PMD 14-P1.43

File / dossier : 8.01.07
Date: 2014-07-21
Edocs: 4476097

Written Submission from

Stop The Great Lakes Nuclear Dump

In the Matter of

Ontario Power Generation Inc.

OPG's Deep Geological Repository (DGR) Project for Low and Intermediate Level Radioactive Waste

Joint Review Panel

September 2014

Mémoire de

Stop The Great Lakes Nuclear Dump

In the Matter of

Ontario Power Generation Inc.

Installation de stockage de déchets radioactifs à faible et moyenne activité dans des couches géologiques profondes

Commission d'examen conjoint

septembre 2014

Canada

Stop The Great Lakes Nuclear Dump Inc. Submission

To:

Members of the Joint Review Panel

Concerning:

Ontario Power Generation's Proposed Deep Geological Repository
for Low and Intermediate Level Nuclear Waste
on the Shores of Lake Huron
in the Municipality of Kincardine

CEAA Registry Reference No. 06-5-17520

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July 21, 2014

Table of Contents

1. INTRODUCTION

Stop The Great Lakes Nuclear Dump Inc. (STGLND) is a not for profit corporation whose purpose is supported by large and increasing numbers of Canadians and Americans. Ontario Power Generation's proposal to build a Deep Geological Repository ("DGR") to bury radioactive nuclear waste on the shores of the Lake Huron is a very big issue causing very serious concern to very many people. The Great Lakes provide safe clean drinking water for 40 million people in two countries, as well as providing recreation, fishing, supporting agriculture, plant and aquatic life.

We believe that radioactive nuclear waste should not be buried in a DGR anywhere in the Great Lakes Basin. We believe that the protection of our Great Lakes from buried radioactive nuclear waste is responsible stewardship, and is of national and international importance.

DGR is a national and international matter requiring extensive public consultation

We continue to believe that an issue of this magnitude demands the involvement of all Canadians and Americans. Our two countries are jointly responsible for the stewardship and protection of the Great Lakes under various statutes, including the Great Lakes Water Quality Agreement. Decisions made today will impact the 40 million people in two countries and all future generations to follow who rely on the Great Lakes for their drinking water. The unanimous passage of a bill and resolutions by the Michigan Senate is clear evidence that this is an issue of national and international importance.

STGLND supporters are a voice of opposition that cannot be ignored

When we originally appeared before the Joint Review Panel in 2013 we did so with the strength of 34,000 citizens (who had signed the Stop The Great Lakes Nuclear Dump Petition) and 6 million people (in communities that had passed resolutions opposing OPG's plan) standing behind us. Today, we appear before you with the strength of 64,000+ petitioners standing behind us and with over 10.5 million citizens represented by local governments in communities in Ontario and in all 8 Great Lakes States that have passed resolutions opposing OPG's plan. These growing voices of opposition share a common concern that the Great Lakes must be protected from potential contamination from leaking nuclear waste from an underground DGR.

WIPP is a wakeup call

STGLND's 64,000+ petitioners, Michigan legislators, local governments in Ontario and every Great Lakes State, environmental organizations and members of the public are voicing serious concerns about this proposal. The Waste Isolation Pilot Plant (WIPP) in Carslbad New Mexico, the only deep geologic repository operating in the world today, has now leaked radiation below the ground and into the biosphere and contaminated 22 workers after a mere 15 years of operation. The fact

that WIPP featured prominently in OPG's safety case as an example of a DGR with a successful track record coupled with the fact that WIPP was never supposed to leak, has created a heightened sense of awareness of what is at stake – the fresh water of the Great Lakes, drinking water for 40 million people - and the folly of relying assurances that can never be proven except through the passage of hundreds of thousands of years of geologic time.

OPG site selection is fatally deficient and non-compliant

STGLND and others continue to express serious concern that OPG failed to consider any other sites for the location of the low and intermediate DGR. OPG's failure to present evidence in its original Environmental Impact Statement submission coupled with its failure to adequately respond to subsequent information requests from the JRP during the 2013 hearings is clear evidence that OPG's safety case is fatally deficient. OPG was required to consider alternative locations off the Bruce site as part of its evaluation of Alternative Means of Carrying out the Project, and OPG failed to do so. OPG failed to consider any other locations for the DGR and we are troubled by the fact that the JRP appears to be giving OPG a second chance to address this and other deficiencies in its case in the re-opened hearings.

Site selection deficiencies are fatal and not remedied by consideration of hypothetical granite DGR site in Canadian Shield

As a result of glaring and continuing deficiencies in OPG's assessment of Alternative Means of Carrying out the Project, the JRP issued information request EIS 12-513 requesting that OPG provide renewed and updated analysis of the relative risks of siting alternatives under alternative means requirements of the EIS guidelines.

We note with interest that as part of EIS 12-513, OPG has been asked to analyze a conceptual DGR in granitic bedrock of the Precambrian Canadian Shield. We note that the Precambrian Canadian Shield covers a vast area that includes a deep, common, joined bedrock region in Eastern and central Canada and stretches North from the Great Lakes to the Arctic Ocean, covering over half of Canada; it also extends South into the Northern reaches of the United States.[1] We note that the Independent Expert Group (hired by OPG to analyze the conceptual Granite DGR) requested clarification from the JRP as to the Granite DGR location and were directed to assume it would be located near a large body of water (like a Great Lake). Even though the JRP *might* have directed the Independent Expert Group (IEG) to assume the Granite DGR would be located in the Canadian Shield but far from a Great Lake (e.g. outside of the Great Lakes Basin), for reasons unknown, this did not happen. We assert that the assumed location of the conceptual Granite DGR location being proximal to a Great Lake, is sub-optimal from a risk perspective and therefore inappropriate for purposes of the comparative risk analysis.

[1] https://en.wikipedia.org/wiki/Canadian_Shield

Community Non-Acceptance is very significant and growing

We want to bring to the attention of the JRP that the STGLND petition, signed by 64,000+ citizens, together with the vast majority of resolutions that have been passed by local governments in Ontario and in all 8 Great Lakes States, oppose the construction of the proposed Kincardine DGR or any DGR in the Great Lakes Basin. The concern and opposition being expressed by our petitioners and by local governments that have passed resolutions compels us to outline our concerns with information presented in OPG's response to EIS 12-513.

Contrary to claims being made by OPG of the public's support for OPG's plan that most people change their minds once they learn about all the research that has gone into the DGR, we find that in actual fact the exact opposite is occurring. When people learn of OPG's plans, they are horrified and vehemently opposed to OPG's plan as evidenced by the growing number of citizens signing the STGLND petition, the growing number of resolutions being passed by local governments in Canada and the United States, and by actions taken by Michigan legislators aimed at stopping OPG's project. While OPG would have the JRP believe that the public supports OPG's plan, it is overwhelmingly clear and should be clear to the JRP that this is not the case. What we are witnessing is a compelling rejection by the public of OPG's unproven hypothesis that this DGR will not result in the contamination of the Great Lakes, a hypothesis that cannot be proven except through the passage of a 100,000 years. OPG's ill-conceived plan defies common sense.

It is against this backdrop that our comments and concerns are respectfully provided below:

2. RELATIVE RISK ANALYSIS OF ALTERNATIVE MEANS OF CARRYING OUT THE PROJECT

2.1 Background to Information Request EIS-12-513

OPG's selection of the proposed DGR site should be a major source of concern for the JRP.

During the course of public hearings that took place in 2013, it became obvious that there was no process undertaken by OPG to consider, look at or determine the appropriateness of any other location for the low and intermediate level nuclear waste DGR in Canada.

The JRP asked OPG, on several occasions to provide a detailed description of the alternative means analysis. In EIS-02-40 the JRP requested that OPG *"Provide further information on the location, salient features, evaluation criteria used, and a summary presentation of the comparison and selection process for alternative locations considered for the DGR."*

The JRP specifically pointed out to OPG in EIS-02-40 that "*The EIS Guidelines directs the proponent to consider the siting of the DGR in a location outside the existing site as an alternative mean. A brief reference is made to this matter in Table 3.4.2-1 and in Section 3.2.5 - "...the possibility of pursuing a Greenfield site at a location other than Kincardine was considered." No supporting information is provided as to what off-site locations were considered and to what extent. "*[2]

Yet as at the close of public hearings on October 30, 2013, and to this day, it is very clear that the OPG's Environmental Impact Statement submission together with information provided in response to JRP Information Request EIS-02-40, fails to satisfy the requirements of section 7.3 of EIS Guidelines requirements dealing with Alternative Means of Carrying out the Project.

The context information provided in IR EIS-12-513 confirms that the JRP recognized OPG's analysis of Alternative Means of Carrying out the Project as being deficient.

The context language indicates: *"The analysis of alternative sites in Section 3.4.2 of the EIS was limited to locations within the Bruce Nuclear Site and a very generic "off the Bruce nuclear site" location."* The context language goes on to say that the reliability and defensibility of OPG's comparison of the Bruce site versus the generic site cannot be assessed with confidence based on information provided in OPG responses.

The reliability and defensibility of OPG's comparison of the Bruce site versus some form of hypothetical site cannot be assessed with confidence based on information provided in OPG responses. The JRP was looking for a detailed description of the alternative means analysis, and it has not received it from OPG.

[2] Ibid

This deficiency in OPG's Environmental Impact Statement submissions and response to Information Requests as at the close of public hearings on October 30, 2013, among other things, prompted the JRP to issue a number of substantive information requests, including IR EIS-12-513.

The JRP and the public should not be fooled into thinking that OPG's response to IR EIS-12-513 will allow it to claim compliance with the EIS guideline requirements concerning evaluation of alternative means. What remains obvious is that OPG did not and cannot present an analysis of an actual alternate site off the Bruce site during the course of these hearings because by their own admission they have decided not to identify an actual alternate site, nor have they conducted any alternate site characterization work. It is impossible to conduct a site characterization assessment for a site that doesn't exist. All that OPG has done is provide some best guesses about a hypothetical site.

Despite the fact that EIS 12-513 effectively provides OPG with an opportunity to attempt to address deficiencies in its Environmental Assessment application, OPG's response to this information request can never remedy OPG's failure to consider other sites. A review of a conceptual site with no site characterization work to support it is totally inadequate and non-compliant with the requirements set forth in the EIS guidelines.

OPG did not comply with a critical requirement and no information provided in response to IR EIS 12-513 will change that fact.

2.2 Analysis of OPG Response to Information Request EIS-12-513

Although EIS 12-513 requests that OPG provide a renewed and updated analysis of the relative risks of four siting alternatives, our submission herein focuses on OPG's relative risk analysis of the two DGR options, namely the proposed DGR located on the Bruce site (i.e. Option 3) and the conceptual DGR located in the granite of the Canadian Shield (i.e. Option 4)

Option 4 is described as follows:

"A conceptual DGR in granitic bedrock of the Precambrian Canadian Shield. Information required for the qualitative analysis of a conceptual DGR in granite bedrock should be based primarily upon the extensive data and analyses available with the environmental assessment performed by Atomic Energy of Canada Limited (AECL) for the Environmental Assessment Panel for Nuclear Fuel Waste Management and Disposal Concept (known as the Seaborne Panel).[3]

[3] http://www.ceaa.gc.ca/050/documents/p17520/96032E.pdf

a) Concerns regarding JRP terms of reference for analysis of Granite DGR option

There are a number of concerns about the JRP's terms of reference for the analysis of a granite site.

- IR EIS-12-513 indicates *"Analysis of risks to socio-economic factors (such as physical, social and financial assets) is not required because the conceptual DGR in granite is not located in a specific geographic location"* [4]

- STDLND questions the appropriateness and validity of the JRP direction set forth above that the analysis of risks to socio-economic factors "is not required". If the goal is to perform a rigorous, robust and comprehensive comparison of a Granite DGR site versus a Bruce DGR site, of necessity, a rigorous, robust and comprehensive analysis of the risks to socio-economic factors for both sites is, among other things, exactly what is required.

- The JRP indicates that an analysis of risks to socio-economic factors is not required "*because the conceptual DGR in granite is not located in a specific geographic location."* It goes without saying that if an actual site for a DGR in granite were identified and proposed, then OPG *would have been able* to conduct an analysis of risks to socio-economic factors for such a site. We assert it is logical to conclude that if such an analysis could have been conducted, it should and would have been required. OPG's inability to perform an analysis of risks to socio-economic factors does not mean that it is "not required", but simply that it cannot be performed. It can't be performed because the allegedly comparative site is not a real site.

- The fact that OPG's evidence will not and cannot include an analysis of socio-economic factors for a granite site is evidence of a further fatal deficiency in OPG's Environmental Assessment application. OPG's analysis of a DGR in granite for a "conceptual" site must be characterized as a stop-gap analysis that seeks but fails to remedy this further deficiency in OPG Environmental Assessment application.

- The above noted deficiency is cause for the JRP to dismiss OPG's Environmental Assessment application as non-compliant and fatally deficient.

b) Concerns with IEG/OPG characterization of DGR options

i. The need for active management and robust societal structure following closure

- The IEG/OPG report assumes that once ultimate closure takes place, there are no longer requirements for active management or for assuming a continued existence of

[4] http://www.ceaa.gc.ca/050/documents/p17520/96032E.pdf

a robust societal structure for either DGR option. In effect, IEG conveniently assumes there will never be a problem with either DGR option and since there will never be a problem, monitoring is not required following closure. This is faulty and self-serving logic.

- Where's the backup plan? The disaster recovery plan? When we are dealing with the most dangerous substance on earth, does a "lets bury it and forget it" approach sound reasonable?

- The IEG's assumption represents a hypothesis that cannot be tested, validated or verified except through the passage of a 100,000 year timeframe.

- Very simply, out of sight and out of mind does not mean that the probability of problems arising is zero.

c) Concerns with IEG/OPG comparison of DGR Options

i. IEG's comparison of the DGR options is an "apples/oranges" comparison

- As noted in the IEG report *"it is possible to make some general comparisons between the hypothetical Granite DGR and the well-characterized Bruce DGR"*[5]

- What is very clear from this statement is the acknowledgment that the Bruce DGR site has undergone specific site characterization work. However no such site specific characterization work has been conducted for a granitic site in the Canadian Shield as no such site has been identified by the proponent.

- Here are the facts: no actual granitic site exists; no site specific characterization work has been undertaken by OPG for any actual or potential granitic site. The granitic site that has been discussed in the IEG's analysis of Option 4 is hypothetical and represents OPG's unproven hypothesis of what a granitic site *could* look like. It is a best guess. The tenuous nature of this best guess is reflected in the IEG's description of the conceptual granitic option. The IEG report indicates the granitic DGR option is "*based on the idea that a DGR for L&ILW **could possibly** [emphasis added] be constructed in an appropriate granite formation **somewhere** [emphasis added] in the Canadian Shield, although no actual site has been selected for this purpose*." [6]

- OPG is therefore forced to make statements about the Granite DGR site with lower quality information than gathered in the site characterization work of the Bruce. This is not to say that the site characterization work for the Bruce DGR site is

[5] Report of the Independent Expert Group (March 25, 2014) page 10

[6] Report of the Independent Expert Group (March 25, 2014) page 8

adequate, but rather to point out that there is no propoer detailed comprehensive information for the JRP to make its assessment since all there is before it are "general comparisons" with a hypothetical site, because no other alternate actual site exists and no site characterization work has been undertaken.

ii. The IEG report contains misleading statements about fracture potential and regional tectonics of the Bruce DGR site versus conceptual Granite DGR

- The IEG report notes that there was a certainty of the existence of natural fractures in the granite rock of the Canadian Shield versus the sedimentary rock underlying the Bruce site yet it is revealed in the CNSC's review of the IEG report[7] that "*although many igneous rock masses in the Canadian Shield are characterized by the presence of fractures, there are exceptions. The Lac du Bonnet batholiths in the Canadian Shield was characterized as a sparsely fractured granite during previous investigations into siting a deep geological repository conducted by AECL a couple of decades ago, with an absence of "significant groundwater flux" similar to what the IEG cites on page 11 for limestone at the Bruce DGR repository horizon."*

- The CNSC review further notes "Generalizing statements about rock types may give false information about their suitability requirements for deep geological repository projects."

- As regards regional tectonics in the Bruce DGR location, the CNSC review[8] concludes that statements in the IEG's report indicating there are "*geological reasons for this lack of fractures, such as the absence of any tectonic forces*" are misleading given that there are neotechtonic faults in the broader region.

- That OPG would allow the above misleading statements to be published in IEG's report is concerning to the public and should be concerning to the JRP as it raises issues of trust. As noted in a report[9] commissioned by the IEG, research on initiatives to manage nuclear waste has described a range of social and ethical concerns that have made the siting of nuclear waste facilities a very contentious and usually unsuccessful undertaking. One such concern identified in the report is that "*There is often "public unease about experts' claims of knowledge about long term safety, and a lack of trust in the nuclear industry and other risk management authorities*"[10] It is

[7] http://www.ceaa-acee.gc.ca/050/documents/p17520/99546E.pdf, page 35

[8] Ibid, page 36

[9] Risk Sciences International Report on Risk Perception of Nuclear Waste Disposal submitted by Anne Wiles to the Independent Expert Group, April 23, 2014 page 26

[10] Ibid , page 26

very clear to us that allowing misleading statements to be presented to the JRP does not build trust.

- Alternatively, if OPG did not know that the above statements were misleading, this too would be concerning to STGLND and the public as it raises issues of competence.

- Allowing misleading information to be presented to the panel (whether knowingly or otherwise) concerning the suitability of the Granite rock of the Canadian Shield as a location for a DGR, is a blow to the credibility of OPG's application and raises issues of trust and/or competence that cannot be ignored.

- It is noted that the above noted instance of unrealiable information being put forward by OPG is not an isolated incident. In this regard, we point to a whistleblower report prepared by retired OPG scientist Dr. Frank Greening that revealed that OPG had severely underestimated the radioactivity in the waste inventory sometime by factors as much as 100.[11] Additionally, in a more recent submission to the JRP, Dr. Greening's analysis reveals that information provided by OPG to the JRP describing a supposedly innocuous malevolent event scenario actually describes a very deadly incendiary bomb.[12]

iii. An appropriate comparison requires that the Bruce DGR site be compared with an "optimal" Granite DGR site

- The risk that a DGR leakage would result in radioactive contamination of the Great Lakes is an enormous risk that has been identified by many concerned citizens, governments and environmental organizations.

- We would assert that a key metric for judging the optimality of a granite site in the Canadian Shield is the extent to which it mitigates or reduces the risk of radioactive contamination of the Great Lakes in the event the DGR's geologic or engineered barriers fail to perform as expected.

- We note that if and when the suggested geologic and engineered barriers fail to perform as expected and if the granite DGR were to be located outside of the Great Lakes Basin, then the risk to the Great Lakes would be eliminated. In comparison, if the geologic and engineered barriers fail to perform as expected and the granite DGR is located within the Great Lakes Basin, such a location would expose the Great Lakes to the risk of radioactive contamination given that waters located in the Great Lakes Basin flow into the Great Lakes.

[11] http://www.ceaa.gc.ca/050/documents/p17520/98019E.pdf

[12] http://www.ceaa.gc.ca/050/documents/p17520/99512E.pdf

- Accordingly, we would assert that DGR locations outside of the Great Lakes Basin would exhibit more favourable risk mitigation metrics and are therefore far more appropriate for comparative environmental assessment with the proposed Bruce DGR site. Equally, sites located within the Great Lakes Basin would be sub-optimal from a risk perspective and therefore inappropriate for comparison versus the Bruce DGR site.

iv. Did the JRP effectively direct the IEG to compare the Bruce DGR site to a sub-optimal Granite DGR site in the Canadian Shield?

- A letter dated December 6, 2014 from the JRP to OPG indicates "*The Panel has one comment on the detailed scope of work for the OPG information request responses. Regarding EIS-12-513, the "DGR in granite" alternative should include analysis of distinctly different surface water receiving environments including a boreal wetland, a stream system with several stream orders, and a large lake system (analogous to a Great Lake).* [13]

- The IEG's report notes "*The IEG was also asked to consider the hypothetical granite site to be in many ways similar to the real Bruce site. For example, the directions indicated that the hypothetical Granite DGR would have similar geographical and hydrological disposition to the real Bruce DGR site as it is now understood, being defined as proximal to a (small) wetland area, a stream-and-small-lake region, and a Great Lake (i.e. sited near a large lake)."*[14]

- In our view, the language included in the JRP's direction concerning EIS 12-513 and the IEG interpretation thereof bears close scrutiny.

- The JRP's direction did not specifically ask the IEG to consider a hypothetical Granite DGR site that would have similar geographical and hydrological disposition to the real Bruce Site. This appears to be the IEG's interpretation of the directions included in the Dec 6 letter. The direction indicates "*the "DGR in granite" alternative should include* ***analysis of distinctly different surface water receiving environments, including*** *a boreal wetland, a stream system with several stream orders, and a large lake system (analogous to a Great Lake)."*

- It appears the IEG has taken liberties in interpreting the JRP's direction and has not followed or complied with it.

- In our view it is unclear whether each receiving environment referenced by the JRP was to be considered individually or collectively. We note that the IEG did not seek clarification from the JRP that the IEG was correctly interpreting the JRP's direction.

[13] http://www.ceaa.gc.ca/050/documents/p17520/96786E.pdf

[14] Report of the Independent Expert Group (March 25, 2014) page 10

- The direction from the JRP begs the question as to why, given the vastness of the Canadian Shield, the JRP did not direct OPG additionally consider a hypothetical Granite site located outside of the great Lakes Basin (i.e. not proximal to a Great Lake)?

- If it was intended by the JRP that the IEG evaluate a hypothetical granite site proximal to the Great lakes (i.e. within the Great Lakes Basin), this begs the question as to why JRP would direct the IEG to select a suboptimal hypothetical granite site versus other lower risk locations in the Canadian Shield outside of the Great Lakes Basin?

- Alternatively, it is possible that the IEG's interpretation of the JRP's direction that the Granite DGR should have "*similar [emphasis added] geographical and hydrological disposition to the real Bruce DGR site*" is incorrect given that the JRP language did not explicitly describe the hypothetical Granite DGR in this way. We note that "*analysis of distinctly different [emphasis added] surface water receiving environments including a boreal wetland, a stream system with several stream orders, and a large lake system (analogous to a Great Lake)"* makes no mention that the location of the hypothetical Granite DGR should be proximal to a Great Lake. Indeed, we note that the absence of the word "proximal" in the language of the JRP direction.

- Finally, we note that the IEG sought no further clarification from the JRP regarding the interpretation of the JRP's direction contained in the December 6th letter.

v. The data used by OPG in its assessment of the DGR Granite site does not comply with the direction from the JRP

- OPG was directed that the qualitative analysis of a conceptual DGR in granite bedrock should be based primarily upon the extensive data and analyses available within the environmental assessment performed by Atomic Energy of Canada Limited (AECL) for the Environmental Assessment Panel for Nuclear Fuel Waste Management and Disposal Concept (known as the Seaborn Panel).

- Despite the JRP direction, OPG chose to utilize an alternate set of data from the NWMO. OPG notes *"Where needed, site conditions described in the NWMO Fourth Case Study [4] will be used."*[15] OPG asserts that this hypothetical crystalline rock site is preferred over that presented to the Seaborn Panel in 1994 as this site has been extensively used by NWMO and OPG for the past 10 years as a framework for conducting geoscience and safety case studies.

- In OPG's description of alternative options it notes "*Within the Canadian Shield, three granite sites have had some characterization relevant to siting of a deep*

[15] http://www.ceaa.gc.ca/050/documents/p17520/96785E.pdf, page 3 of Detailed Scope of Work for OPG Responses to Information Requests in Package #12

geologic repository – Whiteshell/Pinawa, Atikokan and East Bull Lake. However, these were research areas and never intended as candidate sites for a repository….there is no characterized potential Canadian Shield granite site for an L&ILW DGR. The site information from the Whiteshell/Pinawa was used for illustrative purposes as part of the AECL Environmental Impact Statement for a used fuel repository (AECL 1994) presented to the Seaborn Panel."[16]

- On the one hand, OPG dismisses the suitability of data obtained from the Whiteshell/Pinawa research site because it was "*never intended to be a candidate site for a repository*", and then it proceeds to utilize data from a hypothetical site, which by definition is not a real site and can never be a candidate site for a repository.

- The significance of OPG choosing to use the alternate NWMO data set versus the extensive data and analyses used in the environmental assessment of a conceptual DGR in granite for the Seaborn Panel is not known. We note that OPG's has provided very little explanation as to why this alternate data set was chosen other than that it has been used by the NWMO and OPG for the past 10 years. This does not provide a reasoned justification for OPG's unilateral decision not to comply with the directions from by the JRP.

- Again, OPG has failed to comply with a JRP requirement.

vi. The IEG's transportation assumptions unfairly burdens the Granite DGR option with incremental risks that may be avoidable

- In OPG statements in Scope of Work in response to IR EIS-12-513 it indicates that all wastes are assumed to be first transported to the Western Waste Management Facility (WWMF) for processing and temporary storage as may be needed before transfer to the DGR.

- We question the validity of the assumption that **intermediate level nuclear waste (ILW)** presently located on the Pickering and Darlington sites as well as future ILW produced at these nuclear generating stations must first be transported to the WWMF prior to it being transported to a granite location in the Canadian Shield. We note that ILW, because of its radiological and physical properties, is not processed for volume reduction. This would seem to suggest that if an alternate location existed, ILW could be shipped directly from the Darlington and Pickering sites to this alternate location without first being shipped to the WWMF. Just because it has been done this way for the past 40 years, doesn't mean this is an appropriate assumption for the purposes of the relative risk analysis.

[16] http://www.ceaa.gc.ca/050/documents/p17520/99106E.pdf , page 92

- If ILW were shipped directly to the alternate location rather than first being shipped to WWMF and then on to the alternate location, the risks and costs associated with transportation to an alternate site would be lower than assumed in OPG's analysis.

- Finally, we note that there will be significant volumes of ILW buried in the DGR taking into account the contemplated expansion of the DGR to accommodate decommissioning waste.

- For this reason, we assert that OPG's assumption that the ILW will first be transported to the WWMF unfairly burdens locations off the Bruce site in OPG's comparative risk analysis.

d) Analysis of Community Acceptance Risks to OPG Safety Case for DGR Options

i. Background to IR EIS-12-513 Community Acceptance Risk Analysis

- The letter dated November 8, 2013 from the JRP to OPG requested that OPG provide a renewed and updated analysis of the relative risks of siting alternatives under alternative means requirements of the EIS guidelines. The above noted information request indicates that the relative risk analysis to OPG's safety case must include a review of community acceptance in the Local and Regional Study Area as well as outside of the Regional Study Area.[17]

- In a letter dated February 20, 2014 (which includes as an attachment a letter from OPG's IEG dated February 18, 2014) OPG advised the JRP that the IEG retained by OPG to conduct the relative risk assessment request in the above note information request identified a concern respecting their ability to perform the relative risk analysis of "community acceptance" of the four options identified in the information request. Further noted was that the IEG determined that insufficient information was available for them to properly perform a "distinguishing" risk assessment of community acceptance of the four options. As a result, OPG requested that the JRP provide clarification of what would be acceptable to respond to this aspect of the information request. [18]

- The JRP's March 6, 2014 letter[19] responds to OPG's February 20th letter indicating that *"The Panel has determined that the phrase "community acceptance" requires revision and further explanation."*

[17] http://www.ceaa.gc.ca/050/documents/p17520/96032E.pdf

[18] http://www.ceaa.gc.ca/050/documents/p17520/98441E.pdf

[19] http://www.ceaa.gc.ca/050/documents/p17520/98479E.pdf

- The March 6th letter then indicates *"Rather than community acceptance, the Panel expects that there be a comparison of risk perception (and thus, risk acceptability) among the four options. Risk perception, in turn, is affected by the relative degree of uncertainty associated with each option. The Panel notes that risk perception and risk acceptability are also affected by trade-offs among social and ethical values; however, it does not expect the Expert Group include social and ethical trade-offs in its analysis since that would go well beyond the intended scope of the IR."*

- Elsewhere in the March 6th letter it notes *"The Panel did not intend that the requirement for the risk analysis to be "defensible and repeatable" would be interpreted as a requirement for "evidence based" analysis. The Panel's intent was that the analysis be transparent. Transparency produces defensibility. If other investigators understand precisely how the risk analysis results were determined, then repeatability is also possible (although the Panel acknowledges that a different set of experts may produce different outcomes)."*

STGLND offers the following observations on the above noted correspondence dealing with the assessment of community acceptance:

- STGLND asserts that possessing a clear understanding of the community's acceptance of any given DGR option is an important element to the analysis of alternative means for carrying out the project. This information is required by the JRP to enable it to complete its assessment of OPG's compliance with the requirements in the EIS guidelines dealing with Alternative Means of Carrying out the Project. The fact that the initial direction by the JRP in IR EIS-12-513 required OPG to provide said analysis supports our assertion that the community acceptance analysis is a critical piece of analysis. If unimportant, this information would not have been requested by the JRP in the first place.

- The purported inability of the IEG to comment on the issue of community acceptance in the relative risk analysis due to insufficient information does not diminish or eliminate the critical importance of this analysis for gauging OPG compliance with the section 7.3 EIS guideline requirements pertaining to Alternative Means of Carrying out the Project.

- STGLND further asserts that the JRP's revision of the phrase "community acceptance" as set forth in the March 6th letter does not diminish or eliminate the critical importance of this analysis both for gauging OPG compliance with the section 7.3 EIS guideline requirements pertaining to Alternative Means of Carrying out the Project, and also for actually knowing whether community acceptance actually exists.

- As noted in our 2013 submission to the JRP, the EIS guidelines required OPG to consider alternative locations off the Bruce site. This did not happen. We assert that OPG's response to information request EIS-12-513, which requested that OPG provide information concerning a theoretical DGR in granite in the Canadian Shield, including an analysis of community acceptance, while interesting, can never satisfy the EIS guideline requirements that OPG provide analysis of an alternate means off the Bruce site. We noted in our original submission in 2013 and reiterate today that analysis of a "conceptual site" is non-compliant with the EIS guideline requirements.

- We note that when the JRP was advised that the "community acceptance" relative risk analysis would not be provided, the JRP modified the charge directions to the IEG that they instead provide a risk perception analysis. In our view, the fact that the IEG or OPG could not provide a community acceptance analysis for an actual alternative location off the Bruce site is clear evidence that OPG has failed to meet the requirements of the EIS guidelines.

- The JRP's charge to the IEG required that the relative risk analysis be qualitative, transparent, defensible and repeatable. We note however the comment from the IEG that indicated *"We interpret this charge, specifically the terms defensible and repeatable, as also encompassing the notion that our analysis must be "evidence based".* STGLND notes with surprise the JRP's direction that the relative risk analysis of community acceptance need not be "evidence based". We assert that evidence based analysis is fundamentally required to produce defensible, transparent and repeatable study results.

- Evidence presented by STGLND during the 2013 hearings asserted that OPG's definition of "community acceptance" meant only 4,067 people in the Municipality of Kincardine indicating "yes" in a questionable local telephone poll. We asserted then and still maintain that using this as evidence of community acceptance is flawed and grossly inadequate. Granting 4,067 local citizens (many who stand to benefit financially if the DGR proceeds or who otherwise rely on the nuclear industry for their livelihood) the power to make a decision that affects 40 million people is unconscionable and highly undemocratic and is not anywhere near to having cogent and strong evidence of widely based community acceptance.

- We would again urge the Joint Review Panel to reject OPG's narrow definition of "community acceptance" in favour of a now obvious real world broader definition that would include independent acceptance by all communities comprising the 40 million people who rely on the Great Lakes for their drinking water and who stand to be affected if the DGR fails to perform over the next 100,000 years as proposed by the proponent.

ii. Community Acceptance Outside of the Regional Study Area

- We note that information request EIS-12-513 includes a requirement that the relative risk analysis to OPG's safety case include a review of community acceptance in the Local and Regional Study Area as well as outside of the Regional Study Area. The IEG's February 18th letter indicates that there is insufficient information directly relevant to the issue of "local and regional" community acceptance. We note that the IEG failed to acknowledge that information is available that does provide an indication of community acceptance (or lack thereof) "outside of the Regional Study Area". In this regard, sixty (60) resolutions opposing the construction of the Kincardine DGR or any DGR in the Great Lakes Basin have been passed by communities in Ontario, Michigan, Ohio, Pennsylvania, Wisconsin, Minnesota, Illinois, Indiana and New York as shown in the figure below.

- Copies of all resolutions passed can be found at http://stopthegreatlakesnucleardump.com/resolutions.php

- We note that the population of communities that have passed resolutions now exceeds 10 million people.[20] We note with interest that 100% of the communities that have passed resolutions opposing the DGR are located outside of the Regional Study Area, which provides convincing evidence that once you leave Bruce County (which essentially encompasses the Regional Study Area) the evidence clearly demonstrates an overwhelming lack of community acceptance.

- A review of the 60 resolutions that have been passed to date provides important information that is useful for gauging community acceptance of the Bruce DGR and Granite DGR options outside of the Regional Study Area. In particular, the resolutions can be summarized as follows:

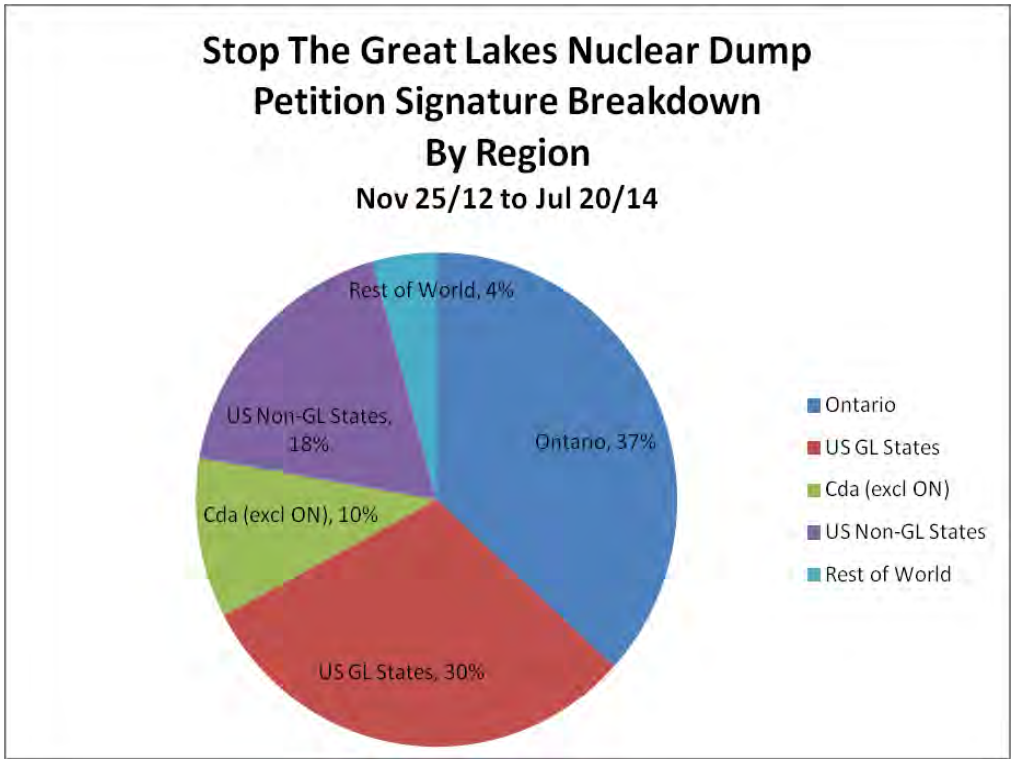
Analysis of Resolution passed as at July 14, 2014

	Weighted by Population of Community	Unweighted
Outright oppose the construction of the Kincardine DGR	22%	15%
Outright oppose the construction of the Kincardine DGR or any DGR in the Great Lakes Basin	57%	65%
Oppose the construction of the Kincardine DGR at this time	20%	13%
Express concern and request further study	2%	7%
	100%	100%

- STGLND asserts that the above noted "evidence based" information concerning resolutions passed outside of the Regional Study Area clearly demonstrates an overwhelming lack of "community acceptance" for either the Bruce DGR or any DGR in the Great Lakes Basin (which by definition would include a Granite DGR located in the Great Lakes Basin portion of the Canadian Shield).

- We note that the 64,000+ signatures on the Stop The Great Lakes Nuclear Dump petition is further "evidence" of an overwhelming lack of community acceptance outside the Regional Study Area. A glimpse of the breakdown of STGLND petition signatures is reflected in the graph below:

[20] http://stopthegreatlakesnucleardump.com/resolutions.php



- Not surprisingly, the majority (67%) of petition signatures are from people living in the Great Lakes Region (i.e. Ontario and the 8 Great Lakes States). Also revealing is that 58% of all petition signatures are from people living in the US or in the rest of Canada (i.e. outside of Ontario), which clearly demonstrates that petitioners view this as a national and international issue.

iii. Public perception of risk and acceptability of Bruce DGR versus Granite DGR in Canadian Shield

- The JRP's direction to OPG in IR EIS-12-513 indicated that the Panel expects there to be a comparison of risk perception (and thus risk acceptability) among the four options.

- We note that the JRP's March 6th letter lists a number of "primary uncertainties" that are expected to affect the public's relative perception of risk of the various options, including the Bruce DGR and Granite DGR. The listed primary uncertainties include:
  - accidents and terrorist threats
  - natural events (seismic/weather)
  - transportation risks
  - efficiency and trustworthiness of options

- level of confidence needed before proceeding
- ease of monitoring
- retrievability
- equitable distribution of risks and benefits (theory that those who generate the waste bear more of the risk)
- risk to future generations.

- In a study by Risk Sciences International (commissioned by the IEG), it is pointed out that *"research on initiatives to manage nuclear waste in many countries has described a fairly consistent range of social and ethical concerns that have made siting a nuclear waste facility a very contentious and usually unsuccessful undertaking".*[21] Social, ethical and other concerns noted in the Risk Sciences International (RSI) report, over and above the primary uncertainties outlined by the JRP include the following:
  - Objectivity of information provided to the community particularly when financial compensation is offered
  - Whether community consent is genuine or is a result of political pressure or financial pressure
  - Inability of residents to reject a facility they would otherwise oppose due to promises of compensation and employment
  - Concerns that wastes remain hazardous for a very long period of time and will require monitoring or management raising issues of intergenerational justice
  - Concern that consent can only be obtained from the present generation, yet many future generations who cannot give or refuse consent will also be affected by, and perhaps at risk from, the facility
  - Skepticism about the public participation in siting processes
  - "Public unease" about expert' claims of knowledge about long-term safety
  - Lack of trust in the nuclear industry and other risk management authorities

- We note with interest a comment in the RSI report that indicates *"The public is concerned with uncertainty in the performance and safety of proposed facility, but their interest in it is not the same as experts'….non-experts tend to be less concerned with the likelihood that an adverse consequence will occur than they are with the significance of the consequence itself….With respect to nuclear waste, people recognize that there are a number of very serious impacts that could occur with a technology that must keep long-lived hazardous wastes contained and 'safe' for hundreds of thousands of years. A large part of the concern with the attention to consequences is the value of the people or ecosystem elements that could be affected."* [22]

[21] Risk Sciences International Report on Risk Perception of Nuclear Waste Disposal submitted by Anne Wiles to the Independent Expert Group, April 23, 2014 page 26

[22] Ibid, page 29

- STGLND asserts that it would be beneficial for the JRP to carefully review the more than 22,000 comments provided to date on the STGLND petition as credible evidence of the public's uncertainty and social, ethical and other concerns about OPG's proposal to construct a DGR at the Bruce site.[23]

- A scan of petitioner comments confirms a broad range of concerns and sentiments. Many of the primary uncertainties noted above by the JRP (some more than others) as well as many of the social, ethical and other concerns identified in the RSI report are reflected in comments provided by STGLND petitioners. In addition to the very frequent sentiments of anger, outrage and disbelief being expressed by the public, major areas of concern expressed include: concerns about the proximity of the proposed site to the Great Lakes given the importance of the Great Lakes as a source of drinking water for 40 million people in 2 countries; concerns about the potential impact on future generations; concerns about the lack of intergenerational justice where decisions affecting future generation are being made without the consent of future generations; concerns about the need to take a precautionary approach; concerns about protecting Mother Earth and the environment and the need for stewardship and for development of sustainable solutions; concern with siting a nuclear waste repository in close proximity to the Great Lakes rather than in remote less populated regions in the Canadian Shield.

- We note that the excerpts from non-aboriginal and aboriginal intervenors as presented in Section III and IV of the IEG's report are echoed in comments provided by STGLND petitioners.

- We would agree with the RSI research findings that show that the public is less concerned with the likelihood that an adverse consequence will occur than they are with the significance of the consequence itself. And we would assert that the approach taken by the public is entirely valid. As was pointed out in the report of the Seaborn Panel in their assessment of the social acceptability of the AECL disposal concept, *"In our view, safety is not a matter of probabilities and meeting standards and regulations. It is, rather, the opposite of danger; it is protection from harm."* We would also point to the testimony of Dr. Conrad Brunk who testified in the Seaborn Panel hearings that "*Whatever the claims of some technical experts to the contrary, in the public mind and in the mind of many risk experts and risk assessment which has to take into account the behavior of natural and technological to say nothing of social and political systems over spans of time far exceeding those of recorded human history will be dogged by high levels of uncertainty."*[24]

- In the conclusions section of the IEG report it is noted "We find no discernible pattern … in which preferences among the four management options [two of which

[23] http://www.gopetition.com/petitions/stopthegreatlakesnucleardump.html

[24] Dr. Conrad Brunk, University of Waterloo [Conrad Brunk, in Nuclear Fuel Waste Environmental Assessment Panel Public Hearing Transcripts, March 13, 1996, p. 98.]

are the DGR options] are directly or even indirectly related to perceptions of risk associated with the storage and disposal of nuclear waste.

- The IEG report conclusions further note *"With regard to the concept of risk acceptability, we find in the record of the public discourse few statements about what constitutes acceptable risk in the storage of nuclear waste (as opposed to statements about what risks are unacceptable) and thus no basis to discriminate among the four options using this concept."*

- The IEG report conclusions also indicate that the IEG *"cannot provide the Panel with a score reflecting public perception or acceptance of risk of the four options."*

- Although the IEG was unable to provide a score reflecting public perception or acceptance of risk of the four options, the report information leaves no doubt that the public finds the proposed DGR at the Bruce Site to be unacceptable.

- STGLND asserts that the significant opposition that exists among the public (as evidenced by the 64,000+ signatures and over 22,000+ comments on the STGLND petition) and among elected local officials in Ontario and all Great Lakes States (as evidenced by the large number of resolutions expressing outright opposition to the proposed DGR on the Bruce site or any DGR in the Great Lakes Basin) presents clear and convincing evidence that the proposed DGR at the Bruce site as well as any DGR in the Great Lakes Basin (which would include a Granite DGR in the Great Lakes Basin located in the Canadian Shield) are both unacceptable options.

- We note that the CNSC's review of OPG's response to IR EIS-12-513 indicates that while *"The risk perception report identified accurate concerns and positions expressed in the submissions to the JRP prior to the hearing and at the hearing in fall 2013….[but] it does not take into consideration …[the] extensive discussion of community views expressed by many elected municipal representatives, these did not appear to be represented beyond a reference to one statement by one representative. CNSC staff would suggest that [the IEG] report does not cover in detail the full context with respect to risk perception regarding these concerns."*[25]

- As regards the CNSC staff comment that the discussion of municipal representatives is not adequately covered in the [IEG] report, STGLND assumes that CNSC staff is referring to the written and oral submissions of municipal officials from the Municipality of Kincardine and in adjacent municipalities that are beneficiaries under the Hosting Agreement between OPG and the Municipality of Kincardine. STGLND would point out that municipal officials in communities located outside of Bruce County also provided submissions to the JRP, said submissions in the form of resolutions passed by their local governments opposing the DGR. We note that the IEG report fails to mention said resolutions. CNSC staff failed to point out that the IEG report makes no mention that municipal officials in many communities outside

[25] http://www.ceaa.gc.ca/050/documents/p17520/99546E.pdf page 40

of the Regional Study Area in Ontario and in all Great Lakes States (representing a population of over 10 million people) have passed resolutions opposing the DGR. STGLND notes that all municipal resolutions were passed by duly elected local officials during municipal council meetings that were open to the public and are all part of the public record. STGLND notes that copies of many resolutions were posted on the CEAA registry and therefore readily available for review by the IEG during the course of preparing its report. STGLND asserts that IEG's failure to comment on the passage of resolutions at the municipal level is a material omission in its report, a material omission we would add that was not addressed in the CNSC's review of the IEG report.

- STGLND asserts that sentiments expressed by the public by way of petition comments that urge OPG to consider locations outside of the Great Lakes Basin in the Canadian Shield suggest that there is a qualified support for a Granite DGR option outside of the Great Lakes Basin and therefore we assert that from the public's perspective the Granite DGR option is relatively more acceptable than the Bruce DGR option.

3. APPLICABILITY OF RECENT INCIDENTS AT WASTE ISOLATION PILOT PLANT (WIPP) TO OPG DGR SAFETY CASE

3.1 Background to IR EIS-13-515

In February 2014, a number of incidents occurred at the Waste Isolation Pilot Plant (WIPP) that have implications for OPG's safety case to construct the DGR in Kincardine. As a result of growing concerns being expressed by various interested parties, the JRP issued information request EIS-13-515.

The WIPP incidents included:

- On February 5th, a diesel powered truck used for hauling salt caught fire in the underground mine

- On February 14th, at least one and perhaps more of the 258 contact-handled waste containers in Room 7 and Panel 7 released radioactive and toxic chemicals. The release spread contaminants through more than 3000 feet of tunnels, up the exhaust shaft (2150 feet) into the environment, and to the air monitoring station #107, approximately 3000 feet northwest of the exhaust shaft. If the release came from Panel 6, which has more than 22,500 CH containers, it will be difficult to determine many aspects of the release. According to DOE modeling, the release lasted for 15.5 hours. No workers were underground when the radiation leak was detected.

- On February 26, the 13 WIPP employees that had been at the WIPP site when the radiation release was detected were notified that they had tested positive for internal radiological contamination, "predominantly americium – 241"

3.2 Lessons Learned and Implications for OPG DGR Safety Case

a) OPG/CNSC perspectives

- OPG notes that it engages in the ongoing process of seeking operational experience from other nuclear facility operators, including from WIPP, and carefully consider its direct and indirect application to its proposed facility designs and processes.

- OPG notes that to the extent that information is available on the WIPP incidents, OPG has reported it in its response to information request EIS-12-515. OPG further notes that when further information becomes available, it will be assessed for applicable lessons.

- Both the fire mine incident and the radiological contaminant release incident were the subject of a phase 1 investigation by the US DOE Office of Environmental Management. Accident Investigation Reports were issued for both incidents respectively on March 13, 2014 and April 24, 2014.

- OPG's comment concerning the fire incident is that *"OPG is confident that the measures and processes we have established will prevent or mitigate a similar event at the proposed OPG DGR."*[26] In effect, OPG is saying there are no lessons to be learned from the WIPP fire incident and that they have all the bases covered.

- OPG's comment concerning the radiological incident is that *"OPG has conducted a **preliminary** [emphasis added] review of the recently released Phase 1 report and has made an **initial** [emphasis added] determination that no design changes, including to the ventilation system, are required **at this time** [emphasis added]….OPG will continue a detailed review of the Phase 1 report to identify opportunities to incorporate specific findings into the future planning for the DGR project consistent with our management system and the regulatory process."* We note that OPG is more guarded in its statements regarding the radiological contaminant release incident. It is clear to us that in using the words "preliminary", "initial" and "at this time" OPG is providing itself with additional degrees of freedom to change its position in the future. Furthermore, it again appears that OPG is saying there are no lessons to be learned from the WIPP radiological contaminant release incident and that they have all the bases covered.

- In a nutshell, OPG's message is "don't worry, be happy", we have it all figured out and the DGR will be safe and never contaminate the Great Lakes

[26] http://www.ceaa-acee.gc.ca/050/documents/p17520/99190E.pdf , page 62

- CNSC staff's assessment of the WIPP incidents is much the same as OPG's. CNSC staff indicate they are *"satisfied that there are no new environmental consequences or impacts that OPG should be considering in the DGR Project safety case….and no new information on the WIPP website up to July 7, 2014, about the release affects CNSC staff assessment that the DGR safety case was conservatively bound and so the information provided remains applicable."* [27]

- We note with interest CNSC's comment that "*While the problems experienced at WIPP…**did not result in injury to any worker** [emphasis added] or impact the public; **workers could have been very seriously affected** [emphasis added]. CNSC staff have already noted...the importance of the management system…and the importance of treating the DGR as both a waste management facility and an operating underground mine. The lessons learned from the WIPP events have confirmed these areas remain important over the **entire life-cycle** [emphasis added] of a DGR."*[28] Elsewhere CNSC staff indicate they "*remain satisfied that … radiological releases would not result in significant impacts to workers, the public and the environment."*[29]

- STGLND questions the accuracy of CNSC staff's statement that workers sustained no injury in light of the fact that 22 workers were definitely confirmed through bioassay testing to have sustained internal radiation contamination. Although CNSC staff (and indeed DOE) claim no injury, STGLND asserts that it may take many years and potentially decades for injury (in the form of cancer) to manifest itself. STGLND notes the lack of consistency in CNSC staff statement given that "no injury" is clearly at odds with "not result in significant impacts". STGLND asserts that only through long term monitoring of the health of the affected 22 workers will it be possible to make a definitive determination that no injury resulted from the WIPP internal contamination incident. STGLND asserts that little faith should be put in DOE's claim of no injury given their obvious conflict of interest in this matter. In STGLND's view, any determination of no injury should only be made by qualified medical experts that are completely independent of DOE. Finally, STGLND concurs with CNSC staff's assessment that workers could have been seriously affected. Indeed, it was perhaps through sheer good fortune that the radiological contaminant release occurred during a period when no workers were present in the underground mine. That WIPP and its workers dodged a very significant bullet will not soon be forgotten by the public and should not now be forgotten by the JRP.

b) STGLND perspectives

There are a number of important lessons to be learned from the recent failures at the WIPP facility.

[27] http://www.ceaa.gc.ca/050/documents/p17520/99546E.pdf, page 59, 60

[28] Ibid, page 60

[29] Ibid, page 63

i. Assurances ≠ Reality

- DOE assurances that WIPP would never leak proved false after a mere 15 years of operation when WIPP released radioactive contaminants underground and on the surface. The very fact that WIPP leaked provides sobering evidence that the public cannot blindly accept and rely on assurances provided by project proponents without considering the implications of said assurance being proven wrong at some point in the future. Consequences matter notwithstanding assurances or probabilities. In the case of the Kincardine DGR it is the fresh water of the Great Lakes that is at stake. For this reason the need for proceeding fully in a precautionary manner is paramount.

- DOE assured the public that the WIPP safety case was sound and would not expose the public or the environment to any significant adverse effects. The WIPP safety case also assured the public that all potential negative scenarios had been contemplated and all risks identified and mitigated as does the OPG case. We would remind the panel of the WIPP Visit Report by Dr. Abraham Van Luik, Carlsbad Field Office, US Department of Energy wherein it indicates *"The only credible radioactive waste releases come as a consequence of disturbance-scenarios. Region is, has been, and is expected to remain seismically and volcanically quiescent. Human intrusion is the only credible disturbance scenario that can lead to waste being brought into the accessible environment. Several human intrusion scenarios have been constructed and evaluated through peer review. As a result, two were selected as credibility bounding inherent uncertainties, and are routinely analyzed."*[30] As they say, what a difference a day makes. Despite Dr. Van Luik's steadfast assurances that human intrusion is the only credible disturbance scenario that can lead to waste being brought into the accessible environment, on February 14, 2014, radiological contaminants were brought into the accessible environment – not as a result of human intrusion and not due to a seismic or volcanic event, but due to reasons yet to be discovered. Fifteen years into its operation, what Dr. Van Luik assured the JRP could never happen, happened. The painful reality that folks at WIPP must now face up to is the fact that they actually know less than they thought they knew. The fact of the matter is that 5 months after the breach of a waste container and the radiological contamination of the underground facility and the release of airborne contaminants that reached several kilometers to the next town, the DOE still have no idea how this leak occurred. They have a number of theories, but no definitive answers. And let's not forget that the fallout from WIPP incident could have been much worse if the container explosion had occurred when WIPP workers were present underground. The recent events at WIPP therefore provide a lesson that while OPG may think they have considered all the possibilities, and think they have identified and mitigated the risks of all potentially negative scenarios, unknown unknowns may conspire to foil their best laid plans and intentions.

[30] http://www.ceaa.gc.ca/050/documents/p17520/88554E.pdf, page 65

- Although assurances were provided that WIPP would be used solely for disposal of transuranic waste from the US defence program, the reality is that over the intervening years, DOE has sought to modify WIPP's permit to allow WIPP to used to store high level nuclear waste. The existing Kincardine Hosting Agreement provides that the DGR will only hold low & intermediate level nuclear waste. Given the difficulty in siting DGR's, there is a very real risk that the Hosting Agreement will be amended at a later date to allow the DGR to hold high level nuclear waste if NWMO efforts to site a high level nuclear waste repository fail. The WIPP experience provides a lesson that the assurances provided in the Kincardine hosting agreement may be subject to amendment at some date in the future.

- The original safety case for WIPP provided assurances that WIPP would operate safely and present no significant adverse risks to the human health of its workers. These assurances were turned upside down with the recent contaminant release that resulted in 22 workers suffering internal radiation contamination. We would ask each panel member to reflect on the very significant health consequences that would have resulted if workers (or indeed members of the JRP who toured the underground tunnels of WIPP in November 2012) had been present in the underground facility at the time of the release. On this point, we needn't remind panel members that their lives would have changed forever (and likely been shortened). In an instant, all the assurances in the world that this could never happen would have become meaningless. In an instant, the assurances provided by "experts" that the radiological release had a near zero probability of occurring would become a near 100% probability to panel members that they would face adverse health consequences from that day forward.

ii. WIPP's "Pilot Plant" status means WIPP is an experiment

- Although WIPP is the only operating DGR in the world we should never forget that WIPP was constructed as a pilot plant, meaning it was a facility planned as a test or a trial. A key goal in building a pilot plant is to be able to demonstrate that it can perform as expected – in the case of WIIP, that transuranic nuclear waste can be safely buried and contained for not less than 10,000 years in a deep underground facility.

- We submit that WIPP has now become a "Pilot Plant" of a different kind. It is now the first operating DGR in the world that is radiologically contaminated that needs to be able to demonstrate that it can be successfully decontaminated. What is clear is that the original WIPP safety case never contemplated the possibility that WIPP would become contaminated and would need, at some point, to be decontaminated, never mind a mere 15 years into its operation.

- We note that OPG is seeking approval to construct the DGR, not as a pilot plant, but rather as a fully proven concept that would operate successfully throughout its 35 years of operation and for the next 100,000 years. The Great Lakes are themselves

only 12,000 years old. While we recognize that OPG has spent the last decade developing its case, we note that the WIPP evaluation period prior to a construction permit being granted spanned 25 years. STGLND asserts that a lesson to be learned from the WIPP experience is that there are significant risks to moving hastily and prematurely before a concept is proven. Despite OPG's assertions to the contrary, the Kincardine DGR is a pilot plant. It is a trial run. It is an experiment. The fact of the matter is that there are no precedents anywhere in the world for a DGR to be constructed in limestone. OPG's unproven hypothesis is that the Kincardine DGR will safely contain its deadly contents; there is no proof that this hypothesis is correct. In fact, if we consider the international experience of the ASSE II, Morsleben and now WIPP, what we observe is a consistent track record of failed DGRs.

- STGLND asserts that the proximity of the proposed DGR to the Great Lakes means that OPG is effectively conducting an experiment with the Great Lakes. WIPP teaches us that project trial runs do not always turn out as planned.

4. CONCLUDING COMMENTS

- OPG would have the public, the CNSC and the JRP believe that they have everything figured out. Well to this we say, what if? What if over the course of geologic time, OPG is wrong? What if OPG's experts are wrong.

- We know today with certainty that no geologist or scientist or organization such as OPG can provide a 100% guarantee that the DGR will not leak and contaminate the Great Lakes, yet given what is at stake, that is exactly what is required. OPG is providing no such guarantee.

- Early warning signs have already emerged that should be major causes for concern. The work of Dr. Greening's alerts us that OPG and the CNSC definitely do not have it all figured out.

- We submit that, given the enormity of what is at stake, the freshwater of the Great Lakes, the acceptability of OPG's plan must reach the highest degree of social acceptability and broad community acceptance. And by community, we mean all those who stand to be affected if something goes wrong. In our view, OPG has a moral and ethical duty to consult with all of the Great Lakes communities consisting of 40 million people as part of determining the social acceptability of its plan. The 40 million *are* the community and their voices must be heard. This decision cannot proceed on the basis of OPG assertions that the consent of the community has been obtained. OPG simply does not have the consent of the 40 million.

- Let there be no mistake. This plan has not passed the test of being in an environment of social acceptability. The lack of social acceptance is abundantly clear and evidenced by all of the resolutions passed so far representing over 10.5 million people that call for this plan to be halted, and by the STGLND petition, signed by

64,000+ people from every Province, Territory and from all 50 US States that call for OPG's plan to be rejected and indeed that no DGR should be permitted to be constructed in the Great Lakes Basin.

- At this point in OPG's quest to find a solution to its growing problem of nuclear waste, we would suggest that humility rather than hubris is what is needed on the part of OPG, the CNSC and the JRP; what is called for is an acknowledgement by OPG, the CNSC and the JRP that despite human ingenuity and best intentions, humans remain fallible; what must be embraced and respected is that OPG, the CNSC and the JRP have a profound responsibility to protect the interests of future generations. As trustees, decisions must be made today that stand the test of time. Future generations will be left to deal with repercussions of current decision-making. OPG cannot seek the consent of future generations. Given what is at stake, future generations cannot afford OPG, the CNSC and the JRP any chance whatsoever to be wrong. There is no room for error.

- We implore the JRP, in its quest to conduct an environmental assessment of OPG's proposal, to place the safety and sanctity of the waters of Great Lakes above all else and recommend against OPG's plan to construct a DGR on the site of the Bruce Nuclear Plant in the Municipality of Kincardine.