & leak detection is key to acceptance of any new or converted pipeline.
- Jobs and safety hand in hand
- Regulator
- We have to stop burning fossil fuels. It makes far more sense to develop renewables at this point.
- Work for agricultural producer organization

Q3 Are there other types of safety information that you think are helpful in understanding the safety of pipelines? If so, please describe:

- - how many unreported spills or leaks? (what is the threshold to report a spill) - percentage of spills that are cleaned up
- -% of pipeline company revenues spent on annual maintenance -Annual government subsidies received -Avg. Speed of emergency response: what is average delay between 1st warning and pipeline shut down what is average delay between 1st warning and cleanup completion
- -Number of spills per mode of discovery (monitoring, visual) -Time for response
- ALL INFORMATION IS HELPFUL. Public awareness of the location and risk of pipelines by more accurate signage. Mandatory foot patrols and ROW maintenance and clearing of brush and trees would also improve pipeline safety and public awareness of pipeline existence. Increased awareness of pipeline should include education of those living near the ROW of the possibility of slow, undetectable leaks into well water and the need to do chemical testing regularly to assure safe water source. This should be paid for by the pipeline company.
- Amount and TYPE of fuel moved per day per pipeline, so that the public can accurately understand what emissions increases may result from each pipeline project.
- Amount of tax payer money supporting pipelines provided by government. This amount should include any money related to pipeline development, review, disaster...
- Certainly the thickness/strength of the pipe is of utmost importance to its safety and integrity. The other part of this equation is 'how deep should the pipe be in the ground'. If the pipe is thinner, then it would necessary follow the pipe should be installed deeper in the ground. The depth of cover is a very important factor to its safety. The abandonment or decommissioning of pipe that is being left to rot in the ground is also a very important safety issue.
- Clean up plans in every jurisdiction.
- Comparisons of pipeline use (on all these various safety indicators that you have listed) with movement of oil (and related products) by ocean shipping, trains and trucks. Somehow (who knows how?) to calculate how (increased) pipeline use will contribute to (increased) annual per capita consumption of petroleum-based products in Canada. Somehow (who knows how?) to calculate how increased building and use of pipelines contributes to increased extraction of bitumin (in Alberta and Saskatchewan, off Newfoundland, potentially in the Arctic), and natural gas (with and without fracking) in various places in Canada
- Construction and protection from earthquake tremors

- Correlation of pipeline age to quantity of spills and pipeline failures along each pipeline For a reported pipeline spill, whether and how long the spill had gone undetected
- Depth of high pressure pipelines re normal agricultural activities
- Emergency response practices: frequency of locations of and number of trained inspectors and leak responders along the length of a pipeline; bonds posted by pipeline owners and users in advance of spills; hours per day such response teams are on call, etc.
- Explaining lasting effects of previous pipeline/oil spills
- General information on safe work practises while working in proximity to a pipeline.
- How deep below the surface the pipeline is on my property; information back to landowners and neighbouring landowners when pipeline repair work is going on. eg. they did a pipeline repair next to my property, the smell one day gave me such a headache I had to leave. They said it was related to bacteria in the soil - I question whether it was a gas smell from the pipe repair.
- How long it takes a Pipeline Company to respond to a request from a landowner for a depth of cover survey on existing pipes on their land. How Energy Companies treat landowners when it comes to wanting to access Right of Ways, sometimes a lack of respect by Energy Companies. If thicker, higher quality grades of steel were used and pipes were installed much deeper in the ground, there would be less opportunity for machinery contact, less problems with movement on the pipes by frost, and a greater opportunity for the soils above the pipe to hold moisture and produce crops. More installation of pipes by horizontal direct drilling causes less above ground disturbance of trees, waterways, agricultural properties, and the ability to go deeper with less remediation costs.
- How much a company is spending in lobby everywhere to manipulate population and government? What would be the time of reaction in a case of spill. What are tools or equipment used to clean up spills. Who can react to spill? What kind of reaction they can have? How long it takes to stop the spill?
- How much time it took to clean up a spill? What type of product was spilt - differentiating between dilbit and other crude.
- I would like to know why is it that the depth of cover over pipelines which is insufficient in much of privately owned land, that the safety of the pipeline now falls in the lap of the landowner with restrictions on farming activity and downloading of liabilities onto landowners.
- I've known several people who have worked on pipelines, who joke over beers of the construction failures and cost-cutting measures employed with the ignorance of the governing body and hiring company. I have personally called the "watch dogs" put in place and nothing was ever done.
- If pipelines are being used as they were intended when designed and built,(type of fuel, direction of flow, etc.) Areas and waterways and watersheds that would be affected by a spill anywhere along a pipeline.
- In addition to info on costs of clean-ups, it would be helpful to note who had paid these costs - companies or taxpayers.
- Long term measures of the effects of pipelines on climate change
- miles of pipeline for various products within size categories; failures per operating mile for various products; Not all pipelines are built to the same standards; therefore categories by wall thickness groupings and internal coatings and material of construction could all be helpful.
- Minimum and maximum safety zone and what can and cannot be done within them.
- Monitoring - continuous vs periodic. Monthly? weekly? When last inspection took place. Information by section should be made available in real time via website.
- New pipeline innovations that promote reduce environmental and safety risks. Regulatory audits conducted and actions taken. Proposed pipelines: Consultations and safety/environmental assessments.

- New technologies that claim to make pipelines safer. Alternatives to pipelines.
- Number of reports to Transportation Safety Board (TSB) of defects found in pipeline system. Corrective action status for safety orders issued by National Energy Board; example: days over safety order due date status, or prior failure cause investigation status where a safety order points at say a fatigue failure and requires system inspection. Corrective action (CA) status for follow up on TSB occurrence reports; often these CA's are left hanging in limbo, or not acted on. Non-compliance events like over pressure events, and corrective actions for same.
- Number of years remaining of service of a pipeline/year of installation.
- Regarding the question on company spending on testing, maintenance and repairs - this is broad and probably would not provide details of if the testing was independently verified or repairs were adequate etc. Regarding the number and type of enforcement actions -would also like to know level of compliance and what happens when they fail to comply - assuming not all enforcement actions are completely implemented. Also, in particular the companies with pipelines in our Area - would like to know this about them - Energy East - TransCanada...
- Required time to detect a leak and how much oil is spilled per minute. In any case i think that our economy should go away from fossil fuels and oil companies have already lost their social license to operate. I am against the energy east pipeline project and will make my voice heard very clearly as will many other citizens against this project.
- Safety valve to stop immediately in case of a spill. Verification after 5 or 10 years for perforations by passing hot water under pressure. What about benzene in the dilbit?
- Stats on life of pipe as indicated by new pipe, coated pipe, product moved in pipe and 1/2 life of pipe. Some of us feel the pipe on our property may not be addressed at the time of decommissioning thereby becoming our problem.
- The above indicators are good, but there should be some thought as to how to present these in a manner which makes them comparable from one company or pipeline to the next, or to the average. for example, the data could be expressed by km of pipeline, or other means to express the relative size of safety records.
- The amount of damage to ecological goods & services (volume of water contaminated; volume of soil contaminated etc) - this should be an obvious one since this is why the public is nervous. It is not just about property damage. Also, people need to know what the pipelines are carrying and how toxic a product is when it is spilled.
- The Big Problem is climate change. There really isn't anything more urgent that the need for many, many solutions to the climate change problem. We need to be able to feed the billions on this planet, as well as the thousands in my County of Renfrew. In our county, there is very little arable land, and the pipeline goes right down the middle of a one-hundred-kilometer-long agricultural valley. This presence does not help us safeguard food production locally. On a global scale, increasing the speed of tar sands production does not help the climate change issue; it exasperates it, and threatens food production security all over the world. It's a choice between securing fresh potable water and healthy food production, versus continuing to extract and burn oil at the above safe rates, which we have been doing for over half a century. Food vs. Gasoline? I'd rather walk more, travel less, and invest in local agricultural production.
- The environmental impact in each area of an incident The nature of the material being transported within the pipeline
- The examples of pipeline information you are listing needs to be by company AND by pipeline AND by corridor given how many multiple pipeline corridors cross Canada. national averages of pipeline spills etc is an OXYMORON because there should be NONE. you may be underestimating Canadians, as indicators are built on solid information needs and assessment tools. they are not generic. Total financial costs to clean up spills etc per year is too cumulative and does NOT indicate the specific costs OR indicate which are not cleaned up.

- The pipeline companies always tout their central monitoring facility is the best, up-to-date, and manned by experts. It would be interesting to know how many pipeline failures these control centres have actually detected, and put in motion the correct procedures. If I read Canadian Safety Board reports, the majority of natural gas pipeline failures are first reported by local people (later confirmed by central control monitoring)
- The type of material being moved. Dilbit is of special concern because it is such a heavy product and sinks to the bottom of rivers, lakes, etc. with no chance of a total clean-up. Pollution forever!
- Track record when it comes to Quality of response to pipeline failure from the offending company i.e. did they respond right away to try to limit the damage and then take full responsibility to clean up everything and ensure everyone affected was helped including covering loss of revenue for people who were affected (if spill occurred in fishing or hunting lands) OR do they have a history of responding slowly, denying it was their fault and trying to get out actual clean up and financial compensation
- What is being done to improve leak detection technology. Require stronger environmental protection by way of legislation, and a more detailed application, EA and approvals processes. Need all information to be provided and an application complete before the NEB public consultation process begins.

Q4. Define a "failure" Other, please specify:

- A spill or leak from the pipeline that results in remediation costs.
- A Spill or leak that results in effects on the environment, water ways, species, air pollution, etc.
- A spill or leak that results in environmental impacts.
- a spill or leak which releases hydrocarbons into the atmosphere
- age of pipe in ground
- any identified failure in the integrity of the pipe
- any leak is a failure. The fact that we still need fossil fuels is a failure
- Any spill or leak at all, regardless of whether or not someone was impacted
- any unplanned spill, assuming a planned spill is one with prior approval by environmental regulator
- doesn't "an unplanned spill or leak...." pretty much cover all the other options in this question?
- drinking water distress
- Every spill or leak must be considered a failure of maintenance
- environmental impact on life cycle maintenance and end life removal/decay
- Expected life of each component and replacement plan
- Failure could also include the lack of detailed cleanup plans.
- no minimal volume and include spills on the company's property
- Observations of petroleum products in the vicinity of a pipeline system, esp. in an aquatic environ
- pig results should be made public
- Should report by categories such as these- eg death/injury shouldn't be reported same as leak
- Slow, "undetectable" leaks
- Standardization of all above

Q6 Define costs: Other, please specify:

- amount of time the land/water cannot be used
- any damage such as health affects to surrounding area
- any negative effect on the environment
- Cost of independent, long term health study following failure
- Cost of long-run damage to the environment
- COSTS? What about environmental damage. As far as I know, we cannot completely remove spilled fuel.
- damage to irreplaceable ecosystems, fines paid to future generations
- economic hardships caused to local stakeholders by a spill
- estimated crop, market, business interruption
- Impact of damage on real estate value of property
- It's not just about the failures... It's about the costs to humanity from burning fossil fuels
- legal costs of private individuals who have to fight for damages due
- Loss of revenue to any stakeholder
- Loss of use of property effected. There is no time component included here. without there is no urge
- lost days from businesses than may have to close
- Not sure I understand the question. I think of property damage from the public's side of things.
- specifics of environmental damage, not costs
- Standardize all
- the cost of lost opportunity from a spill (ie. fishing, tourism, lost productivity)
- The cost to compensate the landowner for the pipeline failure
- The long term aggregate costs to the environment and climate change affects. to the
- The socio-economic cost to the impacted communities & environment - loss of drinking water, fisheries
- Valuation of impacts and effects on the environment, potential rendition costs for environment damage
- value of ecological goods lost or damaged
- Wildlife/biodiversity loss, pollution to lands and waters

Q9 If you have a suggestion for a specific organization that you would trust to publish pipeline safety indicators, please comment:

- A neutral and independent body formed of several stakeholders: regulators, academia, municipal representatives, NGOs (environment and safety), industry. This body would be responsible to create, update, publish the list of indicators, and also to educate the public.
- Auditor General - through information provided by the Commissioner for the Environment and Sustainable development at both a federal and provincial level to ensure direct reporting to the legislative bodies at the federal and provincial levels.
- Based upon a recent review of the Federal Auditor General's Office Commissioner of the Environment and Sustainable Development report on regulation of federally regulated pipelines, I would ask the Commissioner. If pipeline safety data is inaccurate or missing, who can you trust?
- CAEPLA
- Canadian Association of Energy and Pipeline Landowners Association
- CAPLA
- Council of Canadians 350.org
- Definitely not the right wing think tanks nor industry funded organizations And how can the NEB regulate how well it is doing
- I think a group including government, environmental organisations and independent concerned individuals might work, with the understanding that transparent data from the industry is collected and provided.
- Ideally should be NEB and/ or provincial regulator, but currently both are very politicized and potentially corrupt.
- Manitoba Pipeline Landowners Association "MPLA"
- No pipeline!
- Not sure. Please become familiar with what we have had and dont want It is called Casino politics ... the house is always right. This would generally apply to the national energy board and most self-appointed NGO's over time. Most NGO's do not have a vested interest as do land owners
- Organization would need to be national in scope. Legislation would be needed to ensure information would be reported accurately. Preferably an organization that does not have an agenda, either pro or against pipelines. Unfortunately the NEB mandate to expedite energy production & shipment precludes them.
- Private contractor that must be changed every specified interval
- Provincial Department of Energy
- Should be a coalition of governments (municipal, provincial and federal) and independent non-profit organizations specialized on pipeline safety working together. The data provided by companies should not be on a voluntary basis but compulsory. There should be ways for the coalition to independently audit the companies to ensure they are being transparent in the reporting of the necessary data.
- The more unbiased tracking participation and sharing of findings, the better.
- The Pembina Institute
- the previous page address how trends are illustrated did not make mention of 2007, where on all the graphs, the number of beavers had dramatically increased from 2006, then dropped over the following years. Just seems like a bad example. Whoever should be evaluating the risk factors and publishing findings should not be an entity that can be corrupted by the corporations that stand to profit from pipelines.

- There should be a joint group consisting of the USA EPA & Canadian NEB committee that has "Teeth" to overview AMP (administrative Monetary Penalties) to pipeline companies that have been fined for breaking the current or any new pollution legislation, to review the occurrences; the committee would be made up of knowledgeable people consisting and groups like your organization and our group, who make judgement calls or even comment on the size of the AMP levied by the federal agency.
- Transport Canada as they already have extensive expertise, infrastructure and experience in the regulation inspection and enforcement of regulated industries
- University research group
- Very tough question. Even foundations or non-profits are influenced (and possibly biased) by the source of their funding. Definitely not an industry association nor the NEB nor a provincial regulator nor an environmental organization.
- We have lost faith in government Board's and private vested corporations to monitor and inform the public. Preferably provincial regulators; however, they have already streamlined to the point of being ineffective with what's already on their plate now. An independent non-profit organization set up to exclusively monitor pipeline safety should be totally free of any interference or influence from the oil and gas industry, and be subject to audits to ensure accurate and thorough monitoring and reporting.
- You need to differentiate between regulators - as you use the term in your text. There is only ONE regulator in Canada for any pipeline that crosses provincial boundaries yet you keep using a plural text. Provinces deal with pipeline licensing and assessment if the pipeline is INSIDE the province. As to your question a third party independent auditor is needed for pipeline safety in Canada - and therefore a similar arrangement is needed for the indicators and trends - data and public reporting.

Q15 Is there anything else you would like to tell us about pipeline safety indicators, greater pipeline safety transparency, or pipeline safety information you are interested in?

- 1.How does one discover the truth about what is being carried in these pipelines, not just the bitumen for example, but the chemicals used to dilute it? 2.What kind of laws are in place to prevent companies from misrepresenting pipelines as "safe" or "safer than trains" when their track record says otherwise?
- As a company, they have to be more transparent about safety or they don't pass. Also, they must not lie to population because we don't trust them at all and they should also care about environment because it is the source of life of their customers.
- As long as data is shared with CAEPLA, we as members should get reports from it
- Bigger capacity pipelines mean more carbon based fuel being extracted. More extraction does not correspond to the rhetoric of Canada's commitment to reduce greenhouse gases. Minimal compensation to people affected by pipelines just seems like another externalization of cost by the petroleum industry.
- Construction of any new pipelines is in direct contradiction with Canada's commitment to limit global warming to 1.5°C.
- Especially individual company safety records -- here its a yes/no to the pipeline expansion; while not documenting that it should be no to a company with a poor safety and environmental track record.
- Everyone is aware of how bribery and corruption is rampant in these industries. Address that and disclose methods of how this is going to be governed, assessed, and transparent to the public. This is why no one feels safe, we all know 'safety measures are in place', that isn't the problem.

- I believe most of the fossil fuel must stay in the ground at this time to prevent greater warming of the planet and insure our survival. Of course present pipelines should be as safe as possible but to focus on how to make new pipeline safer defeats the purpose.
- I cannot stress enough how important it is to include environmental services indicators. Both industry and regulators are ignoring it completely like it doesn't exist and yet its the key issue that makes the public distrust both the pipeline industry and the pipeline regulators. And its not that difficult to include.
- I have no trust in industry to report on pipeline safety, nor in governments to regulate it. The introduction email indicated climate change, but there were no questions on climate change concerns. One piece of essential information on any proposed pipeline is the total and comprehensive impact it will have on GHGs over the life of the pipeline - including the GHGs produced during the extraction processes of the fossil fuels, transportation, construction of the pipeline, refining and burning of the product. We must know total climate change impacts of any proposed project before it is approved/denied. Also, I would like to see our universities more involved in research.
- I have followed pipeline safety for the past several years. I find that the industry has coopted the regulators. The NEB has not been keeping up with the incidents of pipeline failure; perhaps that has been a prior federal government stand, but pipeline safety is not a political football. I attended the 2015 NEB Pipeline Safety (& Environmental) Forum in Calgary. This was the 2nd forum, for essentially the same industry stakeholders, and the primary safety message has only begun to trickle through. Pipeline systems that have clearance to operate beyond reasonable useful life is an increasing risk to Canada's public safety and environmental protection. Pipeline system age, fatigue life, fatigue failures and less than effective integrity management systems have led to a question of not if a leak will occur, but where and when. As a result, the NEB has indicated that some systems are a problem for them; is that a low risk situation for federally regulated pipeline safety?
- I have left some notes through survey. Regulator(S) is a problem throughout. Various of your indicator queries are too generic, too industry serving. Who benefits needs to be the question you ask in determining each indicator ?
- I have lost faith in the industry due to its pattern of behavior in not being forthright and transparent about its actions, and its terrible treatment of whistle blowers. I have little faith in the regulators too, because they appear to have been captured by the industry and are not looking out for the public interest.
- I think the regulation of pipelines and the process for a pipeline to get approved is important.
- I would like to be able to trust the accuracy and honesty of such information so that I don't have to check and double check every item I hear/read.
- I would like to see all the changes made by our previous federal government regarding the Fisheries Act, Navigable Waters Protection Act and the Canadian Environmental Assessment Act reversed.
- I'm especially interested in the comparison of pipelines and trains for movement of the stuff -- because, at least in the near future, it looks like those are our two main domestic options. Your questions imply this but I'm interested in how we can set up centres of information (on all the issues and areas you list) which we can have some confidence will: have some permanence; be relatively free of industry and political-ideology influence; make information easily available; have ties to (but also independence from) federal and provincial governments (and perhaps municipal as well...that starts to get unwieldy). Ditto that question with regard to regulation.
- Indicators of quantity spilled, duration (time) of spill, estimated time it took to discover spill, whether spill was found by pipeline company or someone else - these seem important because they reveal how attentive the company is and how serious they are about quick discovery and reaction. We know that many spills are discovered by private individuals in the area of the spill and that is unacceptable. Thank you for your survey.

- Install the pipelines below the working depths used by farmers to farm. The depth needs to be below the level of deep rippers.
- Leave it in the ground.
- Monitoring has to take place before there is anything to report and monitoring of most pipelines is very weak. There are real-time monitoring methods that are accurate and timely but the pipeline industry resists these because of cost.
- no. Thank you for this survey.
- not at this time
- Not at this time
- Official investigation reports by TSB and NEB are far too slow to be published- often up to two years post incident and since Jan 2015, the NEB no longer publishes incident reports or investigation results.
- On about page 3 of this survey the questions were very poorly posed seemingly in the negative. This is serious business to landowners and questions need to be clear concise and to the point
- Pay me for having the pipeline cross my property! I filled this out on my time and don't receive any enumeration, yet I have pipelines running through three properties. Have Enbridge send me a check !
- People are completely unaware of the possibility of silent contamination of well water from pipeline slow leaks. Not knowing means not testing their water for anything other than bacteria. There is no effort by pipeline companies, Government such as Ministry of Environment (complaint driven) or Public Health Agencies to educate people at risk who live close to pipeline ROWs. Slow, long term contamination is a bigger risk to public health than a one time event. "We have subjected enormous numbers of people to contact with these poisons, without their consent and often without their knowledge." Rachel Carson LARGE, REPORT WORTHY PIPELINE FAILURES ARE MORE LIKELY TO BE DETECTED BY PRIVATE CITIZENS BEFORE PIPELINE TECHNOLOGY RECOGNIZES A PROBLEM. With improved public awareness, ALL pipeline failures would be detected and reported. As stated previously in survey: Public awareness of the location and risk of pipelines by more accurate signage. Mandatory foot patrols and ROW maintenance and clearing of brush and trees would also improve pipeline safety and public awareness of pipeline existence. Increased awareness of pipeline should include education of those living near the ROW of the possibility of slow, undetectable leaks into well water and the need to do chemical testing regularly to assure safe water source. This should be paid for by the pipeline company who present the risk.
- People should have access to some kind of booklet summarizing what world class pipeline safety means in terms of standards of construction and operation of a project
- Pipelines are much more concerned about profits than they are about respect for property owners and their property. I believe that pipelines for now, are the safest method of transporting oil from point A to point B, but much more should be done to address landowner concerns. I think that Pipeline Companies feel that as long as pipes are out of sight, they are out of mind, which explains their willingness to "Decommission" or "Abandon" as opposed to the "Removal" of old pipes. They don't want to dig up any unforeseen issues such as existing leaks which might be lurking underground.
- Thanks for the survey Carl! Hope all is well with everyone at PST.
- The current regulations need to be amended to define an 'environmentally significant release volume', and to include a requirement that the LDS be able to limit releases to less than this volume. The fact that existing industry practice cannot achieve this performance is no excuse for not imposing the requirement. What is an environmentally significant leak? This is the important question that must be first answered - then technology must be developed to detect that leak. The development of technology to meet the requirement should be made a priority, and then deployed.

- The organization creating and maintaining the database has to be publicly-funded, sufficiently-funded, independent of the industry, its governing board composed of public/NGO, industry, and independent scientific representation.
- The planned energy east pipeline is slated to be installed 12 meters from our house. How is TransCanada allowed to install a new pipeline so close to a residence?
- There is nowhere near enough government funding to establish a credible Intervenor presences during a formal Hearing Process. First Nations Groups are treated in a special category. I believe that any landowner who is "Directly Affected" according to the definition, should receive the same considerations as a First Nations community I will be sending you some photo information
- Three things: - re. Public Awareness Programs, regulators need to check/verify that people who are within the impact zone are actually aware of the nearby pipeline. I'm aware of multiple instances where people were not aware (and in some cases, still are not aware). These are all major sites (schools, high-rises, seniors' facilities, etc). - re. setbacks, we need safety setbacks so that high-consequence sites (eg. high-rises, geriatric facilities, schools, major transit hubs) are not built near transmission pipelines. Many US jurisdictions have prudent setback policies but I'm not aware of any jurisdiction in Canada that has one. - re. database of high consequence sites, companies and regulators both need a database of high-consequence sites that already exist. This would encourage close monitoring of our most vulnerable sites (re. public awareness, site-specific emergency plans, pipe integrity, etc). Presently, there is no database and no special monitoring.
- We are looking to know what the data tells us, not just the basic facts.
- We currently have 3 pipelines through our property with the possibility of another one being constructed Lots of issues
- When can we expect pipelines to become obsolete? When will fossil fuel companies convert to clean renewable energy?
- You asked about my definition of property damage but not if any other kind of damage. I want to be clear that I think property damage is quite superficial in its definition. Even more important is damage related to environmental and human health, safety, and quality of life
- You must connect safety and environment. It would be a missed opportunity if you did not.
- You need to broaden your survey so that Climate Change is taken into account. You barely touched on why my family and friends don't want more pipelines built. Pipeline companies are losing social license with people like myself. I am an educator and my wife is a professional. We have two young children. We make a healthy income and have little debt. We also recognize the not so distant storm that is climate change and we recognize what the consequences are for our children. So we have decided to become part of a counter culture movement. We are part of a movement that is giving up their cars, changing their traveling habits, living in smaller homes that are not heated with fossil fuels, growing our own food, etc... We are showing our neighbours how terrible fossil fuel companies are and that there are viable alternatives to burning fossil fuels. Cheers!