NWMO Generic Approach for Implementing Early Assessment of Social, Economic and Cultural Effects in Site Evaluations – Adaptive Phased Management Siting Process

NWMO SR-2010-15 **March 2010**

DPRA Canada Inc.

nwmo
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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 in accordance with the *Nuclear Fuel Waste Act* (*NFWA*) to assume responsibility for the long-term management of Canada's used nuclear fuel.

NWMO's first mandate was to study options for the long-term management of used nuclear fuel. On June 14, 2007, the Government of Canada selected the NWMO's recommendation for Adaptive Phased Management (APM). The NWMO now has the mandate to implement the Government's decision.

Technically, Adaptive Phased Management (APM) has as its end-point the isolation and containment of used nuclear fuel in a deep repository constructed in a suitable rock formation. Collaboration, continuous learning and adaptability will underpin our implementation of the plan which will unfold over many decades, subject to extensive oversight and regulatory approvals.

NWMO Social Research

The objective of the social research program is to assist the NWMO, and interested citizens and organizations, in exploring and understanding the social issues and concerns associated with the implementation of Adaptive Phased Management. The program is also intended to support the adoption of appropriate processes and techniques to engage potentially affected citizens in decision-making.

The social research program is intended to be a support to NWMO's ongoing dialogue and collaboration activities, including work to engage potentially affected citizens in near term visioning of the implementation process going forward, long term visioning and the development of decision-making processes to be used into the future The program includes work to learn from the experience of others through examination of case studies and conversation with those involved in similar processes both in Canada and abroad. NWMO's social research is expected to engage a wide variety of specialists and explore a variety of perspectives on key issues of concern. The nature and conduct of this work is expected to change over time, as best practices evolve and as interested citizens and organizations identify the issues of most interest and concern throughout the implementation of Adaptive Phased Management

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Executive Summary

NWMO Generic Approach for Implementing Early Assessment of Social, Economic and Cultural Effects in Site Evaluations – Adaptive Phased Management Siting Process

In 2007, the Government of Canada accepted the Nuclear Waste Management Organization's (NWMO's) recommendation for an Adaptive Phased Management approach to the long-term management of used nuclear fuel, and the NWMO is now moving forward in implementing this approach. A guiding principle of NWMO's approach to site selection is that the ultimate decision whether or not to host a site rests with the community at every step up to the signing of a formal agreement on working with the NWMO to seek regulatory approval for the project. In moving ahead, NWMO is looking to develop a generic approach for the implementation of early assessment of social, economic and cultural (SEC) effects as part of the Adaptive Phased Management Siting Process.

In this report, DPRA's experience and research with respect to the siting of complex and controversial projects is drawn upon to provide NWMO with a generic approach and conceptual framework for consideration of SEC effects in Steps 2 to 4 of the NWMO process for siting a deep geological repository (DGR).

This proposed framework has been developed based on DPRA's experience in projects, processes and guidelines involving the assessment of social, economic and cultural effects of proposed developments, particularly those that are controversial or complex. The framework integrates the methodological steps (Steps 2 to 4) with factors for site selection proposed by NWMO, and proposes specific social, economic and cultural criteria for the three site selection steps.

The conceptual framework developed by DPRA includes 'lessons learned' from other case studies, key siting process considerations, recommended considerations to NWMO for implementing Steps 2 to 4, and criteria, indicators, data sources and rationale for each of these steps.

Over the past 25 years, the role of Aboriginal Traditional Knowledge (TK) has become increasingly important in environmental assessment and planning activities. Aboriginal TK and practices may be used to inform guiding principles during the site / transportation route selection or process, or to provide information to be used in screening, site / route definition, or site / route assessment (either comparative or absolute). Recommendations are provided to NWMO in terms of the incorporation of TK in NWMO's siting process (Steps 2 to 4).

The report includes a discussion of the study findings and conclusions.

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1. Introduction

1.1 Overview of NWMO Siting Process

In 2007, the Government of Canada accepted the Nuclear Waste Management Organization's (NWMO's) recommendation for an Adaptive Phased Management approach to the long-term management of used nuclear fuel, and the NWMO is now moving forward in implementing this approach. Essentially, the goal of this approach is to isolate and contain used nuclear fuel in suitable deep rock repositories; and the process of achieving the goal is to be managed in a collaborative and adaptive manner that unfolds over a number of years in response to changing circumstances and knowledge.[1]

A guiding principle of NWMO's approach to site selection is that the ultimate decision whether or not to host a site rests with the community at every step up to the signing of a formal agreement on working with the NWMO to seek regulatory approval for the project. The NWMO proposes to work with communities and provide the necessary information and resources for evaluating potential sites.

In moving ahead, NWMO is looking to develop a generic approach for the implementation of early assessment of social, economic and cultural (SEC) effects as part of the Adaptive Phased Management Siting Process. This generic approach will ensure that community definitions of well-being and shared interests with communities guide the process. Also, this generic approach would be fully cognizant of the needs of Aboriginal[2] communities and applicable legislation, and based on citizen engagement through transparent dialogue. In accordance with the principle of collaboration, NWMO proposes to work with communities in adapting the generic approach to be developed to the specificities of the community.

NWMO's siting process consists of nine steps from the initiation of the siting process to construction and operation of the facility. The consideration of SEC effects will be applicable to Steps 2 to 4 of the NWMO's proposed siting process[3]. This study provides a framework, including principles/considerations, criteria, indicators and data sources for the evaluation of SEC effects in Steps 2 through 4 of the NWMO siting process.

1.2 Purpose and Objectives of This Study

The purpose of this report is to provide NWMO with advice on Social, Economic and Cultural Effects (SEC) assessment in Steps 2 through 4 of the NWMO siting process. Specific objectives are to:

- Define SEC effects assessment;
- Show how SEC effects assessment fits into the overall siting process;
- Document the role of SEC within the willing host decision-making process;
- Develop a preliminary generic approach to doing SEC through Steps 2, 3 and 4;
- Identify the full range of indicators, criteria and data sources to be used in the SEC effects assessment for Steps 2, 3 and 4;
- Show how the SEC can assist NWMO and communities in making informed decisions; and
- Draw on 'lessons learned' to identify other issues and concerns of relevance to the NWMO and its site selection process.

[1] NWMO. 2005. Choosing a Way Forward: Final Study. (Available at http://www.nwmo.ca/uploads_managed/MediaFiles/341_NWMO_Final_Study_Nov_2005_E.pdf

[2] The term 'Aboriginal' refers to First Nations, Inuit and Métis peoples. Wherever the term is use in this report, it will encompass all these groups.

[3] There will be further consideration of SEC effects during the regulatory processes in Step 8; however, this study is focused on Steps 2 through 4.

In this report, DPRA's experience and research with respect to the siting of complex and controversial projects is drawn upon to provide NWMO with a generic approach for consideration of SEC effects in Steps 2 to 4 of the NWMO process for siting a deep geological repository (DGR).

To do so, DPRA:

- Reviewed DPRA's experience with projects related to the siting of other complex and controversial facilities with respect to SEC effects;
- Reviewed relevant case studies of the siting of DGR facilities in other jurisdictions for lessons learned and identification of illustrative criteria that can be applied to operationalize the evaluation factors for the NWMO siting process;[4] and
- Developed a planning framework in which SEC effects can be assessed.

1.3 Report Outline

This report is organized according to the following sections:

- Section 2 – *Methodology* – describes the research and analysis activities undertaken
- Section 3 – *Principles for Site Selection* – lists NWMO principles and proposed additional principles identified by DPRA
- Section 4 – *A Conceptual Framework for Consideration of Social, Economic and Cultural Effects in Steps 2 to 4 the NWMO Siting Process*
- Section 5 – *Social, Economic and Cultural Effects Assessment in NWMO Siting Process Step 2 (Initial Screening)*
- Section 6 – *Social, Economic and Cultural Effects Assessment in NWMO Siting Process Step 3 (Preliminary Assessment/Feasibility Study*)
- Section 7 – *Social, Economic and Cultural Effects Assessment in NWMO Siting Process Step 4 (Detailed Evaluation)*
- Section 8 – *Discussion* of study results
- Section 9 – *Conclusions* of the study

[4] The NWMO evaluation factors are listed in: Nuclear Waste Management Organization (NWMO). May 2009. *Moving Forward Together: Designing the Process for Selecting a Site - Invitation to Review a Proposed Process for Selecting a Site*. Page 32.

1.4 What is Social, Economic and Cultural Effects Assessment?

Social, Economic and Cultural (SEC) Effects Assessment is an important component of a site selection/ environmental assessment process. SEC addresses several dimensions that are relevant to people and communities and helps to provide answers to what the potential impacts of a project siting might be. Therefore, SEC is a major consideration for both the NWMO and any willing host community in reaching decisions at each step in the siting process.

DPRA's definition of SEC Effects Assessment is provided below:

> "SEC Effects Assessment is the systematic analysis used to identify and evaluate the potential social, economic and cultural effects of a proposed development on the day-to-day lives of individuals, households, and communities. The assessment includes consideration of peoples' material well-being, their ability to make a living, and the social, cultural and economic underpinnings of the community. The impacts resulting from identified effects may be positive or negative, and may be experienced at different levels (e.g., individuals, households, local communities, regionally, provincially, nationally). SEC also involves identification of impact management measures to eliminate, reduce, or mitigate adverse effects and maximize the positive effects."

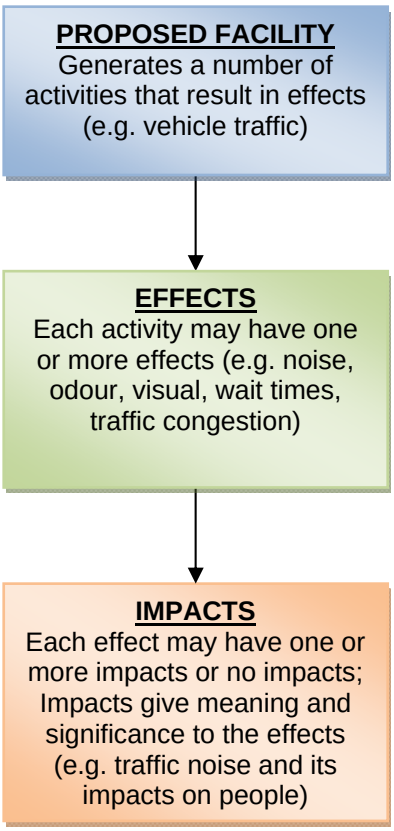
1.5 Effects and Impacts

For decision-making purposes, it is important to distinguish between SEC 'effects' and 'impacts'. The critical question is "what are the actual impacts of the identified effects?". This section describes both effects and impacts and their relevance to the SEC effects assessment.

It is important to ensure the terminology is consistent with both the applicable legislation and professional practice. A proposed facility may result in 'effects' and 'impacts'. An effect is the direct result of the construction, operation and decommissioning a facility (e.g., displacement, noise, traffic, employment). Effects may or may not result in an impact, depending on their nature and significance to the people and communities potentially affected. Throughout this report the term 'effects' is used, however it is through the application of the SEC criteria in the assessment process and evaluation of significance that potential impacts will be identified.

Figure 1 illustrates the distinction between effects and impacts.

Figure 1: Effects and Impacts



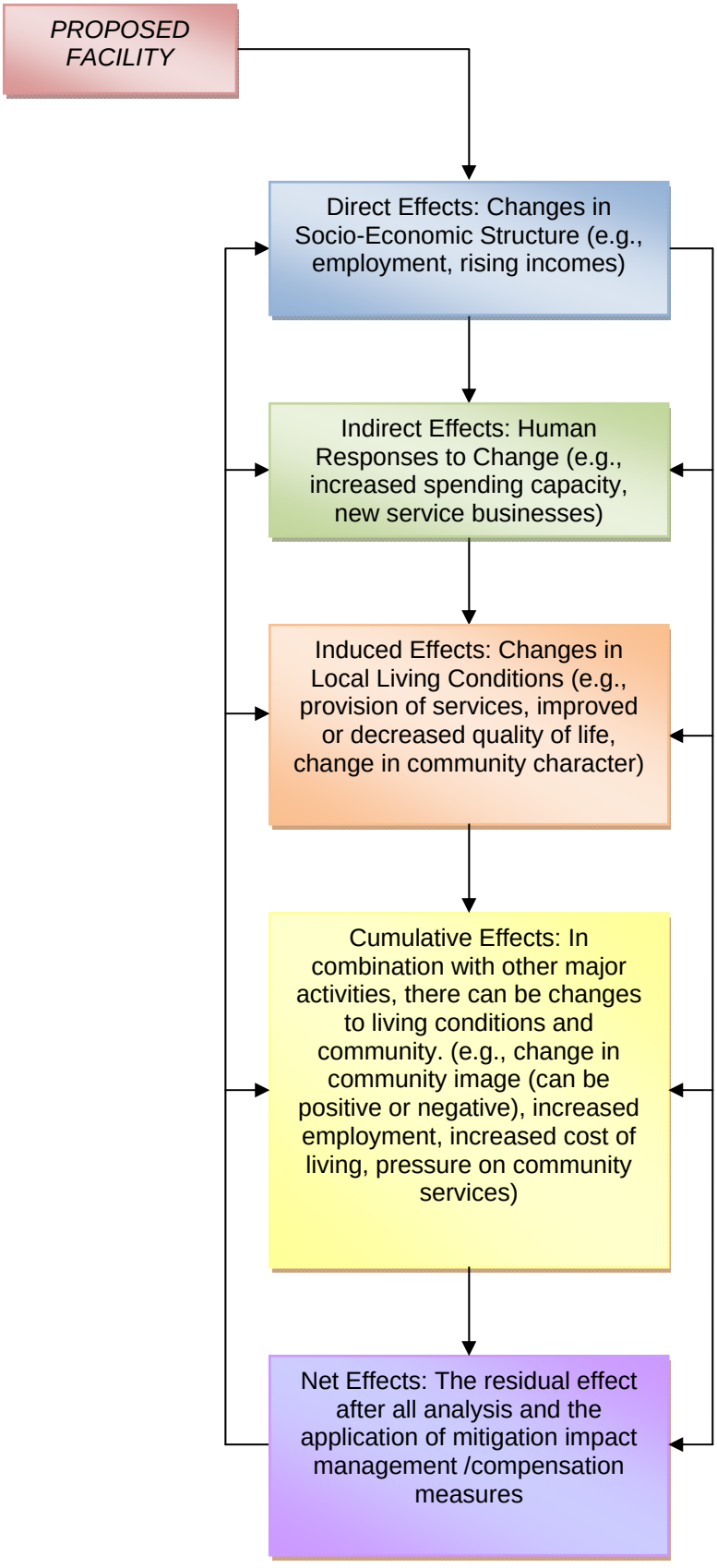
The SEC effects from a proposed DGR can be both negative and positive. For example, the creation of a substantial number of stable jobs will be positive; the public image or perception of the DGR might be negative. These effects can be short-term (e.g., during construction) or long-term (e.g., during operations) and can affect individuals/households, the community as a whole, or facilities, services and institutions. Effects are also characterized as direct, indirect, induced and cumulative. In addition, net effects should be considered. These types of effects are summarized in Table 1[5]:

Also, Figure 2 shows examples of the linkages between direct, indirect and induced effects, as well as cumulative and net effects.

[5] Adapted from: Terriplan Consultants (DPRA). (August 3, 2006). Future Directions for Social, Cultural and Economic Impact Assessment in the Inuvialuit Settlement Region. March 28th to March 30th, 2006, Inuvik, NT: Summary of Workshop Research. Page 15.

Table 1: Types of Social, Economic and Cultural Effects	
TYPE	**DEFINITION / EXPLANATION**
Direct Effects	Direct effects are the immediate consequences of a project's construction, operation or decommissioning. They can be characterized as typical or inevitable, and are relatively easy to predict with some degree of accuracy. The timing of direct effects coincides with construction, operation or decommissioning, and is usually limited to the project's 'footprint' or immediately adjacent or nearby areas. Examples include increases in local employment levels, the value of contracts to regional businesses, the noise from construction and increases in traffic.
Indirect Effects	Indirect effects are changes that result from one or more direct effects of a project (e.g. influx of workers puts additional pressure on existing facilities/services such as medical or recreation services). The increased number of employees may lead to increased housing sales; the adjacent lands may be re-zoned for complementary land uses. Indirect effects cannot be determined or measured with the same certainty as direct effects. In terms of timing, indirect effects follow the direct effect(s) (however, they may still be associated with construction or operation), and may extend some distance from the project footprint.
Induced Effects	These are changes that occur more broadly subsequent to the project (e.g., stimulation of new business/services, changes in community's image). Induced effects may have broader implications than direct or indirect effects, and may result in changes to the overall living conditions experienced by those affected by the project. Induced effects are difficult to predict because they depend closely on the context from which they arise and a range of somewhat uncertain indirect effects.
Cumulative Effects	These are the changes that may occur when a proposed facility or project is considered in combination with other major projects existing or planned facilities or activities that have been or will be carried out. Existing and proposed developments in an area can have a cumulative effect on individuals, households, and communities (e.g., available services and facilities, and housing resulting in potential service shortfalls or increased housing costs). Likewise, several projects may provide a broader range of job opportunities which may benefit a community economically.
Net Effects	Net effects are the residual effects – both positive and negative – are those that remain after mitigation. Selected net effects may be addressed through monitoring, impact management initiatives, and compensatory mechanisms.

Figure 2: Direct, Indirect and Induced Effects



The effects described in and by Figure 2 are directly relevant to Step 4. Of particular note are the types and levels of effects that will need to be addressed at Step 4. In addition, the Step 4 assessment will need to explicitly consider cumulative and net effects so NWMO and the community(s) can decide whether to move forward into Step 5.

2. Methodology

DPRA's methodology to outline a state of the art approach to SEC effects assessment was grounded in three streams of activity. Within each activity stream, the focus was on SEC effects assessment for controversial and complex projects. The three activity streams are:

1. Review of DPRA's past projects involving social, economic and cultural effects assessment definition and application.

2. The list of selected DPRA case studies involving siting of complex and controversial projects and/or SEC effects assessment, and other relevant studies/ presentations, is included in the list of References at the end of this report.

3. Professional judgement and analysis of the case studies to determine application of the findings to social, economic and cultural effects assessment to Steps 2 to 4 of the proposed NWMO repository siting process. This information was provided by DPRA's experienced senior SEC effects assessment practitioners.

4. Research on international case studies on siting nuclear used fuel repositories, reviewing best practices and 'lessons learned'. This consisted of a review of case studies for the following countries:
   - United States of America;
   - Sweden;
   - Finland;
   - China;
   - France;
   - Germany;
   - Japan; and
   - Switzerland.

The development of the framework for social, economic and cultural effects assessment in Section 4.0 was based on DPRA's professional experience, supported by the review and analysis of relevant research in other countries and similar circumstances for siting of major facilities.

3. Principles for Site Selection

3.1 NWMO Site Selection Guiding Principles

The NWMO, drawing on the input from Canadians in various engagement processes, has developed a series of guiding principles for the site selection process. The first four are key NWMO commitments for the design of the siting process; the remainder represent additional operational principles for the site selection process. Table 2 lists the heading for each principle.

Table 2: NWMO Guiding Principles[6]	
NWMO Key Guiding Principles for Design of the Siting Process	
Focus on Safety	Informed and Willing Host Community
Focus on the Nuclear Provinces	Right to Withdraw
NWMO Operational Principles for Site Selection	
Siting process led by "interested communities"	Definition of "interested community"
Definition of "interested community" in the special case of Crown Land	Aboriginal rights, treaties and land claims
Share decision-making	Inclusiveness
Informing the process	Community well-being
Regulatory review	

These principles set out the operational parameters for the NWMO process and - explicitly and implicitly - the expectations, roles and responsibilities of the NWMO and any willing host communities.

3.2 Additional Considerations

The NWMO has identified guiding principles for the design of the siting process and operational principles for site selection. DPRA has identified several additional considerations that may be relevant to the overall siting process and site selection. NWMO may wish to consider these as additional principles. These are discussed below.

1. *Informing NWMO and Community Decision-Making:* it is important that the SEC effects assessment that occurs at Steps 3 and 4 not only informs the NWMO decision making process, but also contributes to the decision process of each community as to whether they proceed to the next step in the process. The SEC effects assessment must also provide information needed to fully understand the implications of hosting the DGR, and contribute to fully informed decisions by community leaders and the public.

[6] Nuclear Waste Management Organization. (NWMO). May 2009 *Moving Forward Together: Designing the Process for Selecting a Site – Invitation to Review a Proposed Process for Selecting a Site.* P. 16-17.

2. *Minimize Net Adverse Impact and Optimize Net Benefits:* Throughout the SEC effects assessment in Step 4 it is important to recognize that the information generated contributes to an analysis of the effects and impacts, essentially to minimize overall adverse impact and to optimize net benefits. The intent is to ensure that the community can deal effectively with the outcomes from the process and that such outcomes are overall beneficial to the community.
3. *Integration of Traditional Knowledge into the SEC Effects Assessment*: The full and meaningful involvement of Aboriginal communities with an interest in any of the potential sites considered will ensure that Traditional Knowledge (TK) is integrated into the SEC effects assessment at any Step in the siting process (see additional discussion in S. 4.6). This is in addition to any broader involvement of national Aboriginal organizations or advisory groups in NWMO activities.
4. *Demonstrate Sustainability Linkage* – The NWMO has identified "Potential for the project's enhancement of the community's and the region's long-term sustainability, including factors identified by Aboriginal Traditional Knowledge" as an evaluation factor.[7] At Step 4 – when there is detailed evaluation of potential sites and possibly a comparative assessment of two or more sites, there is a need to demonstrate the contribution to the sustainability goals for the community(s)[8]. The sustainability analysis becomes an important factor in the selection of the preferred site(s), as well as in the decision of each community as to whether or not they will proceed to the next step of NWMO's process.

With respect to sustainability, the NWMO will need to consider both the willing host community as well as the immediate region that might also be impacted.

The NWMO DGR brings with it employment – both during construction and operations – as well local and regional benefits through purchases, tax revenue etc. The site will be managed for hundreds of years so employment will be long-term and consistent; the land uses on and around the site will be managed in order to ensure safety and security and this provide another constant in the community. Depending on its location in a community, the site may also provide a location or buffer that protects some valued environmental and/or socio-cultural features.

In seeking to achieve or contribute to sustainability, one is seeking to bring about improvements and/or make things better in the long term. The extent to which the NWMO facility will do so will vary with the potential host community and its vision, goals and objectives. Sustainability is contextual – there is no absolute measure – and so it will be judged by the potential host community in light of their goals/ aspirations and the assessment of potential SEC effects (both positive and negative).

[7] Nuclear Waste Management Organization. (NWMO). May 2009 *Moving Forward Together: Designing the Process for Selecting a Site – Invitation to Review a Proposed Process for Selecting a Site.* P. 32.

[8] Under the federal Gas Tax Agreement, municipalities across Canada are required to prepare Integrated Community Sustainability Plans (ICSPs). These long-term plans are based in the values, goals and projected future needs of the community. The ICSP provides a common vision for the community to work towards, integrating the four pillars of economy, environment, social and cultural life. During NWMO's siting process, a community's ICSP can provide information that can be used in the SEC assessment.

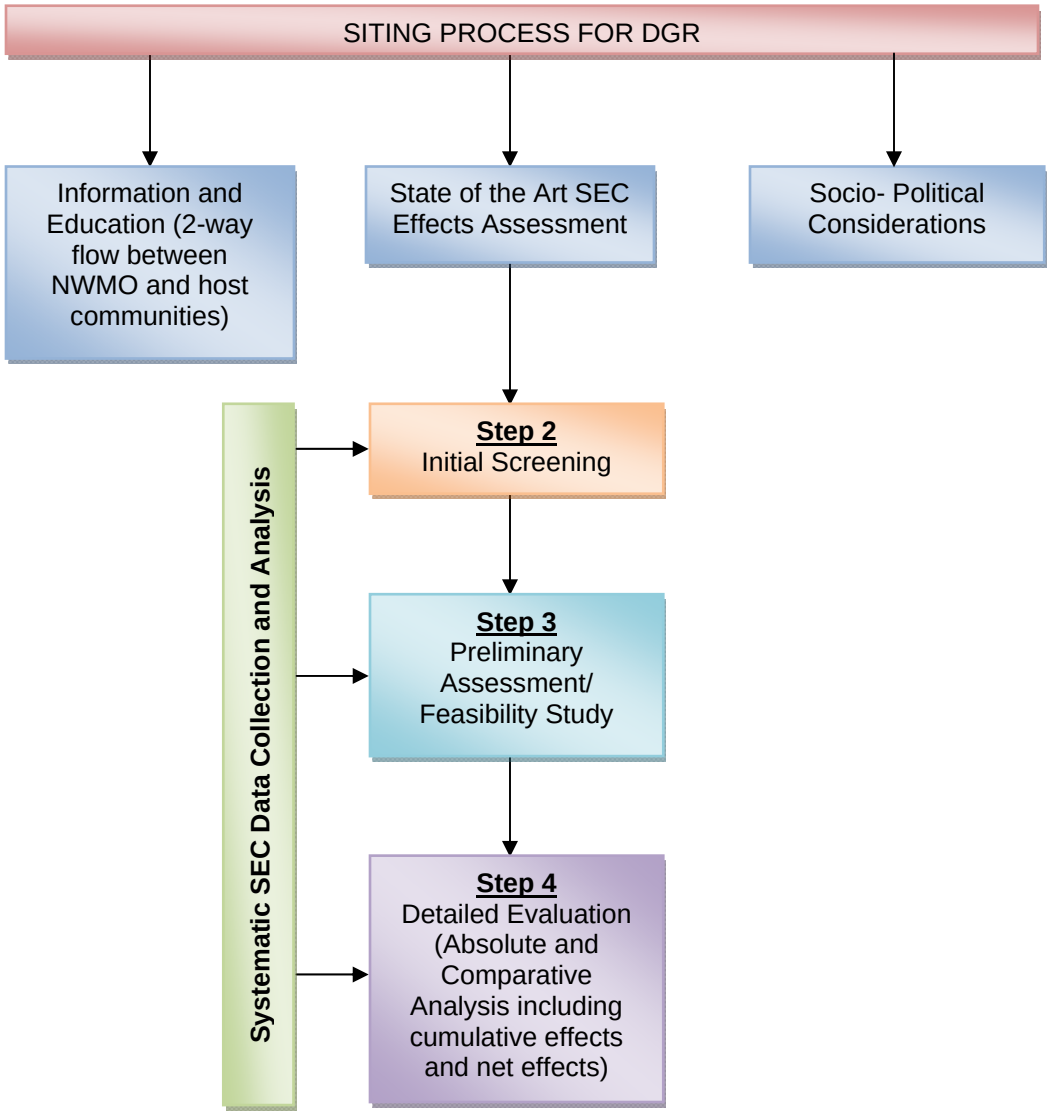
4. A Conceptual Framework for Consideration of Social, Economic and Cultural Effects in Steps 2-4 of the NWMO Siting Process

4.1 Introduction

The NWMO has been charged with finding an appropriate location to site the DGR for the permanent containment of Canada's used nuclear fuel. The NWMO has committed to working with any interested communities that might be willing hosts in a structured, systematic evaluation of potential sites as the chief mechanism of finding the permanent containment facility.

The specific intent of this report is to thoroughly document the SEC effects assessment approach for Steps 2 through 4 of the NWMO siting process. However, before doing so, DPRA believes it is important to set out the role and contribution of SEC to wider decision-making. Figure 3 illustrates that while SEC has an important role in the site selection process, the outcomes of the site selection process will also be strongly influenced by at least two other factors: information and education, and socio-political considerations. That is, decisions will be influenced not only by the findings of the SEC and other assessments, but by the understanding of an informed and educated community, and the socio-political milieu within the community at each step in the process.

Figure 3: SEC Effects Assessment, Information / Education and Socio-Political Considerations in the Siting Process



The conceptual framework outlined above is grounded in DPRA's experience with numerous controversial and complex siting processes and a review of the literature for other similar projects. The 'lessons learned' from other experiences inform the appropriate activities and level of detail needed to systematically work through Steps 2, 3 and 4 in the NWMO site selection process, ultimately leading to the identification of one or more potential sites.

DPRA has outlined a series of indicators and criteria that could be used as the NWMO process moves through Steps 2, 3 and 4, which should ultimately assist one or more communities in determining their willingness to enter negotiations with NWMO. The level of detail increases at each Step, and the involvement of the community increases, with some limited input to Steps 2 and 3 and considerable input in Step 4. The decisions resulting from the SEC effects assessment must be traceable and evidence-based, allowing for consistent conclusions to be reached regardless of who conducts the assessment.

This proposed implementation framework has been developed based on DPRA's experience in projects, processes and guidelines involving the assessment of social, economic and cultural effects of proposed developments, particularly those that are controversial or complex. The framework integrates the methodological steps (Steps 2 to 4) and factors for site selection proposed by NWMO, and propose specific social, economic and cultural criteria for each of the site selection steps.

Table 3 illustrates the nine steps in the NWMO site selection process, highlighting the focus of this study on Steps 2 to 4 for the conceptual framework for consideration of social, economic and cultural effects.

Table 3: Steps in the NWMO Siting Process
STEP 1: Information, Awareness Building Program
STEP 2: Initial Screening
STEP 3: Preliminary Assessment of Suitability (Feasibility Study)
STEP 4: Detailed Site Evaluation
STEP 5: Communities with Suitable Sites Negotiate Terms of Reference of a Formal Agreement to Host the Facility
STEP 6: Community and NWMO Enter into a Formal Agreement to Host the Facility
STEP 7: A Centre of Expertise is Established, and Consultation and Operation of the Underground Demonstration Facility Proceeds
STEP 8: Regulatory Review and Approval
STEP 9: Construction and Operation of the DGR Facility

4.2 Inputs, Outcomes and Activities in Steps 2 to 4

In this section DPRA has summarized the NWMO inputs/activities/outcomes of Steps 2 to 4 of the NWMO's proposed process for selecting a site for a deep geological repository for the long-term management of used nuclear fuel. These in turn were used to assist in framing the generic approach for implementing early assessment of social, economic and cultural effects in site evaluations for the adaptive phased management siting process.

Figure 4 demonstrates the sequence of inputs, activities and outcomes of Steps 2 to 4, and the role of the SEC effects assessment in the process. Table 4 provides additional detail on the process.

Figure 4: Summary of Inputs/Activities/Outcomes of Steps 2 to 4

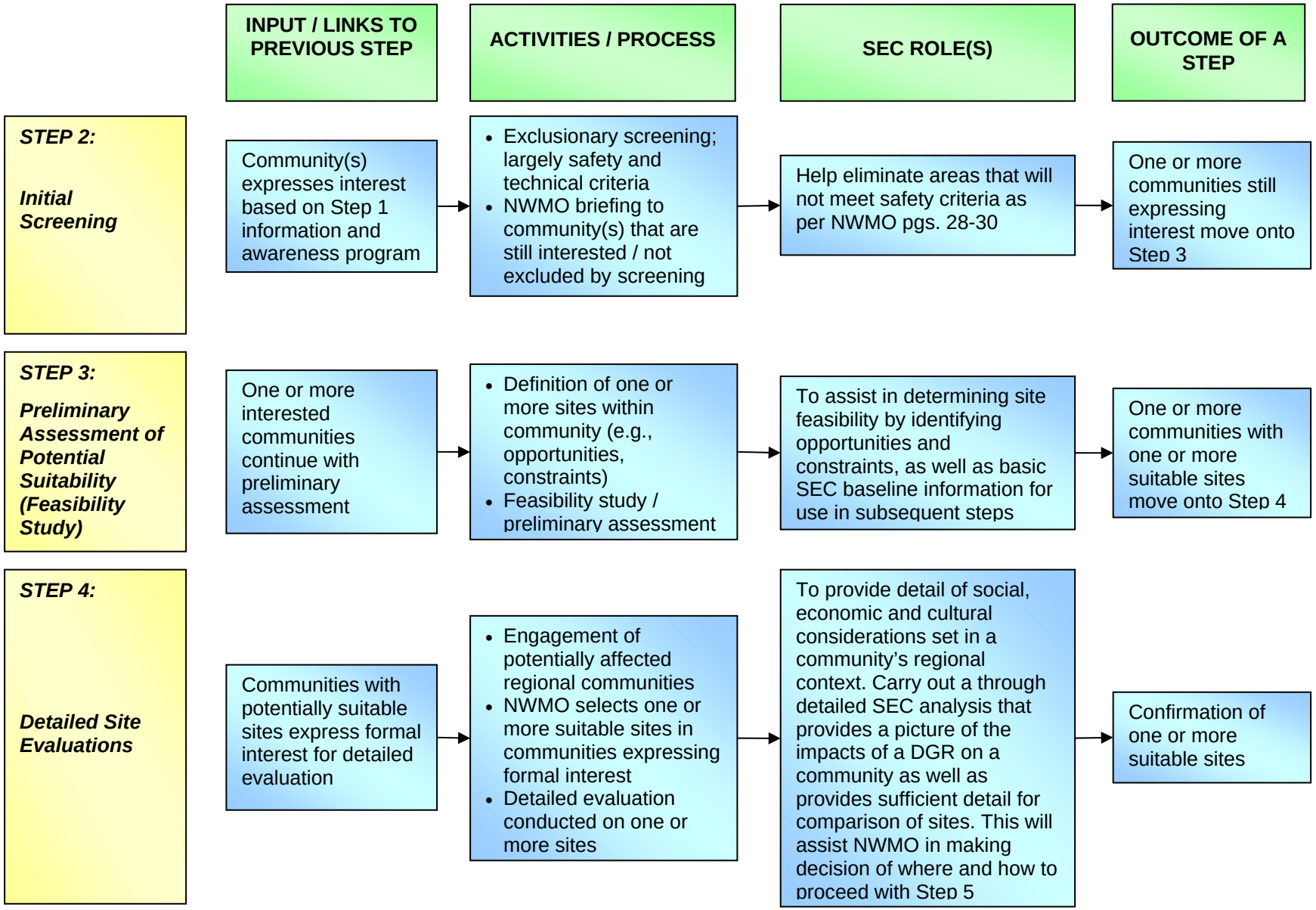


Table 4: Summary of Inputs/Activities/Outcomes of Steps 2 to 4[9]			
NWMO Site Selection Step	***Step 2 – Initial Screening***	***Step 3 – Preliminary Assessment of Potential Suitability ('Feasibility Study')***	***Step 4 –Detailed Site Evaluations***
Input/ Link to Previous Step	Community(s) expresses interest based on Step 1 information and awareness program	One or more communities that meet initial screening requirements, interested in continuing with preliminary assessment in Step 3	Communities with potentially suitable sites (as determined in Step 3) express formal interest/ request detailed evaluation
Activities/ Process - NWMO Step	• Exclusionary screening (NWMO May 2009, p. 13, p.25), largely technical. • NWMO detailed briefing to community(s) that are still interested/not excluded by screening	• Feasibility Study (p. 19, p. 21) to determine if a site in the community has the potential to meet detailed requirements • Definition of one or more potential sites within community (e.g., opportunities, constraints) • NWMO jointly with the community will set general site boundaries. The boundaries should be as extensive as practical • Preliminary assessment / feasibility study of defined sites – using pre-defined geoscientific and community well-being criteria (see S. 4)	• *Several activities concurrent and sequential (p. 22):* • Potentially affected surrounding communities, regional and potentially affected Aboriginal governments must be engaged (if not already) p. 19, 22, 34 • NWMO selects one or more suitable sites from communities expressing formal interest, and conducts detailed site evaluation (p. 19, 22) using criteria from S. 4 (see p. 31-32) • Detailed site evaluations, inc. transportation effects (p. 19, 22, 34)
Objective/ Outcome of NWMO Step	One or more interested communities that meet initial screening criteria, for potential preliminary assessment in Step 3	• Does the geographic area(s) identified by community contain sites with characteristics required for hosting GDR/will well-being of community be fostered? (p.14) • One or more communities with one or more potentially suitable sites for detailed site evaluation in Step 4 (if community still willing)	• Is the site(s) suitable in terms of safety and community well-being? • Confirmation of one or more suitable sites

[9] All page number references are from: Nuclear Waste Management Organization. (NWMO). May 2009 *Moving Forward Together: Designing the Process for Selecting a Site – Invitation to Review a Proposed Process for Selecting a Site.*

Table 4: Summary of Inputs/Activities/Outcomes of Steps 2 to 4[9]			
NWMO Site Selection Step	***Step 2 – Initial Screening***	***Step 3 – Preliminary Assessment of Potential Suitability ('Feasibility Study')***	***Step 4 –Detailed Site Evaluations***
Scale	'Sites' may not yet be clearly defined, as the 'community' area under consideration may be very large (e.g., potentially a number of sites with differing characteristics) or very small (potentially one or few sites with consistent characteristics) – will depend what the community brings forth as a proposal	'Local community' and site(s)	• 'Regional', as well as 'Local community' and site(s) are the focus of the assessment • Involvement of neighbouring communities and Aboriginal communities (if not already involved) • Looking at regional and transportation effects (p. 19) – Step 4 Part B notes that NWMO will identify preferred transportation modes and potential routes at this time (p. 22, 34)
Timeline	< 1 year	1-2 years for Step 3 (see. P. 14, 21)	Approx. 5 years for Step 4

Table 4: Summary of Inputs/Activities/Outcomes of Steps 2 to 4[9]			
NWMO Site Selection Step	***Step 2 – Initial Screening***	***Step 3 – Preliminary Assessment of Potential Suitability ('Feasibility Study')***	***Step 4 –Detailed Site Evaluations***
Data Sources/ Comments	• Based on available information • Expert review (NWMO May 2009, S. 6) • Only two exclusionary criteria that are social/ cultural/ economic : o Protected Areas, heritage sites, parks o Economically exploitable natural resources as known today	• Desktop exercise with some limited field investigations depending on extent of available information (p. 14) • Expert review (NWMO May 2009, S. 6) • 'Opportunities' as well as 'constraints' are used in defining DPRA's SEC site boundaries • Initial assessment of the potential social, cultural and economic effects of each defined site See also p. 31-32 'Fostering Community Well-Being' and 'Proposed Criteria to Assess Factors Beyond Safety' NOTE: "*Low performance on any of these factors would not exclude a community from consideration, although the ability of the community to benefit from the project, and the resources that would be required from the NWMO to support the community in achieving this benefit, would be a consideration in the selection of a site after all safety considerations have been satisfied."*	• Detailed field and lab investigations, testing, monitoring, safety assessment, and socio-economic studies (p. 14, p. 22) • Expert review (NWMO May 2009, S. 6) • The activities imply that there might be a comparative evaluation when NWMO selects one or more sites for detailed evaluation, and then further detailed site evaluation (possibly still comparative if more than one site) See also p. 31-32 'Fostering Community Well-Being' and 'Proposed Criteria to Assess Factors Beyond Safety' NOTE: "*Low performance on any of these factors would not exclude a community from consideration, although the ability of the community to benefit from the project, and the resources that would be required from the NWMO to support the community in achieving this benefit, would be a consideration in the selection of a site after all safety considerations have been satisfied."*
SEC Contribution to Process	At a large scale, provides limited criteria inputs to screening; assists in excluding areas and helping to clarify potential site boundaries	• Identifies both siting constraints and opportunities • Assist in refining site boundaries • Provides initial assessment of SEC effects	• Preliminary assessment of SEC criteria for host community site(s) complemented by regional scale data and analysis • Using more detailed information for sites and site areas, provide input to detailed site evaluation • At this step, the SEC information must be sufficiently detailed to permit for both comparative and absolute evaluation of sites

4.3 Key Lessons Learned

There are several key lessons drawn from DPRA's experience with other siting processes that are relevant to this project. Many of these 'lessons learned' refer to the overall context within the broader siting process. Others deal with SEC effects assessment components of Steps 2, 3 and 4. Each is discussed below.

1. The social, cultural and economic assessment is one aspect of the overall site selection. This assessment is set in a larger socio-political context and could pit communities against each other, or result in divisiveness within a community. It needs to be recognized that the SEC effects assessment is only one facet of the overall site selection process, and that it must be considered in that context.
2. The importance of the socio-political dimension cannot be understated. There may well be circumstances where a willing host community is met with resistance from neighbouring communities. This resistance will not necessarily be consistent with the objective outcome of the SEC effects assessment.
3. The broad issues of health and safety will need to be addressed directly and consistently over time. It will be these issues that will come to dominate the overall site selection process, regardless of how fair and balanced the SEC effects assessment may be.
4. Based on some of the case experiences, it has been noted that positive net benefits resulting from economic inducements help to balance some of the real and perceived negative effects.
5. The SEC effects assessment must be carried out in a consistent manner, grounded in objective data collection and analysis for all potential sites. Confidence in the process and the proponent is important for any successful siting process.
6. The proponent must be transparent and open with any potentially affected communities. What is known, what is predicted, and what is uncertain must be openly and clearly presented.
7. The practical application of concepts such as sustainability and community well-being in site selection and assessment activities continues to evolve, and in many ways is specific to the unique circumstances of the particular project and the community(s) being considered. It can be anticipated that the specific approach taken to incorporating sustainability and community well-being will become clearer over time as communities come forward for consideration.

4.4 Considerations for the Implementation Process

DPRA has outlined below a number of process considerations that NWMO will need to take into account in implementing Steps 2, 3 and 4 of the site selection process. These are relevant to both the evaluation of safety (the ability of the site to protect people and the environment, now and in the future) and 'factors beyond safety' (the effect of the project on the sustainability and well-being of the host community).

1. At this time, the nature of the 'communities' that might come forward is unknown. For example, the geographic size of the area that might be considered at Step 2 is uncertain, and may range from relatively small to large. As NWMO notes[10], the definition of 'community' and 'willingness' require further definition as the site selection process proceeds.
2. The level of detail of the existing/secondary source information used in desktop exercises in Steps 2 and 3 may be insufficient to either exclude a community in Step 2, or to successfully complete Step 3 without some level of field investigation.

[10] Nuclear Waste Management Organization. (NWMO). May 2009 *Moving Forward Together: Designing the Process for Selecting a Site – Invitation to Review a Proposed Process for Selecting a Site.* P. 15

3. Individual communities may find themselves at different points in the process at any given time. That is, one community may be at Step 2, 3, or 4 while another is at a different step[11].
4. The evaluation at Step 2 is exclusionary. The evaluation at Step 3 is based on constraints and opportunities criteria. The Step 4 assessment is a site analysis and/or comparison. This means the weight and significance of criteria used may vary between steps.
5. There are issues – such as those related to fairness and consistency of approach – that need to be defined prior to Step 3 so that site assessment and comparisons are carried out on a "level playing field". That is, a consistent core approach needs to be utilized at each potential site, while accommodating unique circumstances in a community.
6. The effects of the number of jobs created, and local and regional expenditures, need to be considered in the context of the degree of effects on the host site community and the defined site region.
7. During the site selection process, NWMO will need to determine what information/level of evaluation is needed at Steps 3 – 4 in order for:
    a. NWMO to make its decision, and
    b. For the community to make decisions regarding i) ongoing participation in the process; ii) choosing one or more of the sites it may have proposed.
8. What, if any, additional detailed assessment is more appropriate for the regulatory review in Step 8 (e.g., environmental assessment under appropriate jurisdictions [e.g., federal assessment under the *Canadian Environmental Assessment Act*; provincial processes][12], review and permitting/ licensing by the Canadian Nuclear Safety Commission)?

4.5 Factors Beyond Safety in SEC Effects Assessment

As noted in Section 3.2, one of DPRA's identified considerations is that establishment of a DGR facility must contribute to the overall well being and sustainability of the community. To achieve this, the NWMO identified five 'factors beyond safety' to be utilized at different steps in the site selection process. Where the factor is utilized in more than one step, the information sought in a subsequent phase will either provide additional detail or be utilized to confirm the results of the previous step. Table 5 identifies the NWMO evaluation factors 'beyond safety'.

The NWMO evaluation factors 'beyond safety' frame the questions on which the SEC effects assessment seeks to make a determination. The determination for each factor (question) listed will be based on an examination of the SEC criteria utilized in Steps 3 and 4, as well as professional judgement.

The determination for each factor (question) will also need to be examined in terms of its weight and significance/relative to that of each of the other factors.

The approach to carrying out the determination of each factor, and the decision based on all the factors combined, must involve professional judgement rooted in comparable experiences and sound, defensible and traceable assessment in Steps 2 to 4. DPRA has identified SEC criteria to be used in Steps 3 and 4 to be used in generating the information needed for the SEC effects assessment and the determination of the response to the NWMO's factors beyond safety. The relevance and significance of the findings of the SEC effects assessment will need to be considered in conjunction with those of the analysis of safety factors in making a decision at each step of the siting process.

[11] At a point to be determined in the siting process, the NWMO will announce the closing of the formal expression of interest phase, ensuring a minimum of six months notice in advance of the closing date (NWMO, May 2009, P. 22)

[12] A harmonized/joint environmental assessment process that meets the needs of relevant jurisdictions may be needed. The SEC assessment in earlier steps will need to anticipate the relevant requirements of the environmental assessment processes that may apply in Step 8.

Table 5: NWMO Factors 'Beyond Safety'	
NWMO FACTORS TO BE CONSIDERED	**NWMO EVALUATION FACTORS**
Potential social, economic and cultural effects, including factors identified by Aboriginal Traditional Knowledge	Sites will be evaluated against the extent to which positive and negative effects on the host community can be addressed *during the implementation phase* of the project, including the following areas: • Health and safety of residents and the community • Sustainable built and natural environments • Local and regional economy and employment • Community administration and decision-making processes • Balanced growth and healthy, livable community
Potential for the project's enhancement of the community's and the region's long-term sustainability, including factors identified by Aboriginal Traditional Knowledge	Sites will be evaluated against the extent to which positive and negative effects of the project *on long term sustainability* of the host community and region can be addressed in the following areas: • Health, safety and inclusiveness/cohesion of the community • Sustainable built and natural environments • Dynamic resilience of the economy • Community decision-making processes • Balanced growth and healthy, livable community
Physical and social infrastructure in place and/or potential to be put in place to implement the project	Sites will be evaluated for the following: • The availability of physical infrastructure required to implement the project • The adaptability of the community, and the social infrastructure it has in place, to adapt to changes resulting from the project • The NWMO resources required to put in place needed physical and social infrastructure to support the project
Potential to avoid ecologically sensitive areas and locally significant features	Sites will be evaluated for the following: • Ability to avoid ecologically sensitive areas and locally significant features
Potential to avoid or minimize effects of the transportation of used nuclear fuel from existing storage facilities to the repository site	Sites will be evaluated for the following: • The availability of transportation routes (road, rail, water) and the adequacy of associated infrastructure and potential to put such routes in place • The availability of suitable safe connections and intermodal transfer points, if required, and potential to put them in place • The NWMO resources (fuel, people), and associated carbon footprint, required to transport used fuel to the site • The potential for effects on communities along the transportation routes and at intermodal transfer points.

4.6 Incorporating Traditional Knowledge

Over the past 25 years, the role of Aboriginal Traditional Knowledge (TK)[13] has become increasingly important in environmental assessment and planning activities. Incorporating TK into such processes has helped to avoid valued environmental components and to result in better project decisions. DPRA has identified where TK can be of considerable importance in the SEC of Steps 3 and 4 of the NWMO process.

4.6.1 Traditional Knowledge in NWMO's Siting Process – An Overview

Traditional Knowledge and practices may be used to inform guiding principles during the site / transportation route selection or process[14] or to provide information to be used in screening, site / route definition, or site / route assessment (either comparative or absolute). The following approach is based on DPRA's more than 30 years of experience and observations working with Aboriginal communities across Canada, as well as our experience with site selection and the assessment of social, economic and cultural effects of proposed developments.

At this time, at the outset of the siting process, there are no specific communities or potential site areas / transportation routes known; the specific approach to incorporation of TK into the process (both in terms of the potential opportunities for its use, and the specific substantive knowledge) will become clearer as the process unfolds and the community(s) involved are known. Successful incorporation of TK into the process will require full and meaningful engagement of Aboriginal organizations and communities[15]. In its proposed approach to the siting process, NWMO addresses the potential role of Aboriginal people and TK in the process, as summarized in Table 6.

[13] For the purposes of this discussion, Aboriginal is defined to include Inuit, First Nations, and Métis. TK also includes Inuit Qaujimajatuqangit (IQ). It should be noted that 'local knowledge', which may or may not be Aboriginal, can also provide important information on local or regional social, cultural and economic environments and potential effects.

[14] See for example: Barnaby, Joanne. 2003. Drawing on Aboriginal Wisdom: A Report on the Traditional Knowledge Workshop. NWMO Background Paper 8-3.

[15] Note that this study is not addressing Aboriginal consultation or involvement in NWMO's larger process or the site selection process beyond the SEC assessment, that is it is limited to a generic discussion of incorporation of traditional knowledge in the social, cultural and economic assessment in Steps 2 to 4.

Table 6: Potential Role of Aboriginal People and TK in NWMO's Proposed Siting Process	
Informing the Process	"The selection of a site will be informed by the best available knowledge—including science, social science, Aboriginal Traditional Knowledge, and ethics." (p.17)
NWMO's Proposed Criteria - Factors Beyond Safety	NWMO proposes to assess "Potential social, economic and cultural effects, including factors identified by Aboriginal Traditional Knowledge" and "Potential for the project's enhancement of the community's and the region's long-term sustainability, including factors identified by Aboriginal Traditional Knowledge"[16]
Involving Surrounding Communities and Regions	"The NWMO will encourage any community interested in hosting this project to involve surrounding communities, regions and potentially affected Aboriginal governments as early as possible ….In order to support involvement, the NWMO will make resources available to elected representative bodies or their delegates in surrounding areas, including First Nations, Métis and Inuit as appropriate, to: • participate in the conduct of a regional study of social, economic and cultural effects, including factors identified by holders of aboriginal Traditional Knowledge participating in the process; • cover the cost of activities to inform residents and identify questions and concerns about the project that need to be addressed; and • support involvement of aboriginal peoples." (p.34)
Involving Aboriginal Peoples	"The siting process will respect Aboriginal rights and treaties and will take into account that there may be unresolved claims between Aboriginal peoples and the Crown. Aboriginal and treaty rights are protected under Section 35 of the *Constitution Act*, 1982. Aboriginal peoples also have a unique cultural, traditional and social connection to the land and have a special interest in preserving and protecting the environment while providing a sustainable future for generations to come. Once a potential site and host community has been identified, and if not already involved, engagement of Aboriginal peoples will take place supported by agreements developed for this purpose (Step 4). These agreements will be developed in conjunction with the Aboriginal peoples in the area and will include support to help build capacity to participate, conduct independent research and develop culturally appropriate communication products. Aboriginal Traditional Knowledge includes important knowledge about the land and ecology stemming from long contact with the land. It also includes knowledge about developing and maintaining effective and meaningful relationships between generations and within and between communities. The NWMO will look to Aboriginal peoples to share that knowledge with the NWMO to the extent that they wish to. The NWMO will ensure that Aboriginal intellectual property is protected, as agreed with the Aboriginal people who choose to share that knowledge with us. (p.35)
Source: NWMO, May 2009. Moving Forward Together – Designing the Process for Selecting a Site. Invitation to Review a Proposed Process for Selecting a Site.	

[16]Nuclear Waste Management Organization. (NWMO). May 2009 *Moving Forward Together: Designing the Process for Selecting a Site – Invitation to Review a Proposed Process for Selecting a Site.* P. 32

4.6.2 DPRA Recommendations for Incorporation of Traditional Knowledge in NWMO's Siting Process

Table 7 summarizes DPRA's recommendations to NWMO in terms of the incorporation of TK in NWMO's siting process (Steps 2 to 4). The recommendations take into account DPRA and other research on TK as well as DPRA's case study experience. A number of documents relating to the incorporation of TK in environmental assessment processes were reviewed; many of these were based on Northern Canadian jurisdictions. The report on NWMO's September 2003 workshop/research on TK was also reviewed.

Table 7: Incorporation of TK in NWMO's Proposed Siting Process – Steps 2 to 4

1. Full and Meaningful Engagement	Successful incorporation of TK into the site selection process will require full and meaningful engagement of Aboriginal organizations and communities.
2. TK Informing Guiding Principles and Evaluation	TK[17] and practices may be used to inform guiding principles for the site / transportation route selection process, or to provide information to be used in screening, site / route definition, or site / route assessment (either comparative or absolute). Three elements of TK can inform the decision-making process: 'knowledge about the environment' (factual knowledge about the environment), 'knowledge about the use and management of the environment' (how the environment is used, and relationships with the environment are managed), and 'values about the environment' (values and preferences with respect to components of the environment, influenced by culture and spirituality, 'the right way to do things')[18].
3. Definition of Traditional Knowledge	There are many definitions of Traditional Knowledge that may be used or adapted for the NWMO siting process[19]. While NWMO may develop a definition within its process for Traditional Knowledge, the local and regional context and definitions will need to be taken into account.
4. TK Provides Value at Many Points in the Siting Process	TK can be brought into the siting process at any time. For instance, TK can assist with: • scoping the project and the assessment; • the collection of baseline information; • consideration of the environmental effects of a project; • evaluation of environmental effects and the determination of their significance; • evaluation of any cumulative environmental effects of the project • evaluation of the effects of the environment on the project; • identification or modification of mitigation measures; and • design and implementation of any follow-up programs[20]
5. TK in Many Forms and Formats	Depending on the specific situation, Traditional Knowledge may be available in one or more formats. These may include oral stories, written documents (e.g., research reports), mapping of land use/occupancy (in electronic format or hard copy), land use or community plans.

[17] It should be noted that 'local knowledge', which may or may not be Aboriginal, can also provide important information on local or regional social, cultural and economic environments.

[18] Mackenzie Valley Environmental Impact Review Board, 2005.

[19] Government of the Northwest Territories (2009): "...knowledge and values, which have been acquired through experience, observation, from the land or from spiritual teachings, and handed down from one generation to another."

[20] Canadian Environmental Assessment Agency. 2004. *Considering Aboriginal traditional knowledge in environmental assessments conducted under the Canadian Environmental Assessment Act - Interim Principles.*

Table 7: Incorporation of TK in NWMO's Proposed Siting Process – Steps 2 to 4	
6. Holistic View	Because of the Aboriginal holistic / inter-related view of the world, Traditional Knowledge does not generally compartmentalize the social, cultural and economic aspects of the environment from the biophysical as western science does. As a result, for example, wildlife will have social, cultural and economic significance.
7. Traditional Knowledge and Local Knowledge	The term 'traditional' may result in a perception that this knowledge is not current, and therefore not relevant to site evaluations. However TK continues to evolve with experience in the world today. The term TK is used almost exclusively in current impact assessment practice to refer to the use and knowledge of Aboriginal people – particularly elders - with respect to the environment (very broadly defined). Some have noted the potential exclusion of other local non-Aboriginal users or residents who may have generations of knowledge about a local landscape –or Aboriginal knowledge holders who are not elders or whose knowledge is reflecting the current situation (one that may be different than the historical one in a changing world)[21].
8. Local and Regional TK Protocols	Individual communities and/or Aboriginal organizations may have developed TK protocols relating to acquisition, use, confidentiality, intellectual property rights, and sharing of TK – NWMO will need to be aware of their existence and application in the context of any sites being considered in the siting process.
9. Funding of Land Use/ Occupancy or TK Studies	Should an Aboriginal community be involved in the siting process either as a potential host or as an interested party, there is a potential that NWMO would be asked to fund / participate in a land use / occupancy study or in traditional knowledge studies to assist in understanding potential effects of a GDR site. NWMO should develop internal understanding of the potential contribution of these studies and the state of knowledge/best practice in this regard.
10. Ability to Obtain TK	It may be difficult for NWMO to obtain Traditional Knowledge at any particular step in the process, for a range of reasons (e.g., capacity issues [human resources; time; funding]; lack of willingness of knowledge holders; available only in oral format). This may particularly be the case if the host community is not an Aboriginal community, but the potential site has linkages to one or more Aboriginal communities.
11. Accountability	Should the sites being considered in Steps 2 – 4 involve Aboriginal communities or interests, NWMO will need to be accountable for demonstrating how TK was used, along with other information sources, in making assessments and decisions.
12. Expert TK Advice Throughout the Process	NWMO should consider obtaining ongoing 'expert advice' from Aboriginal people on how to incorporate TK in the siting process as it evolves and progresses. This could be accomplished utilizing any existing mechanisms NWMO has in place with Aboriginal partners (e.g. working group/advisory committee) or seeking experienced Aboriginal consultants. Activities may include development of a TK policy and/or implementation plan, and training for NWMO staff. Hiring of Aboriginal staff with appropriate skill sets would also benefit NWMO. All of this is in addition to the participation of individual Aboriginal organizations (communities, First Nations, regional organizations) in the evaluation of one or more potential sites during any of the siting process steps.

[21] The *Canadian Environmental Assessment Act* reflects this distinction in S. 16.1: "*community knowledge* and Aboriginal traditional knowledge may be considered in conducting an environmental assessment." (Fedirechuk et. al. 2008).

Table 7: Incorporation of TK in NWMO's Proposed Siting Process – Steps 2 to 4	
13. Review of Existing Guidance and Experience	NWMO should review existing guidance and experience with the incorporation of TK in siting/environmental assessment processes from jurisdictions across Canada.

4.7 Proposed Approach to SEC Effects Assessment in Steps 2 to 4

Sections 5, 6 and 7 provide DPRA's approach to social, economic and cultural effects assessment in Steps 2, 3 and 4 of NWMO's proposed siting process. In these steps the potential suitability of sites put forward by communities that have expressed an interest will be evaluated according to various criteria, including those related to social, economic and cultural effects.

NWMO proposes to establish a review group that will review the assessments conducted of the potential suitability of a site at Steps 2, 3, and 4[22].

For each of these steps, the overall purpose is described; considerations are proposed; and SEC criteria, indicators and data sources identified.

[22] Nuclear Waste Management Organization. (NWMO). May 2009 *Moving Forward Together: Designing the Process for Selecting a Site – Invitation to Review a Proposed Process for Selecting a Site.* P. 36.

5. Social, Economic and Cultural Effects Assessment in NWMO Siting Process – Step 2 (Initial Screening)

STEP 2:
For communities that would like to learn more, an initial screening is conducted.

A: A community expresses interest in learning more about the process
B: The NWMO evaluates potential suitability of the community against the list of initial screening criteria
C: The NWMO provides a detailed briefing to the community.

The following provides DPRA's summary of the purpose and outcome of Step 2, followed by considerations for NWMO to consider in implementing Step 2, and recommended SEC criteria, indicators, data sources and rationales for this step.

5.1 Purpose of Step 2

In this step, communities express interest in learning more about the process for siting a deep geological repository. For such communities an initial screening is conducted to eliminate areas of social or environmental unsuitability.

Communities which do not meet all of the screening criteria are removed from further consideration.

Those communities still under consideration following the screening are provided with a series of briefings by NWMO on the siting process and future steps and offered information and resources for the community to further explore the possibility of continuing to the next step.

Step 2 is conducted entirely as a desktop SEC effects assessment at a reasonably large scale.

5.2 Outcome of Step 2

The outcome of Step 2 is that one or more interested communities that meet initial screening criteria, for potential preliminary assessment in Step 3.

5.3 Step 2 Considerations

Based on DPRA's review of Step 2, the following considerations for NWMO in this step have been identified.

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- A community's request to learn more about the process must be "made by accountable authorities (for example, elected representative bodies). This may involve: existing Municipal Council of a community; the community establishing a new community groups involving community leaders; or other group as deemed appropriate by the community for learning more about the project."[23] DPRA recommends that community leaders strive to seek community agreement from the earliest stages. For example, if Council makes the decision to put a community forward, there must be prior engagement to ensure that community members have been consulted in some way and are 'on board'.

[23] Nuclear Waste Management Organization. (NWMO). May 2009 *Moving Forward Together: Designing the Process for Selecting a Site – Invitation to Review a Proposed Process for Selecting a Site.* P. 20.

- To support this early consultation, DPRA recommends that NWMO provide information about the siting process and steps to community members on request (e.g., a presentation and Q & As) *prior to the decision to put a community forward* for consideration in Step 2.

- As Step 2 is exclusionary, the existing / secondary source information used in the evaluation must be of a sufficient level of detail and level of confidence to support a decision to exclude; otherwise additional study at Step 3 or even Step 4 will have to be used to exclude a community/site.

- At Step 2, 'sites' may not yet be clearly defined, as the 'community' area under consideration may be very large (e.g., potentially a number of sites with differing characteristics) or very small (potentially one or few sites with consistent characteristics).

5.4 Step 2 Criteria, Indicators and Data Sources

Table 8 provides potential SEC criteria, indicators and data sources for the Step 2 screening process. Two of the screening criteria identified by NWMO are relevant for the assessment of social, economic and cultural effects.[24] DPRA has added proposed indicators, data sources and rationales for these criteria.

The Step 2 evaluation is based on available information, and will involve an expert review.[25]

[24] Ibid, P. 25

[25] Ibid, Section 6.

Table 8: Step 2 – Proposed SEC Screening Criteria, Indicators and Data Sources				
	NWMO's Proposed Criteria	**DPRA's Proposed Indicators**	**DPRA's Proposed Data Sources**	**DPRA Comments / Rationale**
Safety/ Technical	*2.1 NWMO safety and technical criteria - beyond the scope of this study*			
Economic	2.2 "This available land must not contain economically exploitable natural resources as known today, so that the repository site is unlikely to be disturbed by future generations" [26]	• Potential oil, gas and mineral resources, including base and precious metals • Lands with known resources	• Existing desktop information: • Natural Resources Canada mapping • Provincial Departments of Natural Resources, Mines	Eliminating areas with known non-renewable natural resources reduces the potential for the DGR area to be subject to conflicting land uses. This may not preclude the use of former /abandoned mine sites from consideration.
Social/ Cultural	2.3 "This available land must be outside protected areas, heritage sites, provincial parks and national parks"[27]	Proximity to: • Federal and provincial parks • Heritage areas • Historic sites	Federal: • Parks Canada • Canadian Heritage Provincial: • Provincial Ministries of Natural Resources, Tourism, etc. Regional: • E.g. Conservation Authorities	Parks, protected areas and heritage sites have cultural, social and economic benefits, as well as recreational and historic value. These areas may also present legal and political constraints to siting. However, there may be an opportunity for the use of DGR lands/buffer areas to enhance or support adjacent protected areas, heritage sites or parks.

[26] Nuclear Waste Management Organization. (NWMO). May 2009 *Moving Forward Together: Designing the Process for Selecting a Site – Invitation to Review a Proposed Process for Selecting a Site.* P. 13, P. 25.

[27] Ibid.

6 Social, Economic and Cultural Effects Assessment in NWMO Siting Process – Step 3 (Preliminary Assessment/Feasibility Study)

STEP 3:
For communities that continue to be interested, a preliminary assessment of potential suitability is conducted over a 1- to 2-year period.

A: The community informs the NWMO of its interest in a preliminary assessment of its potential suitability
B: The NWMO conducts feasibility studies in collaboration with the community to assess whether the community contains potentially suitable sites
C: Communities with potentially suitable sites assess whether they are interested in continuing to detailed site evaluation.

The following provides DPRA 's summary of the purpose and outcome of Step 3, followed by considerations for NWMO to consider in implementing Step 3 and recommended SEC criteria, indicators, data sources and rationales for this step.

6.1 Purpose of Step 3

Step 3 involves activities by NWMO and the community to explore the feasibility of siting a DGR facility in the local geographic area from a technical and social/cultural viewpoint. On request by a community, NWMO will work with the community authorities to develop a memorandum of understanding outlining[28];

- The scope of work to be done for the feasibility study[29];
- The means by which the NWMO and the community will work together on the feasibility study;
- The approach and terms of reference for a multi-disciplinary peer review process;
- The way citizens will be engaged; and
- The nature of funding to be provided by the NWMO to support the process.

NWMO has committed to make the results of the feasibility study and the peer review report available on its website.

Available land areas or individual sites that meet the initial screening criteria and are brought forward by communities for potential consideration by NWMO will be subject to a progressively more detailed evaluation. Two goals set the context within which the feasibility assessment occurs. They are:

- "First, ensuring safety – that is the ability of the site to protect people and the environment; and
- Second, beyond safety – the effect of the project on the sustainability and well-being of the community" [30]

NWMO has noted that "Low performance on any of these factors would not exclude a community from consideration, although the ability of the community to benefit from the project, and the resources that would be required from the NWMO to support the community in achieving this benefit,

[28] Nuclear Waste Management Organization. (NWMO). May 2009 *Moving Forward Together: Designing the Process for Selecting a Site – Invitation to Review a Proposed Process for Selecting a Site.* P. 21.

[29] In the interests of equity and comparability, NWMO should utilize a standard or core approach for the scope of work to be done in each community. The standard approach could be enhanced to meet specific community needs.

[30] Nuclear Waste Management Organization. (NWMO). May 2009 *Moving Forward Together: Designing the Process for Selecting a Site – Invitation to Review a Proposed Process for Selecting a Site.* P. 25.

would be a consideration in the selection of a site after all safety considerations have been satisfied."[31]

In Step 3, the tasks are:

- Definition of one or more potential sites within a community (e.g., using opportunities, constraints), if the area proposed by a community is larger than needed for the DGR;
- Preliminary assessment / feasibility study of defined sites or site areas – using pre-defined geoscientific and community well-being criteria; and
- An assessment of preliminary/potential social, economic and cultural effects of each defined site/site area.

Step 3 is a desktop exercise with some limited field investigations depending on extent of available information; there will be an expert panel review of the evaluations.[32]

6.2 Outcome of Step 3

Based on DPRA's understanding, the outcome of Step 3 is one or more communities with one or more potentially suitable sites for detailed site evaluation in Step 4 (if the community is still willing to proceed).

6.3 Step 3 Considerations

Based on DPRA's review of Step 3, the following considerations for NWMO have been identified for this step.

- To foster well-being in a community, NWMO has indicated that communities should develop a vision. "Beyond safety, the NWMO's commitment to any host community is that its long-term well-being or quality of life will be fostered through participation in this project…Ultimately the vision for the community and the extent to which the project contributes to this vision in an acceptable way is a matter for the community to discuss and assess."[33]
- DPRA recommends that as required, a community's visioning exercise to help map their preferred future in terms of defining community well-being be conducted in Step 3. The visioning exercise would include reviewing changes and trends for the community in the last 10 years, both positive and negative, and identifying future goals and scenarios. The visioning exercise (in addition to the results of the feasibility study) will help the community decide whether or not continuing to be considered for a potential DGR facility will be in the best present and future interests of the community.[34]
- It is possible that in Step 3 there may be only one community (with one or more potential site areas) subject to the feasibility evaluation, or there may be multiple communities (with multiple potential site areas) being evaluated. Differences in time frames for communities coming forward will also need to be considered in the nature of the evaluation.

[31] Ibid, P.31

[32] Ibid, P.14; Section 6.

[33] Ibid P. 33

[34] If a municipality has prepared an ICSP or other community plan, a visioning exercise may already have been completed.

6.4 Step 3 Site Definition Constraints and Opportunities Criteria

There are two types of criteria to be applied in Step 3: constraints and opportunities.

1) The **constraints** criteria identify areas that it would be preferable to avoid in defining a site to undergo a feasibility study for the siting of the DGR. These include population centres and areas with major infrastructure (e.g., international airports, electrical generating stations or major water treatment plant). Constraint criteria assist in site definition, e.g., distinguishing a potentially suitable site from a larger area. Care needs to be taken to consider if an identified constraint may also offer a potential opportunity – for example, while proximity to a park or protected area may be considered as a constraint, there may be an opportunity for the use of DGR lands/buffer areas to enhance or support adjacent protected areas, heritage sites or parks. A similar case may exist in the case of proximity to transportation infrastructure.

2) The **opportunities** criteria in Step 3 are applied to identify features that would be advantageous for potentially siting a DGR, such as availability of major highways, proximity of a rail network and/or access by waterways. Opportunities are also implied by the absence of constraints (e.g., populated areas). Opportunities criteria can assist in site definition (if needed) and site evaluation.

6.5 Step 3 Criteria

Depending on the size/geographic scope of the available land brought forward by a community for consideration, a ‘site definition sub-step’ might be necessary within Step 3. For example, a community may bring forward a large geographic area for consideration that is many times larger than that required for the DGR. The ‘sub-step’ might be required to define or refine the boundaries of one or more sites in the community. The site(s) would then be subject to the Step 3 feasibility study. The criteria identified in Tables 9 and 10 can be modified for use in site definition (if needed), and then used for the feasibility study.

Table 9 provides DPRA’s proposed SEC **Constraints** criteria, indicators, data sources and rationales for Step 3. Table 10 provides the same information for the **Opportunities** criteria.

Table 9: Step 3 Feasibility Study - Proposed SEC Constraints Criteria, Indicators and Data Sources				
	Criteria	**Indicators**	**Data Sources**	**Comments / Rationale**
CONSTRAINTS CRITERIA				
Safety/ Technical	*3.1 NWMO safety and technical criteria - beyond the scope of this study*			
Social	3.2 Avoid major infrastructure areas (e.g. international airports)	Proximity to the following types of facilities, e.g.: • International airports • Major water treatment plants • Electrical generating stations	• Transport Canada • Local/regional municipality • Utility companies	Major infrastructure facilities should be preserved to avoid undue interference with their operations. Some facilities may also be considered opportunities
	3.3 Assess competing claims for land use	• Plans for developments • Comprehensive or specific Aboriginal land claims	• Local and regional planning documents • Regional/provincial planning policies/ statements • INAC Land Claims List • Official Plans • Land Use Plans	The location of the DGR should be compatible with existing or planned land uses
Economic	3.4 Avoid industrial, commercial and retail development areas	• Industrial, commercial and retail development areas	• Local and regional planning documents • Official Plans • Land Use Plans	The location of the DGR should be compatible with existing or planned land uses
Cultural	3.5 Avoid known areas of cultural significance	• Areas with known cultural, and historical resources • Sacred or historic areas	• Historic Sites and Monuments Board of Canada • Local/regional historical societies • Local/traditional knowledge	Areas of cultural and historic value should be preserved for use and enjoyment
	3.6 Avoid Valued Cultural Features	Proximity to: • Local/regional parks • Local/regional historic sites	• Local maps and records • Conservation Authorities	Areas of local recreational, ecological or historic value should be preserved for use and enjoyment of the features

Table 9: Step 3 Feasibility Study - Proposed SEC Constraints Criteria, Indicators and Data Sources				
	Criteria	**Indicators**	**Data Sources**	**Comments / Rationale**
	3.7 For Aboriginal communities –Avoid important traditional use areas (e.g., wildlife harvesting locations, sacred sites, travel routes, calving locations etc.)	• Proximity to traditional use areas	• Local / TK information from Aboriginal communities • Provincial Ministries of Natural Resources	Traditional use areas are essential for communities that rely on harvesting for subsistence, and to support cultural heritage
	3.8 Aboriginal Interests	• Traditional ecological knowledge re: valued areas • Location of cultural and sacred sites	• Aboriginal Information • Community land use plans • Traditional/local knowledge	The objective is to preserve and protect valued areas. The closer the DGR facility is to cultural and sacred sites, the more likely direct or indirect effects will occur.

Table 10: Step 3 Feasibility Study - Proposed SEC Opportunities Criteria, Indicators and Data Sources				
	Criteria	**Indicators**	**Data Sources**	**Comments / Rationale**
OPPORTUNITY CRITERIA				
Safety/ Technical	*3.9 NWMO safety and technical criteria - beyond the scope of this assessment*			
Social	3.10 Potential to avoid or minimize social effects of the transportation of used nuclear fuel from existing storage facilities to the repository site.[35]	• Availability of road transportation routes • Availability of rail transportation routes • Availability of water transportation routes • Adequacy of associated infrastructure • Potential to put such routes in place[36]	• Provincial Ministries of Transportation • Transport Canada • Local/regional municipalities	Transportation mode and distance from the source of used fuel should be considered in determining the potential social, economic and cultural effects and / or feasibility of sites
	3.11 Preference for isolated/vacant areas	• Preference for undeveloped or sparsely populated land areas	• Local and regional planning information • Current land use maps • Zoning maps • Statistics Canada data	A preference for sparsely populated or undeveloped areas will reduce the potential for social, economic and cultural effects on people and communities
Economic	3.12 Contribution to Local/Regional Employment	• Jobs created locally/regionally – during both site selection process and during implementation of the project (construction and operation)	NWMO	The objective is to assess the degree of economic effects in proposed site areas

[35]Nuclear Waste Management Organization. (NWMO). May 2009 *Moving Forward Together: Designing the Process for Selecting a Site – Invitation to Review a Proposed Process for Selecting a Site.*. P. 32.

[36] Ibid,.

Table 10: Step 3 Feasibility Study - Proposed SEC Opportunities Criteria, Indicators and Data Sources				
	Criteria	**Indicators**	**Data Sources**	**Comments / Rationale**
	3.13 Contribution to Local / Regional Economy	• Estimate of local expenditures during both site selection process and during implementation of the project (construction and operation)	NWMO	The objective is to assess the degree of contribution to the local/regional economy
	3.14 Cost of Infrastructure needs	• Cost of new road construction (kms) • Availability of community services such as fire, policing, hospital)	NWMO	Infrastructure costs need to be considered as part of the site evaluation process
	3.15 Effect on municipal revenues (tax revenues, government subsidies, demand for services)	Changes in: • Assessment • Taxes • Subsidies	• NWMO • Local Municipality	The objective is to provide an initial assessment of the potential impact on a municipality's revenues that would result from siting of a DGR
Cultural	3.16 Community values and objectives	Community plan/vision statement	• Municipal or community plans • Community Vision Document • Local / TK from Aboriginal communities • Municipal ICSP	Community values and objectives as determined in the visioning exercise will assist the community in assessing potential effects of a DGR on the community and their willingness to proceed in the site selection process. It is noted that if an Aboriginal community is the potential host, additional indicators/data sources may be appropriate.

7. Social, Economic and Cultural Effects Assessment in NWMO Siting Process - Step 4 (Detailed Evaluation)

STEP 4:
For communities that continue to be interested, potentially affected surrounding communities are engaged and detailed site evaluations are completed over a 5-year period.

A: Communities with potentially suitable sites inform the NWMO of their interest in continuing to detailed site evaluation.
B: Several activities will take place in the course of completing this step. These activities may be undertaken in parallel or sequentially.

- The NWMO and the interested community engage surrounding communities and potentially affected Aboriginal government in study of social, economic, and cultural effects of the project at the broader regional level.
- The NWMO selects one or more suitable sites from communities expressing formal interest for detailed site evaluations.
- The NWMO conducts detailed site investigations in collaboration with the community to further assess and, if appropriate, confirm the suitability of sites.

C: Communities with confirmed suitable sites assess whether they are willing to accept the project.

The following provides DPRA's summary of the purpose and outcome of Step 4. This is followed by DPRA's considerations for NWMO to take into account in implementing Step 4, and recommended SEC criteria, indicators, data sources and rationales for this step.

7.1 Purpose of Step 4

There are three key activities that will take place in completing this step (these activities may be concurrent or sequential):

- The first involves NWMO working with communities who have indicated an interest in proceeding to conduct an evaluation of potential sites at local and regional scales. The surrounding communities and regions will be involved in assisting in the study of social, economic, and cultural effects of the project at the broader regional level.

- NWMO will use the results of that evaluation to select one or more suitable sites which will be evaluated in a more detailed evaluation. The evaluation and site selection of a preferred site(s) will be subject to a third party peer review.

- A detailed evaluation will be conducted on the preferred site(s) selected above, assuming the community(s) continues to be interested in proceeding to the detailed assessment.

Step 4 includes detailed field and lab investigations, testing, monitoring, safety analysis, and socio-economic studies, as well as expert review.[37] In Step 4, NWMO will identify the preferred mode(s) of transportation to each potential site under consideration.

Step 4 is the crucial step in that cumulative and net effects need to be addressed to evaluate the contribution of the DGR to the sustainability of the host community and region.

[37] Nuclear Waste Management Organization. (NWMO). May 2009 *Moving Forward Together: Designing the Process for Selecting a Site – Invitation to Review a Proposed Process for Selecting a Site.*.P. 14, 22, and S. 6.

7.2 Outcome of Step 4:

The outcomes of Step 4 are as follows:

- A decision as to whether the site(s) is suitable in terms of safety and community well-being; and
- Confirmation is made of one or more suitable sites.

As NWMO has noted, "Low performance on any of these [community well-being] factors would not exclude a community from consideration, although the ability of the community to benefit from the project, and the resources that would be required from the NWMO to support the community in achieving this benefit, would be a consideration in the selection of a site after all safety considerations have been satisfied."[38]

7.3 Step 4 Considerations:

Based on a review of Step 4, DPRA has identified the following considerations for NWMO in this step:

- Because the evaluation at the local and regional levels and the detailed evaluation on one or more preferred sites will vary considerably in scale and level of detail, DPRA proposes that this step should be divided into two discrete sub-steps:
    - Part A – An initial evaluation of sites in communities (including the regional level); and
    - Part B: A detailed evaluation of one or more sites within participating communities.

  Part B builds on Part A, in that many of the same criteria and indicators are used, but more detailed information is gathered for the detailed evaluation of sites in Part B.

- DPRA has proposed the following initial study areas for the Step 4 evaluations. These study areas are proposed because they have typically been used in other major development projects and may be applicable to the siting of a DGR. NWMO and its social, economic and cultural consultants, in collaboration with the community(s) would develop the exact study areas in the context of a specific location. The study areas will need to be evidence-based and defensible.
    - On-site Study Area – this is the actual land footprint that will be used for the facility plus all buffer areas. It is from the On-site Study Area that any residents, businesses and other built features will be displaced.
    - Off-site Study Areas:
        - 0 to 1 km Study Area – this study area includes lands directly abutting and adjacent to the site and within 1 km from and around the boundaries of the site. It is within these zones that most disruption/nuisance impacts related to construction and operation will be experienced by individuals and households.
        - 1 to 2 km Study Area – It is possible that construction and operations activities may result in some impacts on people, facilities, services and activities within this study area.
        - 2 to 5 km Study Area - It is possible that some construction and operations activities may result in some impacts on people, facilities, services and activities.
    - Selected transportation route(s) - e.g., adjacent to / within 500m of the roadway, rail line or waterway from the site to the nearest 400-series highway, main rail line or main waterway;
    - Community Study Area - the local municipal area is the starting point, but will be defined based on unique context for each site. The direct, indirect and induced effects of the DGR may have impacts on community character/image, and economic benefits for the community; and

[38] Nuclear Waste Management Organization. (NWMO). May 2009 *Moving Forward Together: Designing the Process for Selecting a Site – Invitation to Review a Proposed Process for Selecting a Site.*.P. 31.

- Regional Study Area - e.g., upper tier municipality such as region or county. The direct, indirect and induced effects of the DGR may have impacts on regional character/image, and economic benefits at a regional level.

1. Because of the broad scope of Step 4, and in consideration of NWMO's principle of actively engaging the communities and regions in the assessment of social, economic and cultural effects, it is recommended that NWMO develop, at the start of Step 4, a detailed engagement plan for all potentially affected parties. This plan should be developed in collaboration with the potential host communities, surrounding communities and regions, but also with the specialists to be engaged in the assessment of potential of social, economic and cultural effects (as well as other NWMO technical experts). This will ensure that local and regional information, including Traditional Knowledge, local knowledge, and community values are included appropriately in the assessment, and the various communities of interest are effectively involved in the assessment. The engagement plan should also include the parties' continuing involvement in the detailed evaluation of the preferred site(s).[39]

2. The potential cumulative effects of the DGR will need to be considered at Step 4, in order for NWMO and the community to fully understand the potential advantages and disadvantages of hosting the facility. An understanding of potential cumulative effects will also contribute to awareness of contributions to sustainability and community well-being. A cumulative effects assessment would likely be required for the Step 8 regulatory review. For example, Subsection 16(1) of the *Canadian Environmental Assessment Act* requires every environmental assessment to include consideration of the environmental effects of a project, including "any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out." Depending on the jurisdiction of the site, other requirements for cumulative effects assessment may apply.

7.4 Criteria

Table 11 provides potential criteria, indicators and data sources for social, cultural and economic assessment in Step 4 for Part A: Initial Evaluation. Table 12 provides the same information for and Part B: Detailed Evaluation.

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[39] It is possible that in Step 4 there may be only one community (with one or more potential site areas) subject to the detailed evaluation, or there may be multiple communities (with multiple potential site areas) being evaluated. Differences in time frames for communities coming forward will also need to be considered in the nature of the evaluation.

Part A of Step 4 involves an initial evaluation of candidate sites from which one or more potential sites will be identified (assuming communities remain willing to proceed) for detailed evaluation.

Table 11: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part A

Part A: Initial Step 4 Evaluation of Potential Sites

	Criteria	Indicators	Data Sources	Comments/Rationale
Safety/ Technical	*4.1 NWMO safety and technical criteria - beyond the scope of this assignment*			
Social	**On-Site Study Area**			
	4.2 Potential for displacement of residents on-site	• Number of dwellings and average number of persons per dwelling	• Existing aerial photography/ mapping with confirmation by roadside surveys and municipal assessment roll data • Regional planning data	A DGR may displace the existing population. The objective is to displace as few people as possible
	4.3 Potential for displacement of on-site institutional, community and recreation features	• Number and type of institutional, community and recreation features	• Existing aerial photography/ mapping with confirmation by roadside surveys and municipal assessment roll data • Regional planning data	A DGR may displace institutional, community and recreation features. The objective is to displace as few features as possible
Social	**Off-site Study Areas (e.g., 0 to 1 km, 1 to 2 km, 2-5 km, along transportation routes)**			
	4.4 Potential for disruption of residents in the off-site study areas	• Number of dwellings and average number of persons per dwelling	• Existing aerial photography/ mapping with confirmation by roadside surveys and municipal assessment roll data • Enumeration areas (census) • Regional planning data	A DGR may disrupt the daily activities and use and enjoyment of property by residents. The objective is to disrupt as few residents as possible

Table 11: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part A Part A: Initial Step 4 Evaluation of Potential Sites				
	Criteria	**Indicators**	**Data Sources**	**Comments/Rationale**
	4.5 Potential for disruption of institutional, community and recreation features in the off-site study areas	• Number and type of institutional, community and recreation features	• Roadside surveys • Assessment roll data • Existing aerial photography/mapping • Interviews with owners/operators of features • Other study team members • Municipal office	A DGR may disrupt institutional, community and recreation features. The objective is to disrupt as few features as possible. The concern is with the potential for change in demand for the feature and/or change in its level of quality or service provided. Disruption to these features could lead to a decrease in the quality of life of the users.
Social	**Community Study Area**			
	4.6 Community cohesion	• Sense of community and commitment • Social/community ties and interactions	• Public meetings • Interviews • Focus groups • Local/Traditional Knowledge (for sites where Aboriginal communities have an interest)	Community cohesion measures residents' sense of belonging and psychological identification with the community and the potential effects on these from a proposed DGR
	4.7 Changing aesthetic qualities and character of the community	• Satisfaction with Community • Valued characteristics	• Public meetings • Interviews • Focus groups • Local/Traditional Knowledge (for sites where Aboriginal communities have an interest)	The construction and operation of a DGR may affect a community's qualities (e.g. land uses, environmental features, way of life, shared values and perspectives, type of business activities) and the value placed on these by community members.

Table 11: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part A Part A: Initial Step 4 Evaluation of Potential Sites				
	Criteria	**Indicators**	**Data Sources**	**Comments/Rationale**
	4.8 Changing perceptions about quality of life and/or the value of the environment	• Changes in perceived quality of life for people	• Public meetings • Interviews • Focus groups • Local/Traditional Knowledge (for sites where Aboriginal communities have an interest)	How residents perceive a new facility such as a DGR in their community will influence, to some extent, their responses to that facility and affect their perceived quality of life.
	4.9 Diversity (social)	• Number and type of potentially vulnerable groups (social, ethnic, religious)	• Demographic data • Key informants	The construction and operation of a potential DGR can affect vulnerable populations disproportionally and needs to be assessed
Social	**Regional Study Area**			
	4.10 Potential for worker population in-migration	• Anticipated workforce in-migration compared to regional workforce	• Municipal and regional data • NWMO data	Workforce in-migration, if considerable, may affect community services (e.g., housing, health, recreation, law enforcement)
	4.11 Effect on community infrastructure/ services	• Extent of modifications to infrastructure/service	• Municipal and regional data • Key contact interviews	The DGR may require some relocation/ modification of infrastructure (i.e. hydro lines; pipelines)
Economic	**On-Site Study Area**			
	4.12 Potential for displacement of on-site business operations and public sector employers (includes	• Number of businesses • Types of businesses • Number of employees	• Economic development organizations (municipal level) • Roadside surveys • Regional/ municipal business	A DGR may displace existing businesses; the objective is to displace as few existing businesses as possible and minimize the impact on employment from

Table 11: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part A Part A: Initial Step 4 Evaluation of Potential Sites				
	Criteria	**Indicators**	**Data Sources**	**Comments/Rationale**
	agribusinesses)		directories	the businesses.
Economic	**Off-Site Study Areas (e.g., 0 to 1 km, 1 to 2 km, 2-5 km, along transportation routes)**			
	4.13 Potential for disruption to business operations and public sector employers in the off-site study areas	• Number of businesses disrupted • Types of businesses disrupted • Number of employees in sensitive businesses[40] • Number of employees in other businesses	• Economic development organizations (municipal level) • Roadside surveys • Regional/municipal business directories	A DGR may disrupt existing businesses; the objective is to disrupt as few existing businesses as possible and minimize the impact on employment
	4.14 Impact on property values surrounding the site	• Potential property value change for lands (residential, commercial, industrial, agricultural)	• Real estate valuation analysis (specialist study) • Assessed value of lands today	The construction and operation of a DGR may result in changes to property values. The intent is to maximize potential increases while minimizing potential losses.
Economic	**Community Study Area**			
	4.15 Potential impact on direct and indirect employment and business sales	• Project-related needs for labour and expected local hires • Local project-related purchases of materials	• Business directories • Municipal information • Survey of business operations and public sector employers • NWMO data	The effect on businesses and employment will depend on the size and nature of the enterprise, its contribution to the local economy, and its compatibility with a DGR site
	4.16 Potential for local workforce to be hired	• Local workforce numbers and skills	• Municipal and regional data • NWMO data	Contribution of a local workforce to the DGR can

[40] Sensitive businesses are corporate enterprises involved in: food processing, hospitality (restaurants, hotels, etc.), drug manufacture, health care services.

Table 11: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part A Part A: Initial Step 4 Evaluation of Potential Sites				
	Criteria	**Indicators**	**Data Sources**	**Comments/Rationale**
				provide positive economic benefits to the regional area
	4.17 Potential for local business to benefit	• Local business services potentially benefitting from the DGR	• Municipal and regional data • Key contact interviews	Local business opportunities to support the construction and operation of the DGR can bring economic benefits to the regional area
Economic	**Regional Study Area**			
	4.18 Compatibility with economic image (e.g. eco-tourism, tourism)	• Image (key characteristics) promoted for the regional Study Area	• Community promotional materials • Key contact interviews • Tourism strategies/plans (local/ regional or provincial)	A regional area may have characteristics seen as incompatible with a DGR. Such perceptions may result in negative economic effects
	4.19 Potential for regional workforce to be hired	• Local workforce numbers and skills	• Municipal and regional data • NWMO data	Contribution of a local workforce to the DGR can provide positive economic benefits to the regional are
	4.20 Potential for regional business to benefit	• Local business services potentially benefitting from the DGR	• Municipal and regional data • Key contact interviews	Local business opportunities to support the construction and operation of the DGR can bring economic benefits to the regional area
	4.21 Knowledge of and comfort with similar industries	• Nature and type of nuclear facilities in the regional Study Area	NWMO data	Regional areas in which communities are familiar with nuclear activity may perceive a DGR in a more positive light
	4.22 Knowledge of experience with 'complex/ controversial facilities' (e.g., mining,	• Nature and type of complex/controversial facilities in the regional study area	Regional municipality information	Regional areas in which communities are familiar with complex/controversial facilities may perceive a DGR in a more positive light

Table 11: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part A

Part A: Initial Step 4 Evaluation of Potential Sites

	Criteria	Indicators	Data Sources	Comments/Rationale
	hazardous waste, etc.)			
	4.23 Potential effects on primary sectors of the economy	• Employment distribution and trends by major sectors of the economy • Compatibility of a repository with the economic base of the regional study area	• Business directories • Regional municipality information • Key informant interviews	A DGR has the potential to affect major sectors of the economy in the regional study area if perceived as incompatible with those sectors
Cultural	**On-Site Study Area**			
	4.24 Potential for displacement of on-site cultural heritage feature resources and cultural landscapes	• Number of cultural heritage feature resources[41] • Number of cultural landscape units[42]	• Local Architectural Conservation Advisory Committee (LACAC) • Municipal designation and listed buildings/heritage inventory consultation • Ontario Heritage Foundation Easement Properties/Plaques consultation • National Historic Sites and Monuments Board sites consultation • Roadside survey	The objective is to minimize the loss of cultural heritage feature resources and loss of cultural landscapes. The intent is to identify the cultural landscape unit as either historic or scenic interest or a combination of both.

[41] Cultural heritage feature is a human work, or a place that gives evidence of human activity or has spiritual or cultural meaning, and that has been determined to be of historic value to the province, a community, or an aboriginal people. From: http://www.env.gov.bc.ca/bcparks/conserve/cpp_p1/cultural.pdf

[42] Cultural landscape is any geographic area that has been modified, influenced, or given special cultural meaning by people. A cultural landscape may be evaluated as a cultural resource if it is determined to have historic value. From: http://www.pc.gc.ca/docs/pc/guide/guide/sec3/commemorative_glossary_1.aspx

Table 11: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part A Part A: Initial Step 4 Evaluation of Potential Sites				
	Criteria	**Indicators**	**Data Sources**	**Comments/Rationale**
	4.25 Potential for on-site displacement of archaeological resources	• Presence of known archaeological resources on-site	• Provincial Ministries responsible for Culture • Regional/local histories • Historic maps • Key informant interviews (e.g. with historical society members, local elders) • Partial archaeological survey and preliminary assessment • Land use and occupancy studies	Archaeological sites are valuable non-renewable resources. Identification and impact assessment are required under provincial legislation.
Cultural	**Off-Site Study Areas (e.g., 0 to 1 km, 1 to 2 km, 2-5 km, along transportation routes)**			
	4.26 Potential for disruption of off-site cultural heritage feature resources in the off-site study areas	• Proximity of site to crossroad settlements, villages, towns in the off-site study areas	List of heritage properties identified by municipal/provincial and federal governments within the study areas	The closer the DGR facility is to cultural heritage feature resources, historic features, historic community or heritage conservation districts, the more likely direct or indirect effects will occur.
Cultural	**Community Study Area**			
	4.27 Strength of traditional economy	• Percentage off population engaged in traditional economy	• Data from Aboriginal governments/communities, INAC • Land use and occupancy information	Protection of the traditional economy is an objective for the health and social/cultural well-being of communities

Table 11: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part A Part A: Initial Step 4 Evaluation of Potential Sites				
	Criteria	**Indicators**	**Data Sources**	**Comments/Rationale**
	4.28 Aboriginal Interests	• Traditional ecological knowledge re: valued areas • Location of cultural and sacred sites	• Aboriginal Information • Community land use plans • Traditional/local knowledge	The objective is to preserve and protect valued ecological areas. The closer the DGR facility is to cultural and sacred sites, the more likely direct or indirect effects will occur.
Cultural	**Regional Study Area**			
	4.29 Access to Aboriginal Traditional Use Areas (e.g., harvesting, hunting and fishing areas; sacred sites)	• Location of traditional use areas	• Key informant interviews • Aboriginal information • Hunting statistics • Trapping statistics • Land use and occupancy mapping	Construction and operation of a DGR has the potential to affect access to traditional resource harvesting areas. The objective is to minimize any potential negative effects

Part B involves a detailed evaluation of one or more candidate sites that passed the Part 1 evaluation, assuming the community(s) remains willing to proceed).

Table 12: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part B

Part B: Detailed Evaluation of Candidate Sites

	Criteria	Indicators	Data Sources	Comments/Rationale
Safety/ Technical	*4.30 NWMO safety and technical criteria - beyond the scope of this assignment*			
Social	**On-Site Study Area**			
	4.29 Number of on-site residents potentially displaced	• Number of residents on-site • Number of potentially vulnerable residents (e.g. elderly residents, children) • Ties to property (e.g. cemetery and heritage properties) • Attachment to place • Hardships/difficulties in moving • Proportion of displaced residents relative to size of community	• Existing aerial photography with confirmation by roadside surveys • Enumeration areas (census) • Regional planning data • Interviews/surveys • Focus groups	A DGR may displace the existing population. The objective is to displace as few people as possible. Seniors, children and people with disabilities may be more vulnerable to relocation effects. Attachment to home is significant in determining hardship of displacement
	4.30 Number and characteristics of on-site institutional, community and recreation features displaced	• Number of features on-site • Type of features on-site (services provided, number of clients) • Availability of alternatives • Hardships/difficulties in moving • Special characteristics of users (children, seniors, disabled)	• Existing aerial photography with confirmation by roadside surveys • Enumeration areas (census) • Regional planning data • Interviews with owners/operators of the features • Other study team members • Municipal office • Interviews with operators and service providers	Displacement of institutional, community and recreation features could cause hardship for the users and/or reduce community cohesion. The availability of alternatives may off-set the displacement of on-site features. The objective is to minimize the displacement of features, which may cause inconvenience/ hardship to owners/ operators and users, and negatively affect life in the community.

Table 12: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part B Part B: Detailed Evaluation of Candidate Sites				
	Criteria	**Indicators**	**Data Sources**	**Comments/Rationale**
Social	**Off-Site Study Areas (e.g., 0 to 1 km, 1 to 2 km, 2-5 km, along transportation routes)**			
	4.31 Number and characteristics of residents disrupted in the off-site study areas	• Number of residents in each study area • Number of potentially vulnerable residents (e.g. elderly residents, children) • Uses of property (day to day indoor/outdoor activities) • Satisfaction with place	• Existing aerial photography with confirmation by roadside surveys • Enumeration areas (census) • Regional planning data • Interviews/surveys • Focus groups	A DGR facility may disrupt the daily activities and use of enjoyment of property by residents. The objective is to disrupt as few residents in these study areas as possible.
	4.32 Number of institutional, community and recreation features disrupted in the off-site study areas	• Number of features in the off-site impact zone • Type of features on-site (services provided, number of clients, hours of operation) • Uses of property (indoor/outdoor facilities) • Special characteristics of users (children, seniors, disabled)	• Roadside surveys • Assessment roll data • Existing aerial photography • Interviews with owners/operators of the features • Other study team members • Municipal office	Disruption to institutional, community and recreation features may cause a change in activity patterns of users. The objective is to disrupt as few features as possible. The concern is with the potential for change in demand for the feature and/or change in its level of quality or service provided. Disruption to these features could lead to a decrease in the quality of life of the users.
Social	**Community Study Area**			
	4.33 Community cohesion/ resilience	• Ties and interactions • Community participation • Mobility rates	• Community surveys • Interviews • Focus groups	Community cohesion measures residents' sense of belonging and psychological identification with the community and the

Table 12: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part B Part B: Detailed Evaluation of Candidate Sites				
	Criteria	**Indicators**	**Data Sources**	**Comments/Rationale**
				potential effects on these from a proposed DGR
	4.34 Community character	• Satisfaction with place • Potential change to community features and amenities • Average length of residence • Ancestral ties to community • Potential changes in land use trends • Potential changes in demographic characteristics • Socio-economic well-being	• Community surveys • Key informant interviews • Focus groups • Municipal / regional / provincial planning data and policies • Statistics Canada • Municipal ICSP	The construction and operation of a DGR may affect a community's qualities (e.g. land uses, environmental features, way of life, shared values and perspectives, type of business activities) and the value placed on these by community members.
	4.35 Changing perceptions about quality of life and/or the value of the environment (aboriginal and non-aboriginal)	• Changes in perceived quality of life for people	• Public meetings • Surveys • Key informant interviews • Focus groups	How residents perceive a new facility such as a DGR in their community will influence, to some extent, their responses to that facility and affect their perceived quality of life.
	4.36 Diversity (social)	• Number and type of potentially vulnerable groups (social, ethnic, religious)	• Demographic data • Key informant interviews	The construction and operation of a potential DGR can affect vulnerable populations disproportionally and needs to be assessed
Social	**Regional Study Area**			
	4.37 Potential for worker population in-migration	• Anticipated workforce in-migration compared to regional workforce	• Municipal and regional data • NWMO data	Workforce in-migration, if considerable, may affect community services (e.g., housing, health, recreation,

Table 12: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part B

Part B: Detailed Evaluation of Candidate Sites

	Criteria	Indicators	Data Sources	Comments/Rationale
				law enforcement)
	4.38 Potential for local workforce to be hired	• Local workforce numbers and skills	• Municipal and regional data • NWMO data	Contribution of a local workforce to the DGR can provide positive economic benefits to the regional are
	4.39 Potential for local business to benefit	• Local business services potentially benefitting from the DGR	• Municipal and regional data • Key contact interviews	Local business opportunities to support the construction and operation of the DGR can bring economic benefits to the regional area
	4.40 Effect on community infrastructure/ services	• Extent of modifications to infrastructure/service	• Municipal and regional data • Key contact interviews	The DGR may require some relocation/ modification of infrastructure (i.e. hydro lines; pipelines)
Economic	**On-Site Study Area**			
	4.41 Potential for displacement of business operations and public sector employers on-site	• Size of operation (employment, capital investment) • Contribution to the local economy (linkage to local businesses and local labour force) • Feasibility of relocation	• Economic development commissions (municipal level) • Roadside surveys • Regional/ municipal business directories • Interviews with business operators	A DGR may displace existing businesses; the objective is to displace as few existing businesses as possible and minimize the impact on employment from the businesses.
Economic	**Off-Site Study Areas (e.g., 0 to 1 km, 1 to 2 km, 2-5 km, along transportation routes)**			
	4.42 Potential for disruption to business operations and public sector employers	• The number and type of enterprises • The effect of nuisance effects, as measured by the type, duration, and severity of specific nuisances	• Economic development commissions (municipal level) • Roadside surveys • Regional/ municipal business directories • Interviews with business operators	A DGR may have positive or negative effects on business operations and public sector employers. The intent is to minimize negative disruption and

Table 12: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part B Part B: Detailed Evaluation of Candidate Sites				
	Criteria	**Indicators**	**Data Sources**	**Comments/Rationale**
	located in the off-site study areas	• The compatibility and sensitivity of enterprises to these effects, as well as market image concerns; and • The potential for increase sales of goods and services related to the operation of the landfill		encourage positive effects.
	4.43 Potential for impact on property values surrounding the site and any additional areas of property value influence	• Predicted range of potential property value changes for land (including farmland) within the area of potential property value impact	• Real estate valuation analysis (specialist study) • Assessed value of lands today • Interviews with study area realtors • Case study literature review	The construction and operation of a DGR may result in changes to property values. The intent is to maximize potential increases while minimizing potential losses.
Economic	**Community Study Area**			
	4.44 Potential impact on the local economy	• Changes in non-local tourist spending due to market image effects • Changes in local spending by affected businesses and agriculture • Benefits for the local economic environment related to increased business opportunities and benefits associated with the repository	• Interviews with tourist operators; other case studies • Interviews • Number of businesses/agricultural operations that will cease operations • NWMO estimates of local purchases	The effects from a DGR on the local economy may be negative if (e.g. if the market image of the local area is changed) or positive (e.g. if the facility encourages the development of new business ventures into the area). The objective is to minimize negative and maximize positive effects on the local economy.
	4.45 Potential effects on primary sectors of the economy	• Employment distribution and trends by economic sector • Compatibility of a repository with the economic base of the affected area.	Major sectors of the economy (Statistics Canada)	If sufficient numbers of businesses/employees are displaced or disrupted in a particular economic sector there could be negative

Table 12: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part B Part B: Detailed Evaluation of Candidate Sites				
	Criteria	**Indicators**	**Data Sources**	**Comments/Rationale**
				effects on the community economy. The facility could also stimulate sectors in the economy (e.g. if a new highway were built as part of the transportation route). The intent is to maintain or benefit the primary economic sectors.
	4.46 Estimated capital and operating costs associated with the acquisition, establishment and operation of the DGR including off-site infrastructure improvements	Present value of estimated cost of construction and operation, including: • Site acquisition • Site development • Off-road site improvements • Site operation • Transportation costs • Administration • Site perpetual care • Approvals	Data developed by NWMO	Capital and operating costs of the DGR will be borne by the NWMO
Economic	**Regional Study Area**			
	4.47 Potential impact on direct and indirect employment and business sales	• Project-related needs for labour and expected local hires • Local project related purchases of materials	Data developed by NWMO	Employment and local business activity may be affected by the construction and operation of DGR in the regional study area.
	4.48 Potential for impact on municipal finances of host municipalities (upper tier and	• Net change in municipal revenues and expenditures • Present value of the combined cost to be borne by upper and lower tier municipalities • Tax impact of the cost above on	• Municipal tax rolls • Municipal budgets	A DGR facility may affect municipal finances positively or negatively. The intent is to minimize costs and a maximize benefits to lower and upper tier host

Table 12: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part B Part B: Detailed Evaluation of Candidate Sites				
	Criteria	**Indicators**	**Data Sources**	**Comments/Rationale**
	lower tier)	each local taxing authority (upper tier, lower tier, and school boards)		municipalities.
Cultural	**On-Site Study Area**			
	4.49 Displacement or loss of on-site cultural heritage feature resources and cultural landscapes	• Number of cultural heritage feature resources[43] • Number of cultural landscape units[44] • Value of heritage features • Number of designated heritage structures • Number of farm complexes	• Local Architectural Conservation Advisory Committee (LACAC) • Municipal designation and listed buildings/heritage inventory consultation • Ontario Heritage Foundation Easement Properties/Plaques consultation • National Historic Sites and Monuments Board sites consultation • Roadside survey	The objective is to minimize the loss of cultural heritage feature resources and loss of cultural landscapes. The intent is to identify the cultural landscape unit as either historic or scenic interest or a combination of both
	4.50 Displacement of First Nation Traditional Use Areas	• Area lost • Location of alternatives • Effects of loss on cultures/lifestyles	Key informants	Loss of traditional use areas can diminish a community's social and cultural well-being
Cultural	**Off-Site Study Areas (e.g., 0 to 1 km, 1 to 2 km, 2-5 km, along transportation routes)**			
	4.51 Disruption of cultural	• Number of cultural heritage feature resources[45]	• Local Architectural Conservation Advisory Committee (LALAC)	The objective is to minimize potential disruption of

[43]Cultural heritage feature is a human work, or a place that gives evidence of human activity or has spiritual or cultural meaning, and that has been determined to be of historic value to the province, a community, or an aboriginal people. From: http://www.env.gov.bc.ca/bcparks/conserve/cpp_p1/cultural.pdf

[44] Cultural landscape is any geographic area that has been modified, influenced, or given special cultural meaning by people. A cultural landscape may be evaluated as a cultural resource if it is determined to have historic value. From: http://www.pc.gc.ca/docs/pc/guide/guide/sec3/commemorative_glossary_1.aspx

[45]Cultural heritage feature is a human work, or a place that gives evidence of human activity or has spiritual or cultural meaning, and that has been determined to be of historic value to the province, a community, or an aboriginal people. From: http://www.env.gov.bc.ca/bcparks/conserve/cpp_p1/cultural.pdf

Table 12: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part B

Part B: Detailed Evaluation of Candidate Sites

	Criteria	Indicators	Data Sources	Comments/Rationale
	heritage resources in the off-site study areas (introduction of elements not in keeping with the character of the cultural heritage resources or their setting)	• Number of cultural landscape units[46] • Value of heritage features • Number of designated heritage structures • Number of farm complexes	• Municipal designation and listed buildings/heritage inventory consultation • Ontario Heritage Foundation Easement Properties/Plaques consultation • National Historic Sites and Monuments Board sites consultation Roadside survey	cultural heritage resources in the off-site study areas
	4.52 Disruption of First Nation Traditional Use Areas in off-site study areas	• Area affected • Location of alternatives • Effects of disruption on cultures/lifestyles	• Key informants • Land use and occupancy mapping • Land use plans	Disruption of traditional use areas can diminish a community's social and cultural well-being. The objective is to minimize disruption of traditional use areas
Cultural	**Community Study Area**			
	4.53 Strength of traditional economy	Percentage off population engaged in traditional economy	• Data from Aboriginal governments/communities, INAC • Land use and occupancy information	Protection of the traditional economy is an objective for the health and social/cultural well-being of communities.
	4.54 Aboriginal Interests	• Traditional ecological knowledge re: valued areas • Location of cultural and sacred sites	• Aboriginal Information • Community land use plans • Traditional/local knowledge	The objective is to preserve and protect valued ecological areas. The closer the DGR facility is to cultural and sacred sites, the more

[46] Cultural landscape is any geographic area that has been modified, influenced, or given special cultural meaning by people. A cultural landscape may be evaluated as a cultural resource if it is determined to have historic value. From: http://www.pc.gc.ca/docs/pc/guide/guide/sec3/commemorative_glossary_1.aspx

Table 12: Step 4 – Proposed SEC Criteria, Indicators and Data Sources – Part B Part B: Detailed Evaluation of Candidate Sites				
	Criteria	**Indicators**	**Data Sources**	**Comments/Rationale**
				likely direct or indirect effects will occur.
	4.55 Impact on cultural and sacred sites	Location of sites	• Data from Aboriginal governments/communities, INAC • Land use and occupancy information	The closer the DGR facility is to cultural and sacred sites, the more likely direct or indirect effects will occur.
Cultural	**Regional Study Area**			
	4.56 Potential effects on traditional harvesting, hunting and fishing areas	Location of traditional use areas	• Key informants • Community land use plans • Aboriginal communities • Hunting statistics • Trapping statistics • Land use and occupancy data./ maps	Construction and operation of a DGR has the potential to affect access to traditional resource harvesting areas. The objective is to minimize any potential negative effects.

8.0 Discussion

There are fourteen key findings resulting from 'lessons learned', DPRA's analysis of various relevant case studies, and DPRA's professional judgement that reflects some of the unique characteristics of the DGR willing host process. These findings are organized into two categories: "Observations" and "Recommendations".

8.1 DPRA Observations on the Proposed Framework for SEC Effects Assessment in the NWMO Siting Process

There are several observations relating to DPRA's proposed framework for SEC in NWMO's siting process:

1. DPRA has proposed that the assessment using the SEC criteria, indicators, and data sources will become progressively more precise and focussed as the process moves through Steps 2 (screening) to Step 3 (feasibility) to Step 4 (detailed evaluation). Consistent with moving from Step 2 through to Step 3 and then to Step 4 will be the need for more extensive public involvement with progressively broader audiences. Objectivity, accuracy and openness will be essential.

2. Step 4 must provide sufficient information for both an absolute assessment of a site, as well as for a comparative site assessment that demonstrates the relative merits of each site.

3. As indicated in Section 4.6, Aboriginal Traditional Knowledge and practices may be used to inform guiding principles during the site / transportation route selection or process, or to provide information to be used in screening, site / route definition, or site / route assessment (either comparative or absolute). Recommendations are provided to NWMO in terms of the incorporation of TK in NWMO's siting process (Steps 2 to 4).

4. The practical application of concepts such as sustainability and community well-being in site selection and assessment activities continues to evolve, and in many ways is specific to the unique circumstances of the particular project and the community(s) being considered. It can be anticipated that the specific approach taken to incorporating sustainability and community well-being will become clearer over time as communities come forward for consideration.

5. The differences between a community with nuclear experience (e.g., Pickering or another community with a reactor facility or uranium mine) versus a community with no nuclear experience (e.g., King Township) can pose a range of challenges that may require different levels of education, communication and engagement. Again, consistency of process must be maintained. DPRA has included criteria to assess the effects of such experience.

6. The ultimate siting decision will rest on the overall net benefits that contribute to a community's self-assessment of sustainability. The community must feel that they have all the necessary and accurate information to reach a decision at each step with confidence. The DPRA SEC criteria support decision making on a community's sustainability.

7. The proposed DPRA Step 3 SEC criteria are categorized as 'constraints' or 'opportunities' criteria. Given the specific nature of the DGR facility, some features that would usually be considered a constraint, might indeed provide an opportunity under favourable conditions, e.g., a large industrial area adjacent to a major highway; airport buffer lands.

8.2 Recommendations to NWMO for Implementation of the Siting Process

Based on DPRA's analysis, a number of recommendations are provided to NWMO on implementing the site selection process:

1. Because the results of Step 2, 3 and 4 may lead to one or more potential sites that will be required to go through a full environmental assessment in subsequent steps, the SEC effects assessment must be carried out in a consistent manner for all potential sites to ensure an equitable and balanced approach for all.

2. The selected site will eventually undergo regulatory review in Step 8 (e.g., environmental assessment under appropriate jurisdictions [e.g., federal assessment under the *Canadian Environmental Assessment Act*; provincial processes], review and permitting/ licensing by the Canadian Nuclear Safety Commission). Thus the assessments in Steps 2 to 4 must be designed and implemented in anticipation of contributing to the regulatory review.

3. The siting of the DGR is as much a socio-political and psychological decision as a technical one for a potential host community; therefore the information processes must be appropriate, transparent and responsive.

4. Experience with willing host communities in siting processes is limited. It also raises a number of process questions with respect to dealing with differing views within a community or conflicting views between a willing host community and its neighbours in the region.

5. In DPRA's experience, complex and controversial projects often result in strongly held, polarized positions – sometimes based on partial or erroneous information. This reinforces the importance of consistent, grounded, accurate and replicable assessment design, data collection, analysis and reporting.

6. Given the long time frame for the process from Step 2 through to the end of Step 4 (approximately 5 to 7 years), it can be anticipated that community views and opinions – both positive and negative – may change over time. Broad global socio-political circumstances may also play a role. While this may not directly affect the SEC effects assessment, it could influence the importance of various evaluation factors.

7. NWMO needs to consider contingency options if no willing host community comes forward at the end of Steps 2, 3 or 4. "What is Plan B?"

Within this context, it is critical that the SEC effects assessment in Steps 2 through 4 be clear, logical, and internally consistent as a contribution to the overall decision-making processes of both NWMO and the potential host communities.

9. Conclusions

The willing host concept offers opportunities but brings with it a number of challenges as identified in Section 8. It is essential that the overall siting process be managed effectively by being transparent, open, objective and flexible.

In addition, TK must be effectively integrated within the steps of the site selection process.

The concept of sustainability – which is central to the evaluation of the DGR in a host community – must be recognized as an evolving concept.

Within this overall siting process, the SEC component must reflect the state of the art methodologically and be consistent, objective and grounded in terms of data collection and analysis.

Although the willing host approach brings special considerations into play (e.g., a range of economic benefits), the selection of a DGR site must be thoroughly grounded in sound technical and SEC effects assessment.

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