

2014

SCEK Year 1 Status Report:  
Survey on Climate Change  
Impacts to the Oil and Gas Sector



RESOURCES  
NORTH

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## Summary of Year 1 Accomplishments

The *Climate Change Impacts to the Oil and Gas Sector* project started in October, 2013, with formalizing agreements with both SCEK and Natural Resources Canada project funders and with the sub-contractors on the project team (Al Wiensczyk, Shawn Morford, and Jason Morris). The project steering committee members were identified and had its first meeting via conference call in late October (see committee meeting notes in Appendix 1) and met monthly thereafter to work collaboratively on the project research questions (completed December, 2013), the survey questions (completed January, 2014), the survey distribution list and beta testing (completed February, 2014). The survey was deployed March 6<sup>th</sup>, 2014 using an online survey tool called Survey Monkey which allows for advanced statistical analysis of the results for a fee. The survey was open for completion until March 21<sup>st</sup>, 2014, and reminder emails were sent on March 14<sup>th</sup> and March 21<sup>st</sup>. A copy of the final survey can be found in Appendix 3, and preliminary results are summarized below.

The project is on track as per the project work plan. The committee has been effective at working together to define the research questions, designing the survey and distributing the survey to the target audience. The response rate to the survey was lower than the committee expected (15%) which, while disappointing, elicited an interest by the committee to learn why and presents an opportunity through the upcoming expert interview phase of the project to further understand the sector's thinking around climate change and extreme weather events. Is this issue such a low priority that the survey was not of interest? Was the survey too long or the wrong method for collecting this information from the sector?

## Communications

RNA has provided updates on the project to its 7 member executive committee (November, 2013 and February, 2014 meetings) and 16 member board of directors (December, 2013 and February, 2014 meetings). An update was also provided in RNA's Advances Newsletter in February, 2014 (Appendix 2) which is distributed to over 125 email contacts.

## Year 1 Financial Summary

Total funding from SCEK for this first year was \$8,000 (\$4,000 received to date) and from Natural Resources Canada \$17,500 (receivable) for a total of \$25,500. Table 1 below summarizes the project expenditures to March 31<sup>st</sup>, 2014

Table 1

Expenses	Budgeted	Actual
Salaries and benefits	\$18,765	\$18,765
Professional, scientific contracted services	\$3,050	\$2,950
Computer support and software (Survey Monkey)	\$400	\$348
Administration (15%)	\$3,285	\$3,285
<b>TOTAL</b>	<b>\$25,500</b>	<b>\$25,348</b>

The project budget is slightly underspent by \$152 within the contractor and software budget categories. The excess \$100 contractor time is expected to be used in April, 2014 during the data analysis phase of the project. The remaining \$52 will be used to purchase two \$25 gift cards plus postage which was added as an incentive for participants to complete the survey.

## Initial Survey Results

### Overview

The following summary provides a preliminary overview of the survey deployment and results that describe the profile and nature of the respondents. Detailed analysis to address the key research questions around climate change and extreme weather events will be conducted through April, 2014 and a statistical summary and interpretation will be developed with the project committee in May, 2014.

The survey link was sent to a total of 186 contacts using lists from four industry associations as follows in Table 2.

Table 2

Industry Association List	Distributed By	Number of Contacts
Canadian Association of Petroleum Producers (CAPP)	CAPP	86
Canadian Energy Pipeline Association (CEPA)	CEPA	15
Energy Pipeline Association (EPAC)	Trout Creek Collaborative Solutions	69
Pipeline Association of Canada (PCAC)	Trout Creek Collaborative Solutions	16

The survey had an overall response rate of 15% or 28 responses. It was not feasible to determine how many of these contacts had operations in BC.

### British Columbia Respondents

Of the 28 responses, 13 indicated that they had operations in British Columbia (BC). There was good representation across all business areas within the sector (Table 3) and across small, medium, and large companies (Table 4).

Table 3

Which of the following best describes your company's or your clients' primary business area?		
Answer Options	Response Percent	Response Count
Oil Transmission pipeline	8.3%	1
Gas Transmission pipeline	25.0%	3
Conventional oil production	16.7%	2
Unconventional oil production	8.3%	1
Conventional gas production	0.0%	0
Unconventional gas production	25.0%	3
Oil and gas exploration	16.7%	2
Other (please specify)		3
<i>answered question</i>		<b>12</b>
<i>skipped question</i>		<b>1</b>

Table 4

How many people does your company employ?		
Answer Options	Response Percent	Response Count
Less than 100 employees	30.8%	4
100-500 employees	23.1%	3

More than 500 employees	46.2%	6
	<i>answered question</i>	13
	<i>skipped question</i>	0

A large proportion of respondents that operate in BC indicated they also conduct business in Alberta (11), and to a lesser degree, in Saskatchewan (5), United States (2) and Newfoundland (1) (Figure 1).

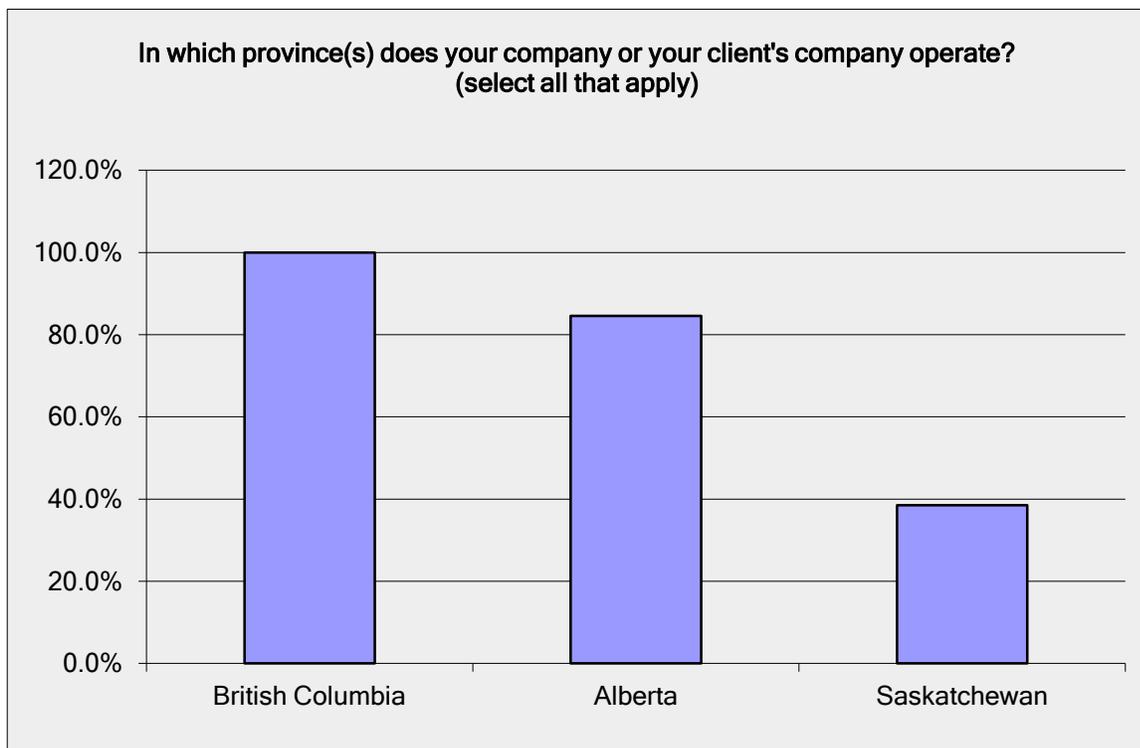


Figure 1

Slightly fewer respondents from BC (varying between 8 and 10) that operate in BC answered questions that describe their individual role and professional background. The majority of these were either in management or environment positions (Table 5) and there was a good representation across years of experience and age groups in the field (Tables 6 & 7). All the respondents had completed university level education (Table 8).

Table 5

In which one of the following roles do you spend most of your time for your company or your client's company?		
Answer Options	Response Percent	Response Count
Management	44.4%	4
Planning	0.0%	0
Operations	11.1%	1
Environment (general)	11.1%	1
Environment (Climate change specific issues)	33.3%	3
Other (please specify)		1
	<i>answered question</i>	<b>9</b>
	<i>skipped question</i>	<b>4</b>

Table 6

How many years experience do you have in your current field?		
Answer Options	Response Percent	Response Count
Less than 5	10.0%	1
5-10	30.0%	3
11-15	30.0%	3
16-20	10.0%	1
More than 20	20.0%	2
	<i>answered question</i>	<b>10</b>
	<i>skipped question</i>	<b>3</b>

Table 7

Which category below includes your age?		
Answer Options	Response Percent	Response Count
20 or younger	0.0%	0
21-29	20.0%	2
30-39	30.0%	3
40-49	10.0%	1
50-59	40.0%	4
60 or older	0.0%	0
	<i>answered question</i>	<b>10</b>
	<i>skipped question</i>	<b>3</b>

Table 8

What is the highest level of education you have completed?		
Answer Options	Response Percent	Response Count
Less than high school degree	0.0%	0
High school degree or equivalent	0.0%	0
College diploma or Trade school certificate	0.0%	0
University undergraduate degree	50.0%	5
University post-graduate degree	50.0%	5
Other (please specify)		0
<i>answered question</i>		<b>10</b>
<i>skipped question</i>		<b>3</b>

# Survey of the Oil and Gas Sector in Western Canada

## Introduction

Dear Energy Sector Leaders and Professionals,

We are inviting you to participate in an important and timely survey of the Oil and Gas sector leaders and professionals in Western Canada (Saskatchewan, Alberta and British Columbia) to learn about your perspectives and experiences with impacts and adaptation strategies relating to extreme weather events and other weather-related phenomena that affect your work.

This is the first stage of a project funded by Natural Resources Canada - Climate Change Impact and Adaptation Division (CCIAD) and the Science and Communities Environmental Knowledge (SCEK) fund, the results of which will be used to develop programs and other initiatives to assist the oil and gas sector in Canada.

The survey is voluntary, but your participation will greatly aid the sector in working together to develop and apply strategies that will help to mitigate potential weather-related phenomena that could otherwise increase costs and risk mitigation investments.

The survey should take about 20-30 minutes to complete. No individual respondent can be identified unless you choose to include your name.

This project is a collaborative effort between industry associations, government, and others (see below for full list) and is aimed at contributing to economic certainty, environmental protection, and 'social license' for the energy sector in Western Canada. This project is lead by Resources North Association, a multi sector not-for-profit organization based in Prince George, British Columbia ([www.resourcesnorth.org](http://www.resourcesnorth.org)) in collaboration with Trout Creek Collaborative Solutions ([www.tccsolutions.ca](http://www.tccsolutions.ca)). Results of the project will be available by December, 2014, by contacting a project team member (see emails below).

The survey will close at 7 p.m. on March 21st, 2014.

Please do not hesitate to contact Al Wiensczyk ([alan@tccsolutions.ca](mailto:alan@tccsolutions.ca)) or Melanie Karjala ([melanie@resourcesnorth.org](mailto:melanie@resourcesnorth.org)) for more information.

Thank you for your participation.

For statistical analysis purposes we respectfully request that you please **do not forward** this survey to others. If there is someone else within your organization who you think should be invited to participate in this survey either in addition to yourself or instead please send an email to either Al or Melanie and we will ensure that they receive a link to the survey.

The following partners are also involved in this project:

- Canadian Association of Petroleum Producers (CAPP)
- Canadian Energy Pipeline Association (CEPA)
- Saskatchewan Ministry of Environment, Climate Change Branch
- Alberta Environment and Sustainable Resource Development – Air Policy and Climate Change Branch
- BC Ministry of Environment Climate Change Secretariat
- BC Oil and Gas Commission (BC OGC), and
- Fraser Basin Council (FBC)

# Survey of the Oil and Gas Sector in Western Canada

## Business Information

### 1. Which of the following best describes your involvement in the oil and gas sector?

- Oil and gas sector company employee
- Consultant to the oil and gas sector
- Operational contractor to the oil and gas sector

Other (please specify)

### 2. Which of the following best describes your company's or your clients' primary business area?

- Oil Transmission pipeline
- Gas Transmission pipeline
- Conventional oil production
- Unconventional oil production
- Conventional gas production
- Unconventional gas production
- Oil and gas exploration

Other (please specify)

### 3. How many people does your company employ?

- Less than 100 employees
- 100-500 employees
- More than 500 employees

### 4. In which province(s) does your company or your client's company operate? (select all that apply)

- British Columbia
- Alberta
- Saskatchewan

Other (please specify)

## Extreme weather events

**5. Have you observed any weather events in your company's or your clients' geographic operating area in the past two years that you would consider as "extreme events?"**

Yes

No

If yes, please describe

# Survey of the Oil and Gas Sector in Western Canada

## Weather-related impacts

### 6. In which of the following ways did those event(s) affect your company's or your clients' business activities?

	Slow down	Suspend temporarily	Shut down permanently	No effect
Administrative activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Planning activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exploration activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Development activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operational activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decommissioning activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Product transportation to market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments

### 7. If the event(s) slowed down or suspended any activities, for how long? (please select longest period if there was more than one)

- Less than a day
- 1-7 days
- More than a week but less than a month
- More than a month
- Not sure

Comment - please indicate which activity from question 7 was slowed down or suspended.

## Extreme weather and climate

**8. Do you think that the extreme weather event(s) that you observed could be a result of a changing climate?**

- Yes
- No
- Not sure

Please explain

**9. Do you anticipate that there may be more frequent and/or severe weather events in the future than would have occurred without a changing climate?**

- Yes
- No
- Not sure

Please explain

**10. How far into the future do you think will be the onset of more frequent and/or severe weather events?**

- 0-5 years
- 6-10 years
- 11-20 years
- Greater than 20 years
- Not sure

# Survey of the Oil and Gas Sector in Western Canada

## Changing climate

### 11. Please indicate your level of agreement with the following statements.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I think that global climate change is occurring.	<input type="radio"/>				
I think that a changing climate could affect my company's or my clients' operations and/or infrastructure in the future.	<input type="radio"/>				
I have observed my company or my clients participating in <u>planning</u> activities to prepare for potential impacts of a changing climate on operations and/or infrastructure.	<input type="radio"/>				
I have observed my company or my clients <u>implementing</u> changes to operations and/or infrastructure to prepare for a changing climate.	<input type="radio"/>				

### 12. Does your company or client(s) currently make management decisions in any of the following areas, in response to current or future predicted changes to the frequency and severity of extreme weather events?

	Yes	No	Not sure
When making operational decisions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When doing long-term forecasting/planning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When doing risk management planning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When designing infrastructure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When developing long-term strategic plans.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

## Risk Factors

**13. What do you perceive to be some of the risk factors relating to a change in the frequency and severity of extreme weather events?**

**Operationally? (Please select all that apply)**

- Health and safety-related incident increases
- Design cost increases
- Operational cost increases
- Environmental damage
- Loss of social licence to operate

Other (please specify)

**14. What do you perceive to be some of the risk factors relating to a change in the frequency and severity of extreme weather events?**

**To Infrastructure? (Please select all that apply)**

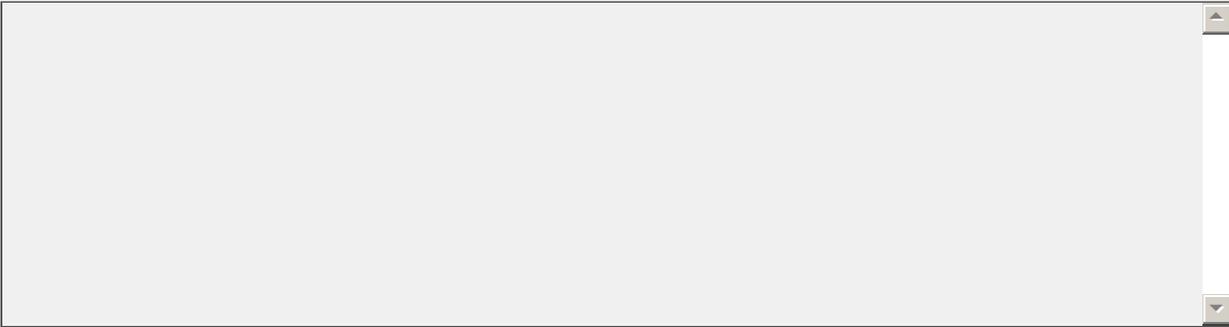
- Health and safety-related incident increases
- Design cost increases
- Operational cost increases
- Environmental damage
- Loss of social licence to operate

Other (please specify)

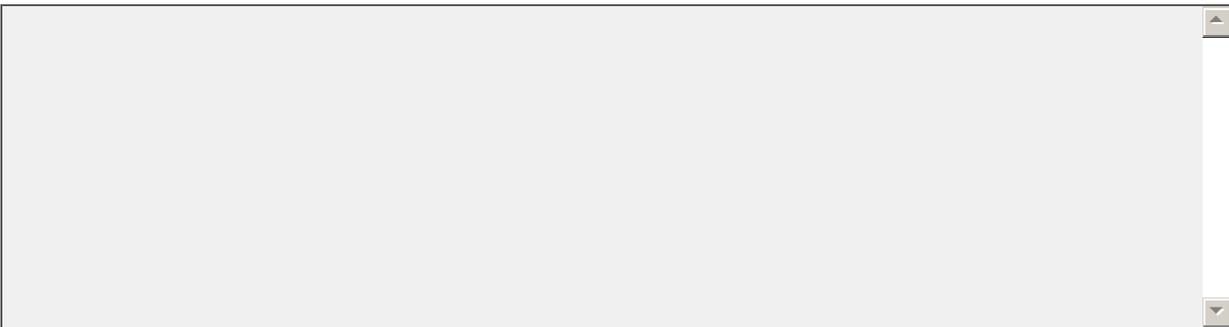
## Temperature

**15. Scientists anticipate that a changing climate could result in changes to temperatures (highs and lows) which may, in turn, affect permafrost levels, and timing of winter freeze up and/or spring melt.**

**Please describe specifically how you think such changes in temperatures would impact your company's or your clients' operations in the future.**

A large, empty text input area with a vertical scrollbar on the right side, intended for the respondent to describe the impact of temperature changes on operations.

**16. Please describe specifically how you think that such changes in temperatures would impact your company's or your clients' infrastructure in the future.**

A large, empty text input area with a vertical scrollbar on the right side, intended for the respondent to describe the impact of temperature changes on infrastructure.

## Precipitation

**17. Scientists also anticipate that a changing climate could result in changes in precipitation patterns (timing, amounts and types (rain vs snow)) in some areas which could result in raised or lowered water tables and changes to run-off patterns and timing.**

**Please describe specifically how you think that such changes to precipitation patterns would impact your company's or your clients' operations in the future.**

**18. Please describe specifically how you think that such changes to precipitation patterns would impact your company's or your clients' infrastructure in the future.**

## Ecological Processes

**19. Scientists expect that changes to temperature and precipitation patterns as a result of a changing climate could affect natural disturbances and other processes that are a regular part of our ecosystems. (e.g., frequency and severity of wildfires, frequency of landslides, increased flooding, and increased forest insects and disease damage.)**

**Do you expect that changes to these types of processes will occur in the future in your company's or your clients' operating areas?**

- Yes
- No
- Don't know

## Natural process impacts

**20. Please describe specifically how you think that these natural process changes would impact your company's or your clients' operations in the future.**

**21. Please describe specifically how you think that these process changes would impact your company's or your clients' infrastructure in the future.**

## Plant Species Diversity

**22. Scientists also anticipate that changes to temperature and precipitation patterns and ecological processes could also impact the extent and diversity of plant and tree species occurring in our ecosystems.**

**Please rate your personal level of awareness regarding the impact these changes may have on**

	Very aware	Aware	Somewhat aware	Not at all aware
<b>Site reclamation and restoration efforts.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Presence of invasive plants.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Company Strategies

**23. Does your company or your client currently have a strategy or strategies (e.g., operational, insurance, engineering design, planning) to prepare for a changing climate?**

- Yes
- No
- Don't know

Comments



## 24. Are there any plans to develop such strategies in the near future (6-12 months)?

- Yes
- No
- Don't know

Comments



## Government Policies and Regulations

**25. How easy do existing government policies or standards make it for your company or your client to modify management practices to adapt to a changing climate?**

1 Not at all easy

2

3

4

5 Very easy

Comments

**26. What level of effect would a changing climate have on your company's or your clients' ability to meet current government regulations and policies?**

1 Significant effect

2

3

4

5 No effect

Comments

**27. Please rate your level of agreement with the following statement.**

**Existing government policies or standards create barriers to climate change adaptation.**

Strongly agree

Agree

Neutral

Disagree

Strongly disagree

Comments

# Survey of the Oil and Gas Sector in Western Canada

## Information needs and sources

**28. If you had to make an operational or environmental decision regarding adaptation to a changing climate what types of information would you need to help inform that decision (e.g. climate change projections, monitoring data, predictive models)?**

**29. Where do you currently go to get information on the potential impacts of a changing climate within your field of expertise? (Please rank from 1 to 10 where 1 is the most likely to be used and 10 is the least likely)**

<input type="text"/>	Colleagues/coworkers in your company
<input type="text"/>	Colleagues/peers outside of your company
<input type="text"/>	Industry Associations
<input type="text"/>	Independent private contractors or consultants
<input type="text"/>	College or university researchers
<input type="text"/>	Government researchers and/or technical specialists
<input type="text"/>	Non-government organization (NGO) technical specialists
<input type="text"/>	Scientific literature (e.g., Research reports, journal articles)
<input type="text"/>	Internet-based information sources (e.g., Wiki's, discussion boards, and forums, etc.)
<input type="text"/>	Workshops/training sessions

**30. Please describe any other sources of information on the potential impacts of a changing climate that you currently use, if any.**

## Information needs and sources (2)

### 31. What methods/techniques would be the most effective for you to get information on climate change and its predicted impacts? (Please select your top 3)

- Industry Association (CEPA, CAPP, EPAC, etc.) newsletters (email)
- Webinars
- Workshops
- Website
- Research reports
- Extension notes (short 4-5 page documents presenting relevant information on a topic)
- Online discussion forum/blog
- Trade magazine articles

Other (please specify)

# Survey of the Oil and Gas Sector in Western Canada

**32. What methods/techniques do you think would be most effective in increasing the overall level of knowledge within the oil and gas sector of the recent science regarding the potential impacts of a changing climate on operations and infrastructure? (Please rank from 1-10 where 1 is the most effective and 10 the least effective)**

<input type="text"/>	Industry Association (CEPA, CAPP, EPAC, etc.) newsletters (email)
<input type="text"/>	Industry Association (CEPA, CAPP, EPAC, etc.) newsletters (regular mail)
<input type="text"/>	Online presentations/workshops (i.e., Webinars)
<input type="text"/>	Workshops
<input type="text"/>	Websites
<input type="text"/>	Social Media (e.g. Facebook, LinkedIn, Twitter)
<input type="text"/>	Online discussion forum/blog
<input type="text"/>	Research reports
<input type="text"/>	Extension notes (short 4-5 page documents presenting relevant information on a topic)
<input type="text"/>	Trade magazine articles

## Demographic information

**33. In which one of the following roles do you spend most of your time for your company or your client's company?**

- Management
- Planning
- Operations
- Environment (general)
- Environment (Climate change specific issues)

Other (please specify)

**34. What is your title/position within your company?**

**35. How many years experience do you have in your current field?**

- Less than 5
- 5-10
- 11-15
- 16-20
- More than 20

**36. Which category below includes your age?**

- 20 or younger
- 21-29
- 30-39
- 40-49
- 50-59
- 60 or older

## Survey of the Oil and Gas Sector in Western Canada

### 37. What is the highest level of education you have completed?

- Less than high school degree
- High school degree or equivalent
- College diploma or Trade school certificate
- University undergraduate degree
- University post-graduate degree

Other (please specify)