NUCLEAR WASTE MANAGEMENT ORGANIZATION
SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

# Public Attitudes Research – Understanding the Public Context for the Transportation of Used Nuclear Fuel

**ENVIRONICS RESEARCH GROUP**

**APM-REP-06310-0001**

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ENVIRONICS RESEARCH GROUP

# PUBLIC ATTITUDES RESEARCH

## *UNDERSTANDING THE PUBLIC CONTEXT FOR THE TRANSPORTATION OF USED NUCLEAR FUEL*

PN8030

Prepared for the Nuclear Waste Management Organization (NWMO)

February 2015

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## I. Introduction

**Nuclear Waste Management Organization**

The Nuclear Waste Management Organization (NWMO) was established in 2002 by Ontario Power Generation Inc., Hydro-Québec and New Brunswick Power Corporation. The NWMO was created in accordance with the *Nuclear Fuel Waste Act*, which was enacted to ensure that the long-term management of nuclear fuel waste will be carried out in a comprehensive, integrated and economically sound manner. Under the Act, the NWMO assumed responsibility for the long-term management of Canada's used nuclear fuel, and its vision is to undertake this management in a manner that both safeguards people and respects the environment, now and in the future. From 2002 to 2005, the NWMO conducted extensive studies into the options for long-term management of used nuclear fuel.

The NWMO presented its report and recommended approach – Adaptive Phased Management, or APM – in November 2005. In June 2007, the Government of Canada selected APM as Canada's plan for the long-term management of used nuclear fuel. Now in a new phase of its mandate, the NWMO is responsible for implementing APM, subject to all of the necessary regulatory approvals. In 2010, a process was launched to select a willing host community for the APM facility, taking into account public and stakeholder input.

Currently, Canada's used nuclear fuel is safely stored on an interim basis in licensed facilities at reactor sites located in Ontario, Quebec and New Brunswick, as well as at AECL's nuclear research facilities in Ontario and Manitoba.

As of November 2014, there are 14 communities involved in the site selection process and, while no preferred site will be selected for many more years and no used nuclear fuel will be transported until 2035, communities are beginning to pose questions about safety relating to the transport of used nuclear fuel.

While governments and industry have obvious responsibilities for environmental protection and management of projects such as this, individual citizens also have a key role to play, in terms of shaping public policy and social norms.

**NWMO social research**

The NWMO retained Environics to conduct exploratory qualitative research to understand priorities and concerns of the public related to the transportation of used nuclear fuel. This insight will be used by the NWMO to assist in the development of plans and materials with the goal of ensuring its transportation planning is socially responsive.

The facility could begin operation as early as 2035. The main priority of this research is to gain a deeper understanding of public perceptions and concerns regarding the transportation of used fuel from the seven interim storage facilities to an eventual repository site.

## II. Research Methodology

The NWMO required a series of eight (8), two-hour focus groups across Ontario to explore perceptions and concerns as they related to the transportation of used nuclear fuel. For the purposes of this project, 11 participants were randomly selected and recruited for each session and each participant was paid an incentive of $100. The focus groups were held between November 22 and 27, 2014 – and all were moderated by Derek Leebosh, Vice-President, Public Affairs at Environics Research.

The groups were composed of the following representation, and conducted in a number of communities in order to ensure a range of citizen perspectives and experiences, Oshawa, Toronto and Timmins:

- Two in-person focus groups were conducted in Oshawa, one group with only men, and one group with only women. Both groups included individuals aged 18-69 with mixed levels of education.
- Four in-person focus groups were conducted in Toronto, one group with men aged 30-69 with a university education (including 2 health care professionals), one with women aged 30-69 with a university education (including 2 health care professionals), one group with men aged 18-29, either currently attending or completed post-secondary school, and one group with women aged 18-29, either currently attending or completed post-secondary school.
- Two in-person focus groups were conducted in Timmins, one group with only men, and one group with only women. Both groups included individuals aged 18-69 and included individuals in households with mining, forestry, transportation, and/or manufacturing experience.

In an effort to ensure a good discussion, all focus group participants were recruited to include participants who paid either some attention or a great deal of attention to the news about public policy issues and current events.

## III. Key Findings

### A. Background for discussion of transportation of used nuclear fuel: Awareness of nuclear power and used nuclear fuel

***What are Ontario's sources of energy?***

To begin the discussion, participants were asked to list the sources of energy that generate Ontario's electricity. Top responses included nuclear, hydro, wind (wind turbines), oil, coal, solar power and natural gas. In most groups, nuclear was stated to be the largest source of Ontario's energy. Hydro was typically the second highest, or first among those who were unsure. Despite this fact, those individuals were not surprised when they were told that nuclear was Ontario's largest source of energy. There were some differences in how people answered this question, depending on what community they were from. Participants in Oshawa live in a community that is in close proximity to the nuclear power plants at Pickering and Darlington – so they, and to a lesser extent participants in the Toronto sessions, were well aware of the importance of nuclear power. In Timmins, it was a different story since it is in a region of Ontario where a lot of hydroelectric power is generated and where there are no nuclear power plants. As a result, participants in Timmins were more likely to think that hydroelectric power was Ontario's main source of energy and they tended to know much less about nuclear power in general.

When informed that more than 50% of Ontario's energy comes from nuclear power, there was a split between those who were not surprised by this fact, and participants who were surprised it was so large. Although most participants were not surprised that it was the single largest source of energy, some participants were surprised that it was as high as 50 percent. In general, men were less surprised than women at the extent to which Ontario depends on nuclear power.

***What is "used nuclear fuel"?***

In each group, participants were asked about "used nuclear fuel" and what exactly it was. It was apparent that most participants had only vague notions of what used nuclear fuel was and had rarely heard that terminology. Several people knew it more as "nuclear waste," and many had no idea what exactly used nuclear fuel or nuclear waste actually were. When probed further about what used nuclear fuel might look like, many participants were able to correctly identify the substance as a solid rod or as a bundle of rods, and a few participants were further able to describe those rods as being kept in large tanks of water during the cooling process. There were clearly some misconceptions about the characteristics of used nuclear fuel and, in each session,

some participants assumed it was a liquid. This may be because the word "fuel" is often assumed to mean a liquid that can flow or leak. A handful of participants mentioned that they pictured used nuclear fuel to be a glowing green stick, similar to what is typically portrayed in pop culture television shows, movies, etc.

Awareness of used nuclear fuel characteristics was slightly higher among participants in Oshawa. This would most likely be due to their proximity to Pickering and Clarington, which both house nuclear power plant facilities. Participants in Timmins, although more unaware of the extent to which Ontario uses nuclear fuel, were similarly knowledgeable about what nuclear fuel looks like and how it is stored.

In the Toronto, Oshawa and Timmins groups, women were typically less aware of what used nuclear fuel is and what it looks like, and were more likely to believe that used nuclear fuel is a liquid and held in barrels.

Everyone understood that used nuclear fuel was a very hazardous substance due to its radioactivity.

About half of participants in the focus groups accurately stated that it was stored on the premises of nuclear reactor facilities such as those in Pickering, Darlington and Bruce. However, an equal proportion thought that it was already being buried or being stored in abandoned mines, which led many to infer that it was already being transported.

***Learning about used nuclear fuel***

Participants were given a handout drawn from NWMO publications entitled "*What is used nuclear fuel?"* This document outlined what used nuclear fuel was and how it was currently being managed in Canada, and included an image of a nuclear fuel bundle. After reading the handout, participants understood what used nuclear fuel was and what it looked like, that used nuclear fuel was being stored on a temporary basis at nuclear power plant sites, the amount of used fuel is increasing, and that a long-term solution is needed.

There were mixed reactions to learning about the volume of used nuclear fuel bundles in Ontario. The handout made reference to the fact that all the used nuclear fuel bundles in Canada could fill six hockey rinks from the ice surface to the top of the boards. Most participants were surprised by the large volume of used nuclear fuel that had accumulated over the past 40 years (e.g., more than 2 million fuel bundles). The only exception to this view was that most of the men aged 18-30 in the Toronto group thought this was not such a significant amount to accumulate in 40 years, expecting that the stockpile would have been much larger.

They and many participants in all the sessions noted that, while six hockey rinks worth of used nuclear fuel was a large quantity, it was not so large as to be totally unmanageable. It is a large, but still tangible, quantity. In Timmins, it was noted that this was nothing compared to the piles of tailings from some local mines.

Most participants recognized that there was little alternative to using nuclear fuel because it is such a large supplier of Ontario's energy, agreeing that something must be done to manage the used nuclear fuel on a more permanent basis, as it is currently being temporarily stored at reactor sites. It was noted that even if Ontario stopped using nuclear power tomorrow, the used nuclear fuel that has already been created would still have to be permanently stored somewhere.

In all groups, no more than one participant had ever heard of the Nuclear Waste Management Organization or NWMO. The few who acknowledged recognition of the name were not aware of NWMO's mandate or purpose and just knew the acronym.

***Learning about Canada's Plan***

In each session, participants were shown a five-minute animated video outlining Canada's plan for used nuclear fuel in order to provide some background to participants. This film outlined how a nuclear reactor works, how raw uranium is processed into fuel bundles, and the Adaptive Phased Management plan including the construction of a permanent repository for used nuclear fuel. Participants felt that the video was informative, and provided a lot of detail about how nuclear power is created and the genesis of used nuclear fuel (which they were unaware of prior to the focus group).

Participants underlined that something has to be done with the current stockpiles of used nuclear fuel regardless of our future dependence on this as a source of energy. A few participants expressed concern that the very extensive safety steps that are going to be taken to contain and isolate the used nuclear fuel at the repository also signaled just how hazardous used nuclear fuel actually is. It was noted that the repository would be designed to last more than a 100,000 years and to withstand a future ice age! Many participants were also highly skeptical that any communities would voluntarily express a willingness to host the permanent repository, so they wondered if this would ever actually happen.

After seeing this video, most participants questioned the cost of this project, anticipating that it would be extremely high. There were questions about where the money for this project was coming from that led to concerns that they would see a sudden rise in their taxes or energy bills

to pay for this upcoming project. Participants were comforted with the information that the project is being funded out of the sale of electricity generated by nuclear plants.

Participants also had questions about whether the containers depicted in the video could last over the long time periods involved and about the extent to which the containers were earthquake resistant. Questions were also raised about whether in the future there might be a possibility of rendering the used nuclear fuel non-radioactive or at the very least reusable in which case there could be alternatives to burying the used fuel. However, most participants understood the necessity of transporting used nuclear fuel to a permanent repository, but there was a few who were still trying to imagine some alternative solution.

**B. Attitudes towards the transportation of used nuclear fuel**

***Unaided discussion about the transportation of used nuclear fuel***

Participants were asked to work together in pairs, and identify any questions or concerns they have about the future transportation of used nuclear fuel in Canada. The top issues that people raised concerned what mode of transportation NWMO would use to transport the used nuclear fuel to the permanent repository, and what effects it could potentially have on the surrounding area during the transportation by simply passing through communities and in the event that an accident were to occur. Examples of questions included:

- *How will the fuel be transported?*
- *What happens if there is a collision or accident? Would the fuel spill all over the highway/tracks?*
- *What if terrorists highjack a transport?*
- *Can the radioactivity leak as it is being transported?*
- *Would local communities be informed as the transports passed through?*
- *Would it create traffic congestion?*
- *Does the used fuel need to be moved or is there some other solution?*

Many participants raised questions and concerns about potential accidents that could be possible with each mode of transportation from terrorism to a similar derailment as at Lac-Mégantic. Participants were eager to know what the consequences would be if something were to happen to the used nuclear fuel during transportation. Participants wanted to be reassured that the containers transporting the fuel would be safe, and any risk to the public would be avoided as much as possible during the transportation.

- ***Transportation by truck***

There was a mixed response among participants about what mode of transportation would be optimal. Many participants expressed the view that truck would be the best way to transport used nuclear fuel. Many participants noted that we already encounter hazardous and dangerous materials on our highways each day that we are not aware of, so it would not be surprising to learn that used nuclear fuel was to be transported this way as well. Many participants also felt that truck would be both more economical and more direct, requiring less handling between the interim facility and permanent repository. Participants felt that increasing the amount of times a container was handled increased the risk for human error or damage to the containers. With trucking, people imagine the fuel rods being loaded onto the trucks at the current interim facilities and then unloaded at the final destination – the permanent fuel repository – with no need for any handling in between.

The greatest concern expressed about transportation by truck is the fear that there will be an increased likelihood that the hazardous material will come in contact with individuals either by being transported through communities, or from sitting on the highway in traffic. However, participants stated that this mode also allows for greater security because it can alternate routes often (as opposed to rail that typically takes the same route each time), and accommodates smaller loads that will reduce the impact on a community in the event that there is an accident. There were also concerns expressed that truck drivers are often not highly trained and could be less reliable than the people who would be operating a train.

In general, it was felt that truck transportation would likely be less expensive as it would not require a dedicated rail line and would also be more flexible since nuclear fuel could be shipped from a variety of interim locations to the final site for the permanent repository.

- ***Transportation by rail***

Many participants also advocated that rail would be the best option for the transportation of used nuclear fuel. The reasons listed included that rail would provide a more direct route while avoiding a great deal of interaction with the public on highways and would not encounter traffic like a truck would on the highway. People have an image of rail lines as being away from other transportation arteries and being more segregated. Some participants thought that rail would provide more security, while others preferred to believe that truck would be more guarded during the transportation. However, there was some dissatisfaction among participants who believed that the predictability of rail routes would increase the potential risk of terrorism on the cargo as it was being transported. This was because it would be one rail line that everyone

would know about that could be a target and also that since a train would carry a much larger volume of fuel – it would be a more tempting target for sabotage.

Some participants also suggested rail transportation as a way to ship much larger volumes all at once. This could potentially reduce the number of individual trips compared to truck transportation. However, there were also concerns that the greater amount being shipped at one time could present greater risk for communities in the event of an accident.

Many participants questioned the safety of rail, mentioning Lac-Mégantic as an example of a recent accident that could potentially arise while transporting used nuclear fuel. However, the parallel to Lac-Mégantic and participant concerns about a similar incident were largely addressed in the transportation video later in the focus groups.

- ***Transportation by ship***

The idea of transporting used nuclear fuel by ship was more controversial. There was a concern that any accident on water might contaminate the fresh water supply. Some were concerned that if a ship containing used nuclear fuel went down, it may be difficult to recover the containers from the bottom of the lake or sea.

Others felt that shipping over water could be an ideal way to reduce the contact of the used nuclear fuel with populated communities. However, people were unsure of the possibility of this mode of transportation due to the lack of waterways directly from the current storage sites to a potential permanent repository location. Participants also highlighted a similar concern with ship, as with train, in that they expressed concern over the amount of times the containers would be handled. Participants anticipated that the containers would have to get from the temporary sites to the shipping docks and then off to the permanent repository, which would require more handling of the containers.

- ***Modes of transportation summary***

In the focus groups overall, there was a mix of people who thought that either truck or train would be the best way to transport the used nuclear fuel to the permanent repository. There were slightly higher levels of agreement that truck would be the best mode of transportation; however, in each group there were definite pros and cons to each approach. It became apparent that there could be a case made for either train or truck, and that people would be comfortable with either mode or some combination thereof.

When discussing each mode of transportation, the biggest factor that participants wanted factored into the final decision was a reduction in the number of times it would be handled

from one mode to another during the process (i.e., use of ship followed by truck or rail to transport it directly to the facility), and as minimal contact with the general public as possible. Additionally, participants want transportation to allow for adequate access if an accident were to happen. Ultimately, participants wanted the transportation to be the most practical and to present the lowest amount of risk.

***Aided discussion of transportation***

Participants were shown a second video from NWMO specifically focusing on the safe transportation of used nuclear fuel. The vast majority of participants felt that their concerns about transportation were largely resolved after watching the video – particularly the way in which the video demonstrated the multitude of tests that these casks were put through.

Participants were asked to list one word that would capture how they felt after seeing the clip. The most common responses were "reassured," and feeling "safe" and "secure" about the transportation of the used nuclear waste containers.

In each group, participants expressed the view that this video addressed many possible scenarios and answered many of their questions about the potential for issues in transportation of used nuclear fuel. The detail that stood out most to participants was the extent of the testing on the containers – and they were especially impressed by the train collision and explosions, which caused only surface damage to the container.

Most participants appreciated the fact that these tests were done internationally to show that other countries validated the tests and that Canada would not be a "guinea pig." Most participants also mentioned that, because most of the dates on the tests were about 10-15 years old, they felt reassured with the potential that this was an ongoing process of innovation and that advances may have been made since. However, a few of the female participants in Toronto stated that the older dated tests worried them because it seemed that they may no longer be relevant. These participants thought that the video would be more reassuring if it included some more recent tests on newer casks. Participants expressed the view that the casks appear to be so indestructible that the biggest danger might actually be from colliding with a truck carrying one. Some participants still wondered to what extent any radiation could leak through the walls of the casks and contaminate people.

In six out of eight focus groups, participants were asked to read two additional handouts: one on the regulatory framework for the transportation of used nuclear fuel and another one on the international experience with the transportation of used nuclear fuel. This additional

information seemed to make participants more inclined to believe that the transportation of used nuclear fuel by the NWMO would be safe.

When asked to read the handout outlining information about the regulatory framework for the transportation of used nuclear fuel, most participants felt that it covered all the necessary levels of regulatory checks and balances. Some participants were skeptical of the roles played by each of the listed organizations and acronyms, and stated that they would be interested in finding out more about the regulations.

In each group, participants agreed that having information on the international experience with the transportation of nuclear fuel that is currently underway – and being executed successfully – was reassuring. Having the knowledge that it was successfully being executed in other countries with no incidents was positive among all participants. A handful of participants also pointed explicitly to the fact that both train and truck were being used to transport the used fuel without incident, which was very reassuring for them.

Some female participants were more skeptical that the process would work as planned and wanted more information about its implementation.

### C. Advice to NWMO moving forward

Participants were asked what the main challenge the NWMO would face moving forward with Canada's plan and what recommendations could be made to overcome these challenges. Many stated that the main problem would be overcoming the initial shock of such a project among people who know very little about it, as most of the general population currently does not. Many participants wanted more information and feel that education, similar to what was displayed in the each group, would be ideal – making as much information as accessible as possible.

The most important piece of information that participants recommended to make public was the video displaying the transportation containers and the extraordinary tests that they were put through to ensure the security of the nuclear waste. For nearly all participants, this video changed their opinions of the transportation of used nuclear fuel, and eased many of their concerns and questions. In addition, participants suggested that the fact that other countries were testing these containers, and currently using both train and truck to transport used nuclear fuel, should be highlighted. The acknowledgement that Canada would not be the pilot program for these containers or various modes of transportation was reassuring to participants.

Additionally, participants stated that having someone with credibility or without a vested interest in the process speaking on the issue would increase satisfaction with the plan. At the very least, people simply want access to someone who could answer their questions, and provide accurate and transparent information.

Overall, participants acknowledged the need for a permanent solution regarding the existing used nuclear fuel that was currently being stored in interim facilities. This fact, coupled with the videos and information participants were given, made many participants acknowledge that they did not know much about used nuclear fuel – but after learning more, they became more accepting of the necessity to transport the used nuclear fuel to a permanent repository location. The focus groups also suggested that a case could be made to support transportation by either truck or train.

# APPENDICES

**Environics Research Group**
**NWMO**
**Recruitment for Group Discussion**
**PN8030**

Respondent Name: _____

Home #: _____

Business #: _____

Group #: _____

Recruiter: _____

| **GROUP 1** | **GROUP 2** | **GROUP 3** | **GROUP 4** |
|---|---|---|---|
| Oshawa | Oshawa | Toronto | Toronto |
| Men | Women | Men | Women |
| 18-69 | 18-69 | 30-69 University Grad | 30-69 University Grad |
| Mixed education | Mixed education | 2+ health care profs | 2+ health care profs |
| Sat., November 22nd | Sat., November 22nd | Mon., November 24th | Mon., November 24th |
| 12:00 pm | 2:30 pm | 5:30 pm | 8:00 pm |

| **GROUP 5** | **GROUP 6** | **GROUP 7** | **GROUP 8** |
|---|---|---|---|
| Toronto | Toronto | Timmins | Timmins |
| Men | Women | Men | Women |
| 18-29 Post Sec. grad | 18-29 Post Sec. grad | 18-69 | 18-69 |
| Or attending Post-sec | Or attending Post-sec | 4+ Resource extract HH | 4+ Resource extract HH |
| Tues., November 25th | Tues., November 25th | Thurs., November 27th | Thurs., November 27th |
| 5:30 pm | 8:00 pm | 5:30 pm | 8:00 pm |

**Each group will have people with a mix of attitudes towards nuclear power. All will be "engaged" people who follow public policy issues and express opinions.**

**Groups 3 and 4 must have at least two participants who are health care professionals (i.e. doctor, nurse etc…) and Groups 7 and 8 in Timmins must each have at least four recruits who are in households where someone is blue collar (i.e. works in mining, forestry, transportation, manufacturing etc…)**

**Recruit 11 participants per group for a minimum 8 shows.**

---

Hello, I'm _____ from Research House. We are telephoning to invite people to be a paid participant in a two-hour long group discussion about some issues facing Canada. May we have your permission to ask you some further questions to see if you fit in our study?

1. INDICATE:

| | | |
|---|---|---|
| Female | 1 | **GROUPS: 2, 4, 6, and 8** |
| Male | 2 | **GROUPS: 1, 3, 5 and 7** |

2. Are you 18 years of age or older and a resident of [Oshawa/Toronto/Timmins] for at least the last year?

Yes
No **TERMINATE**

3. a. Are you or is any member of your household or your immediate family employed in any of the following: READ LIST

3 b. Have you <u>ever</u> been employed...?

| | **3a** | | **3b (Ever)** | |
|---|---|---|---|---|
| | **No** | **Yes** | **No** | **Yes** |
| At an advertising agency | ( ) | ( ) | ( ) | ( ) |
| As a journalist or in the media | ( ) | ( ) | ( ) | ( ) |
| At a public relations agency | ( ) | ( ) | ( ) | ( ) |
| The Ontario government* | ( ) | ( ) | ( ) | ( ) |
| The federal government* | ( ) | ( ) | ( ) | ( ) |
| An environmental advocacy group | ( ) | ( ) | ( ) | ( ) |
| The energy or electricity industry | ( ) | ( ) | ( ) | ( ) |

**IF YES TO ANY OF THE ABOVE – DISCONTINUE**

***EXCLUDE ANYONE WHO WORKS FOR A PROVINCIAL OR FEDERAL GOVERNMENT <u>DEPARTMENT OR MINISTRY</u> BUT IT IS OK IF THEY WORK IN THE**

**BROADER PUBLIC SECTOR (I.E. TEACHERS, HEALTH CARE WORKERS, EMPLOYEES OF CROWN CORPORATIONS (OTHER THAN ENERGY UTILITIES) ETC…)**

4. In general, do you pay a great deal of attention, some attention or no attention at all to news about each of the following topics? READ AND ROTATE

   a. Public policy issues and current events

      A great deal of attention - **CONTINUE**
      Some attention - **CONTINUE**
      Very little attention - **TERMINATE**
      No attention at all - **TERMINATE**
      DK/NA - **TERMINATE**

   b. Sports
   c. Entertainment and celebrity gossip

5. About how often do you watch TV news, listen to radio news, read news on the Internet, or read the front section of the newspaper? Would it be… [READ LIST]

| | | |
|---|---|---|
| Just about every day | 1 | **CONTINUE** |
| Less than every day, but more than twice a week | 2 | **CONTINUE** |
| 2 or 3 times a week | 3 | **THANK AND TERMINATE** |
| Once a week | 4 | **THANK AND TERMINATE** |
| Never | 5 | **THANK AND TERMINATE** |
| Don't Know | 6 | **THANK AND TERMINATE** |

6. And, can you name some of the issues you have recently heard or read about in the news? **PROMPT IF NEEDED**: I'm looking for any two issues that have been in the news lately.

   [Able to name two different issues] **CONTINUE**
   [Unable to name two different issues] **THANK AND TERMINATE**

7. In the past two years have you expressed your opinion or engaged on any issues (e.g. global issues, national issues, provincial, local or community issues) in each of the following ways? Have you…**READ AND CIRCLE ALL THAT APPLY**

| | |
|---|---|
| Written a Letter to the Editor of a publication | 1 |
| Used the Internet to research an issue | 2 |

| | |
|---|---|
| Called or written to an elected representative/political candidate | 3 |
| Attended a public meeting or "town hall" | 4 |
| Signed a petition | 5 |
| Displayed a lawn sign or sticker or bumper sticker supporting or opposing an issue | 6 |
| Supported or expressed an opinion on an issue or cause on Facebook or other social media (e.g. twitter) | 7 |

**ALL MUST HAVE DONE AT LEAST TWO OF THESE THINGS.**

8. We have been asked to speak to participants from all different ages. So that we may do this accurately, may I have your exact age please? _____. WRITE IN

| | | |
|---|---|---|
| Under 18 | 1 | **TERMINATE** |
| 18-24 years of age** | 2 | |
| 25-29 years of age** | 3 | |
| 30-39 years of age* | 4 | |
| 40-49 years of age* | 5 | |
| 50-59 years of age* | 6 | |
| 60-69 years of age* | 7 | |
| 70 or more | 8 | **TERMINATE** |

***ALL PARTICIPANTS IN GROUPS 3 AND 4 IN TORONTO MUST BE MIX OF 30-39, 40-49, 50-59 AND 60-69 YEARS OF AGE**
****ALL PARTICIPANTS IN GROUPS 5 AND 6 IN TORONTO MUST BE MIX OF THOSE 18-24 OR 25-29 YEARS OF AGE**
**PARTICIPANTS IN GROUPS 1 AND 2 (OSHAWA) AND GROUPS 7 AND 8 (TIMMINS) ARE TO BE A MIX OF ALL AGES 18-69**

**ASK ALL 18 TO 29 YEARS OLDS IN TORONTO FOR GROUPS 5 AND 6:**

9. Are you currently a full-time student in a college or university?

| | | |
|---|---|---|
| Yes (SPECIFY WHERE_____) | 1 | **SKIP TO Q. 11** |
| No | 2 | **CONTINUE** |

**ASK ALL**

10. Could you please tell me what is the highest level of education that you completed?

| | |
|---|---|
| Some high school or less | 1 |
| Completed high school | 2 |
| Some community college/trade school/student | 3** |

| | |
|---|---|
| Completed community college/trade school | 4** |
| Some undergraduate university/student | 5** |
| Completed undergraduate university | 6* |
| Post-graduate/professional school | 7* |
| (MBA, Master's Degree, PhD, medical school or law school) | |

**PARTICIPANTS IN GROUPS 1 AND 2 (OSHAWA) AND GROUPS 7 AND 8 (TIMMINS) ARE TO BE A MIX OF LEVELS OF EDUCATION – AT LEAST 4 OUT OF 11 SHOULD HAVE SOME POST-SECONDARY EDUCATION**

***ALL PARTICIPANTS IN GROUPS 5 AND 6 IN TORONTO MUST HAVE AT LEAST SOME POST-SECONDARY EDUCATION IF NOT STILL A STUDENT IN Q. 7**
****ALL PARTICIPANTS IN GROUPS 3 AND 4 IN TORONTO MUST HAVE A UNIVERSITY DEGREE**

11. Are you working (CHECK QUOTAS)?

| | | |
|---|---|---|
| Full Time (35 hrs. +) | ( )\| | 5 minimum |
| Part Time (under 35 hrs.) | ( ) | |
| Homemaker | ( ) | 3 maximum |
| Student | ( ) | |
| Retired | ( ) | 2 maximum |
| Unemployed | ( )\| | 1 maximum |

12. What is your current occupation?

_____

Type of Job Type of Company

**IF MARRIED ASK: WHAT IS YOUR SPOUSE'S OCCUPATION?**

_____

Type of Job Type of Company

**IF ANY CONNECTION TO STANDARD OR PROJECT RELATED OCCUPATION IN Q. 3a/b – TERMINATE…SOMEONE IN HOUSEHOLD MUST BE EMPLOYED**

**NB: GROUPS 5 AND 6 IN TORONTO MUST INCLUDE AT LEAST TWO HEALTH CARE PROFESSIONALS – THIS CAN INCLUDE DOCTORS, NURSES, DENTISTS, PSHYSIOTHERAPISTS, CHIROPRACTORS ETC…**

13. On a scale of 1 to 7, how would you describe your opinion or attitude towards each of the following? A rating of 1 would mean you were totally opposed to it, a rating of 7 would mean you were totally supportive of it and a rating of 4 would mean that you were neutral. Feel free to say if you have no opinion on the issue. READ

A universal affordable, not-for-profit child care program

| **Totally Opposed** | | | **Neutral** | | | **Totally Support** | |
|---|---|---|---|---|---|---|---|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | No opinion |

A tax on fossil fuels to help reduce global warming

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | No opinion |

The use of nuclear power as a major source of energy in Ontario

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | No opinion |

**IN EACH GROUP GET A MIX OF ATTITUDES TOWARDS NUCLEAR…TERMINATE ANYONE WITH NO OPINION…WE DON'T ACTUALLY CARE ABOUT HOW PEOPLE RESPOND TO Q. 13 A AND B – ONLY C**

14. Which of the following categories best corresponds to the total annual income, before taxes, of all members of your household, for 2013? READ

01 - Under $30,000
02 - $30,000 to $50,000
03 - $50,000 to $70,000
04 - $70,000 to $100,000 **GET MIX OF INCOMES**
05 - $100,000 to $125,000
06 – Over $125,000
99 - REFUSE/DK/NA **TERMINATE**

15. Participants in group discussions are asked to voice their opinions and thoughts, how comfortable are you in voicing your opinions in front of others? Are you...(read list)

Very comfortable.....1- **MIN 7 PER GROUP**
Fairly comfortable...2

Not very comfortable.3|- **TERMINATE**
Very uncomfortable...4|- **TERMINATE**

16. Have you ever attended a focus group or a one-to-one discussion for which you have received a sum of money, here or elsewhere?

| | |
|---|---|
| Yes | 1 |
| No | 2 ---> **(SKIP TO Q.20)** |

**IF YES ASK:**

17. When did you last attend one of these discussions?

_____

**(TERMINATE IF IN THE PAST 6 MONTHS)**

18. What was the subject matter?

_____

**(TERMINATE IF IT RELATED TO NATURAL RESOURCES OR TRANSPORATION OR ANYTHING NUCLEAR)**

19. How many focus groups or one-to-one discussions have you attended in the past 5 years?

_____
(SPECIFY)

**IF MORE THAN 5, TERMINATE.**

**ASK ALL**

20. Sometimes participants are also asked to write out their answers on a questionnaire. Is there any reason why you could not participate? If you need glasses to read, please remember to bring them. (Add hearing impairment.)

Yes.....1 - **TERMINATE**
No.....2

NOTE: TERMINATE IF RESPONDENT OFFERS ANY REASON SUCH AS SIGHT OR HEARING PROBLEM, A WRITTEN OR VERBAL LANGUAGE PROBLEM, A CONCERN WITH NOT BEING ABLE TO COMMUNICATE EFFECTIVELY.

**All participants in this study are asked to bring to the group PICTURE IDENTIFICATION. If you do not bring your personal identification then you will not be able to participate in the session and you will not receive the incentive fee.**

**Are you going to bring along your ID?**

**Yes……1**
**No……..2 - TERMINATE**

The session is two hours in length, but we are asking that all participants arrive 15 minutes prior to the start time of the session. Are you able to be at the research facility 15 minutes prior to the session time?

Yes.....1-**CONTINUE**
No.....2-**TERMINATE**

I would like to invite you to a group discussion on:

The focus group will last at most two hours in total and you will receive **$100** to thank you for your participation.

**Locations:**

**Saturday, November 22nd (12:00-2:00pm and 2:30-4:30pm)**
Oshawa
Quality Hotel & Conference Centre
1011 Bloor Street East
Tel: 905.576.5101

**Monday, November 24th and Tuesday, November 25th (5:30-7:30pm and 8:00-10:00pm)**
Toronto
Research House
1867 Yonge Street, 2nd Floor
Tel: 416.488.2328

**Thursday, November 27th (5:30-7:30pm and 8:00-10:00pm)**
Timmins
Days Inn & Conference Centre
14 Mountjoy Street South
Tel: 705.267.6211

**INTERVIEWERS**: Tell respondent that it is a small group and anyone who does not show or cancels at the last minute will compromise the project. Make sure they know we feel their opinions are valuable and we are serious about finding out what they have to offer.

**NOTE:** PLEASE TELL ALL RESPONDENTS THAT THEY WILL RECEIVE A CONFIRMATION CALL THE DAY PRIOR TO THE SESSION. IF FOR SOME REASON THEY HAVE NOT HEARD FROM US THEY SHOULD CONTACT US AT _____. IF THEIR NAME IS NOT ON THE ATTENDANCE FORM THEY WILL NOT BE ADMITTED TO THE GROUP.

**Environics Research Group**
**Focus Groups on Transportation**
**Discussion Guide**
**PN8030**
**NWMO**

## 1.0 Introduction to Procedures (10 minutes)

Welcome to the group. We want to hear your opinions. Not what you think other people think – but what you think!

Feel free to agree or disagree. Even if you are just one person that takes a certain point of view, you could represent thousands of other residents in Ontario who feel the same way as you do. Please be assured that your comments and opinions tonight are totally anonymous and nothing you say will be associated with your name.

You don't have to direct all your comments to me; you can exchange ideas and arguments with each other too.

You are being taped and observed to help me write my report.

I may take some notes during the group to remind myself of things also.

The host/hostess will pay you your incentives at the end of the session.

Please turn off any cell phones, pagers.

Let's go around the table so that each of you can tell us your name and a little bit about yourself, what sort of work you do if you work outside the home and who lives with you in your home.

## 2.0 Nuclear Power/Used Fuel – Warm-up Discussion (20 minutes)

We are going to be discussing some issues around power and transportation in Ontario and across Canada. Just to get things started I would like you to each jot down on paper what sources of power you think of when you think of where <u>most</u> of our electricity comes from in Ontario.

What did people write?

**PROBE IF NOT MENTIONED**: Hydro? Coal? Wind? Nuclear power?

I want to discuss nuclear power in a bit more detail. To what extent do we depend on it as a source of electricity in Ontario?

**IF NOT MENTIONED**: Ontario gets well over half of it's electricity from nuclear power. How many of you were aware of that?

Has anyone ever heard the term "used nuclear fuel"? **IF YES**: What is it?

When people talk about "used nuclear fuel" what do you each imagine? What does it look like? What is it? **PROBE**: Is it solid or liquid? Is it hazardous? In what way?

Does anyone know what do we do with the used nuclear fuel now? Where do you think it is stored?

**IF NOT KNOWN**: In fact, right now the used fuel is stored onsite at interim locations at the nuclear power plants.

Here is a handout that will tell you all more about what used nuclear fuel is and what we do with it now.

***What is used nuclear fuel?***

*Used nuclear fuel is a by-product of electricity generation by nuclear power plants. Canadian nuclear power plants are fuelled by uranium pellets that are sealed inside zirconium tubes and arranged into fuel bundles. Once a fuel bundle has been used to generate electricity, it is highly radioactive and must be carefully managed for a very long period of time, essentially indefinitely.*

***How much used nuclear fuel exists in Canada, and how is it being managed now?***

*Canada has been generating electricity from nuclear power for more than 40 years. In that time, we have produced just over two million used fuel bundles. Each bundle is about the size and shape of a fireplace log, weighing approximately 24 kilograms. If the entire current inventory could be stacked like cordwood, they could fit into a space the size of six hockey rinks from the ice surface to the top of the boards. Used nuclear fuel is safely stored on an interim basis in licensed facilities located at reactor sites where it is produced. After a fuel bundle is removed from a reactor, it is first placed in a water-filled pool for seven to 10 years where its heat and radioactivity decrease. Afterwards, used fuel bundles are typically placed in dry storage containers, silos or vaults. About 85,000 used nuclear fuel bundles are produced in Canada each year.*

After reading this – what stands out the most for you? Did you learn anything you did not know before?

## 3.0 Canada's Plan (15 minutes)

Has anyone ever heard of the Nuclear Waste Management Organization or NWMO?

**READ***: The Nuclear Waste Management Organization (NWMO) was created by Canada's nuclear electricity producers to provide recommendations on the long-term management of used nuclear fuel and to implement the approach selected by the Government of Canada. Ontario Power Generation Inc., NB Power Nuclear and Hydro-Québec are the founding Members, and along with Atomic Energy of Canada Limited and they fund the NWMO's operations.*

There is a plan selected by the Government of Canada for the long-term management of our country's used nuclear fuel. The NWMO is now responsible for implementing it.

Here is a five minute video that will explain a lot about the plan and what we are here to talk about today.

SHOW ANIMATED 5 MINUTE VIDEO

After seeing this video, what is your reaction to Canada's plan?

What stood out for you in what you saw?

## 4.0 Transportation of Used Nuclear Fuel (25 minutes)

So just to re-cap, the NWMO is responsible for selecting a site and constructing a deep geological repository for all of Canada's used nuclear fuel. The repository will be safe and secure, and it will be located in an informed and willing host community. Transportation of the used nuclear fuel from the interim storage facilities to the permanent repository could begin as early as 2035.

One thing I want to emphasize to you is that we are having this discussion to talk about this issue as it pertains to Ontario and Canada as a whole. We are doing these focus groups in a variety of communities across the province and we chose these locations just to see what people have to say in a representative mix of communities. We are NOT conducting a focus group here because this community is likely to be near a transportation route.

Also, I should stress that the used fuel that already exists will have to be transported to the permanent repository no matter what. Even if we phased out nuclear power in Canada we would still have to deal with moving the millions of fuel bundles that already exist.

I would like you to work together in pairs and take a few minutes to talk with your partner and make a short list of what your first reaction is to the this whole topic of the transportation of used nuclear fuel. What are your concerns (if any) and what would you most want to know about it?

EACH PAIR TO REPORT BACK ON WHAT THEY DISCUSSED

**PROBE**: What would be your biggest concerns once fuel starts being transported?

**PROBE:** What do you most need/want to know?

Thinking about transporting used nuclear fuel to its future permanent repository – how do you think it could be done (i.e. by what method?)?

**PROBE**: By truck? By rail? By ship over water?

What are the pros and cons of transporting it by train?

What about the pros and con by truck?

What about by ship?

Hypothetically, what if you heard that once or twice a week a train or trucks with used nuclear fuel were going to pass by or through your community? What would be your reaction?

What would most concern you?

What would most reassure you?

## 5.0 Reaction to transportation video (15 minutes)

Here is a three minute video on the transportation of used nuclear fuel. After you watch the whole thing, I would like you to jot down what one thing stood out for you – it could be an image you saw or it could be a fact that was mentioned. I'd also like you to write down a word that describes how you felt after seeing this (e.g. reassured, worried, cynical, happy etc…)

SHOW TRANSPORTATION VIDEO

What are the words that come to mind after seeing this? How did it make you feel? What stood out the most in this video for each of you?

Here is some more information on the regulatory framework for the transportation of used nuclear fuel. HAND OUT

What is your reaction to this?

Here is some more information on the international experience with the transportation of used nuclear fuel. HAND OUT

What is your reaction to this?

**Advice to NWMO (15 minutes)**

The reason we are doing this research is to help the NWMO work with Canadians to develop a program for the safe and secure transportation of used nuclear fuel. We need to help figure out what questions and concerns will need to be addressed. What is your advice to NWMO?

What do you think will be the main challenge the NWMO will come across, when it starts working with communities that will be along the transportation route?
How should NWMO select the exact route to use for the transportation of the used fuel? What principle should that decision be based on? **PROBE**: Whatever is the most direct route? Other considerations?

How can NWMO involve people? What does this mean? HAND OUT

***TRANSPORTATION PLANS WILL BE DESIGNED TO REFLECT THE INTERESTS OF CITIZENS***

*As part of the site selection process for the used nuclear fuel repository, the NWMO will identify preferred transportation modes and potential routes associated with each interested community under consideration.*

*Decisions regarding the appropriate transportation routes and modes will require engagement and input from all groups who are potentially affected by future transportation and have questions or concerns to be addressed in the process.*

What needs to be on the “check list” to make you feel reassured about the transportation of used nuclear fuel?

Now that we have discussed this topic for the last hour and half – what did each of you learn? What are your final thoughts?

**Thanks for your participation**

## HANDOUT 1:

### What is used nuclear fuel?

Used nuclear fuel is a by-product of electricity generation by nuclear power plants. Canadian nuclear power plants are fuelled by uranium pellets that are sealed inside zirconium tubes and arranged into fuel bundles. Once a fuel bundle has been used to generate electricity, it is highly radioactive and must be carefully managed for a very long period of time, essentially indefinitely.

### How much used nuclear fuel exists in Canada, and how is it being managed now?

Canada has been generating electricity from nuclear power for more than 40 years. In that time, we have produced just over two million used fuel bundles. Each bundle is about the size and shape of a fireplace log, weighing approximately 24 kilograms. If the entire current inventory could be stacked like cordwood, they could fit into a space the size of six hockey rinks from the ice surface to the top of the boards.

Used nuclear fuel is safely stored on an interim basis in licensed facilities located at reactor sites where it is produced. After a fuel bundle is removed from a reactor, it is first placed in a water-filled pool for seven to 10 years where its heat and radioactivity decrease. Afterwards, used fuel bundles are typically placed in dry storage containers, silos or vaults. About 85,000 used nuclear fuel bundles are produced in Canada each year.

## HANDOUT 2:

### VIDEO CLIP REACTION

**What word best captures how you felt after seeing this clip?**

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**What one detail stood out the most for you? Was there an image or fact that sticks in your mind?**

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**HANDOUT 3:**

## REGULATION/OVERSIGHT OF TRANSPORTATION OF USED NUCLEAR FUEL

In Canada, the safe, secure movement of radioactive materials is jointly regulated by the Canadian Nuclear Safety Commission (CNSC) and Transport Canada. Stringent regulatory requirements must be met before used nuclear fuel is transported.

Used nuclear fuel shipments will meet the International Atomic Energy Association's (IAEA's) safeguard requirements to ensure they are secure. Transportation operations will meet federal, provincial and local safety legal requirements, and will be inspected for compliance. The NWMO will need to demonstrate to regulatory authorities the safety and security of a transportation system before the shipments of used fuel can begin.

The CNSC regulates the transport of nuclear materials through the *Packaging and Transport of Nuclear Substances Regulations* (*PTNSR*). This includes a series of safety-based regulatory requirements covering the entire journey of a shipment, from the time it is initially packaged to arrival at its destination.

**HANDOUT 4:**

## INTERNATIONAL TRACK RECORD IN TRANSPORTING USED NUCLEAR FUEL SAFELY

Transportation of radioactive material is a well-established practice. Over 45 years, worldwide there have been 20,000 shipments of used nuclear fuel, using road, rail and water transport. Internationally and in Canada, there have been no serious injuries, overexposure, fatality or environmental consequences attributable to the radioactive nature of the used nuclear fuel being transported.

Canada transports about one million packages of radioactive materials each year. Since the 1970s, Canada has transported approximately five used fuel shipments annually from nuclear generating stations to AECL's Chalk River Laboratories for research and post-irradiation examination. Governments, regulators and commercial organizations in Canada and around the world have extensive experience in the safe, secure transportation of radioactive materials.

The IAEA, government agencies, and independent experts in many countries, most notably the United States, United Kingdom, Europe and Japan, have regularly examined and researched safety issues concerning radioactive substance transport. In the United States, nearly 3,000 shipments of commercial used fuel have been moved over 2.5 million kilometres in the last 40 years, primarily over roads, and some by rail. The United Kingdom and France transport a combined average of 550 shipments of high-level radioactive waste every year, primarily by rail.