

**Communicating Risk to a Concerned Public in  
Historic Low-Level Radioactive Waste (LLRW) Projects**

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**ABSTRACT**

The Low-Level Radioactive Waste Management Office (LLRWMO) was established in 1982 to carry out federal government responsibility for historic low-level radioactive waste across Canada. Funded through Natural Resources Canada (NRCan) and administered by Atomic Energy of Canada Limited (AECL), the LLRWMO has conducted waste characterization, delineation and remediation projects in British Columbia, the Northwest Territories, Alberta and Ontario. Most (95%) of the historic low-level radioactive wastes for which the LLRWMO assumes responsibility are located in and around Port Hope, Ontario, the site of the refining operations of the former federal Crown Corporation, Eldorado Nuclear. Additional contamination is connected to the transportation of the ore along a route extending from Port Radium on Great Bear Lake (Northwest Territories) to Port Hope, a Lake Ontario community of 16,000 in south/central Ontario.

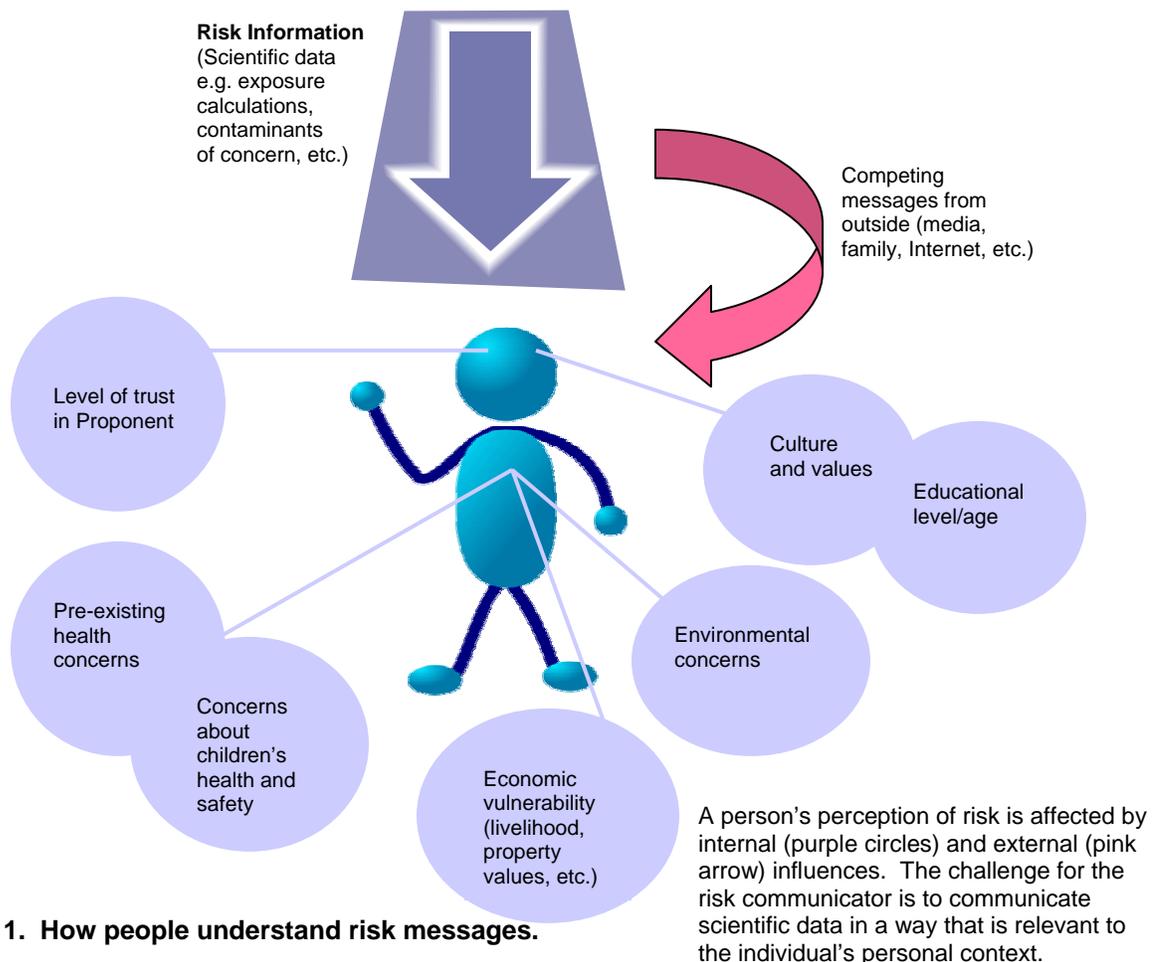
This paper will focus on the successful strategies employed by the LLRWMO over the past 25 years to find solutions to the problems posed by the historic waste. Risks associated with each project must be defined prior to initiating any communication plan. Using this approach, the LLRWMO has addressed socio-economic, health and well being and environmental risks through strategies that embrace proactive communications and full public involvement. Recognizing the diversity of the Canadian communities affected by the historic waste, the LLRWMO has tailored its consultation programs both to the type of solutions proposed and to the character of the communities (i.e. urban, First Nation, rural etc.). In Port Hope, community solutions are being realized through a Legal Agreement negotiated by the affected communities and the federal government in 2000 and an intensive Environmental Assessment process under the *Canadian Environmental Assessment Act*, which is expected to reach completion early in 2007.

**INTRODUCTION**

During 25 years of searching out and remediating low-level radioactive waste across Canada, the Low-Level Radioactive Waste Management Office (LLRWMO) has approached risk communications through dialogue and developing relationships with diverse communities located in the far north or in urban centres such as Surrey, British Columbia or Scarborough, Ontario. Communicating risk begins with listening to people's concerns, explaining risk in the context of the individual's daily life or in a broader Canadian context and adjusting the approach, if necessary, to address the concerns. Through its communications practices the LLRWMO identifies the concerns, issues and perceived risks in a community and addresses those factors in

the conduct of its work. Communicating risk in every LLRWMO project involves relationship building that may extend for months, but more frequently for years, over the life of a project. In this context, the LLRWMO has worked cooperatively with stakeholders to develop locally acceptable waste management solutions for the short and long term.

The diversity of LLRWMO projects across Canada has required individual definitions of risk and customized communications strategies so each fits within a flexible yet standard communications plan. With most of the historic low-level radioactive waste in Canada located in the Port Hope area, this community has been at the forefront of communications strategies for the LLRWMO. The Port Hope Area Initiative Environmental Assessment (EA) Process applies an all-inclusive definition of risk. Risks of the projects are associated with human health and safety, including feelings of emotional well being, impacts on the natural environment and social and economic effects of the project, including potential devaluation of property values. The EA findings concluded that project activities would result in incremental exposure, but at levels that would be a fraction of the allowable incremental dose limits for members of the public and workers. Protecting human health and safety is the primary concern of both the public and the LLRWMO, however, factoring social and economic considerations into the communication of scientific risk assessments creates additional challenges. The risk communicator must recognize that the unique experiences and backgrounds of individuals and communities shape their risk perception. (See Figure 1)



**Figure 1. How people understand risk messages.**

This paper will discuss the tools the LLRWMO uses to reduce the risks associated with low-level radioactive waste remediation projects, with a focus on the Port Hope Area Initiative. Explanations of risk communication challenges and the strategies used to successfully navigate through the EAs for Canada's largest low-level radioactive waste management project will be described. Among the risk reduction techniques highlighted in this paper will be the Interim Waste Management Program, which has managed and reduced the radiological risks associated with the presence of historic low-level radioactive waste in urban Port Hope for 25 years, an extensive public information and involvement program, detailed EAs that employ a comprehensive definition of risk to assess all aspects of the natural and social environment and a Property Value Protection (PVP) Program established to reduce the risk to individuals of project-related property value loss. The LLRWMO has developed these risk communication techniques through years of working in urban, rural and native communities contaminated with historic low-level radioactive waste across Canada.

## **THE HISTORIC WASTE PROBLEM**

Port Hope, Ontario, the site of the refining operations of the former federal Crown Corporation, Eldorado Nuclear, today has approximately 95% of the historic low-level radioactive waste in Canada. Most of the other historic waste managed by the LLRWMO is associated with the refining and conversion of radium and uranium by Eldorado and is located along the Northern Transportation Route, extending from Port Radium in the Northwest Territories to Fort McMurray, Alberta. From there the ore traveled by train to Port Hope, on the north shore of Lake Ontario. From the 1930s to 1988, Eldorado refined and converted radium and uranium in Port Hope for Canadian industrial and medical uses. The radium cycle was dismantled in the 1950s, and the facility began to produce uranium fuel for Canada's fledgling nuclear power industry. In 1988 the federal government sold Eldorado Nuclear Limited to Cameco Corporation, which now operates the Port Hope uranium conversion facilities. The federal government maintained responsibility for all low-level radioactive waste that had been generated from the former Crown Corporation operations.

## **THE PORT HOPE AREA INITIATIVE: A SOLUTION FOR GENERATIONS**

The road to a long-term waste management solution has been long and arduous. During the more than 30 years since awareness of the Port Hope area wastes was raised, the community's determination to overcome this problem has never abated.

In addition to approximately 800,000 m<sup>3</sup> of waste left behind in urban Port Hope after the initial cleanup from 1976 to 1981<sup>1</sup>, another approximately one million cubic metres of historic low-level radioactive waste and contaminated soil require safe long-term management. This latter material is located at two former Eldorado storage sites, the Welcome Waste Management

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<sup>1</sup> The Atomic Energy Control Board (now the Canadian Nuclear Safety Commission) directed a large-scale radiation reduction program removing over 100,000 m<sup>3</sup> of contaminated soil and associated construction material to a designated waste management area 300 km from Port Hope.

Facility, just beyond the boundaries of the former Town of Port Hope<sup>2</sup>, and the Port Granby Waste Management Facility in the neighbouring Municipality of Clarington. After a seven-year search by a Siting Task Force failed to produce a site for a long-term low-level radioactive waste management facility, the three Port Hope area municipalities stepped forward to develop their own proposals for the federal government. Each formed local citizens committees to investigate the long-term siting of their respective wastes within their boundaries. By 2000, long-term waste management concepts had been accepted by the federal government as the basis of the Port Hope Area Initiative.

A Legal Agreement [1] was finalized in March 2001 between the municipalities and the Government of Canada through Natural Resources Canada. It represents a \$260 million (Cdn) commitment to clean up and isolate low-level radioactive waste in aboveground mound facilities designed for hundreds of years. Included are municipal hosting fees of \$30 million<sup>3</sup> and a Property Value Protection Program. The Port Hope Area Initiative comprises two separate projects, the Port Hope Project and the Port Granby Project. The LLRWMO is the Proponent for both.

The Legal Agreement also provided funding for technical advice for the municipalities and residents to review EA studies and other technical reports. Both the Municipalities of Port Hope and Clarington selected Peer Review Teams with expertise in social and economic issues as well as in the technical and environmental aspects of the projects. This third-party detailed scrutiny has contributed credibility to the EA process in the eyes of municipal officials, the public and environmental advocacy groups across Canada.

Over the five years since the Initiative began, the Legal Agreement has provided a firm foundation on which the commitments, objectives and many of the activities that define the projects are based. It has lent a high degree of transparency and accountability, on the part of all partners, to a complex and ambitious process. So far the Legal Agreement, formulated on experiences and lessons of the past, has effectively guided the Initiative by setting forth principles to which the projects must adhere and parameters that can serve to manage stakeholder expectations. Through an Agreement Monitoring Group, the LLRWMO and municipal and federal government partners regularly meet to monitor the Initiative's progress. Issues are identified and addressed early on, thus minimizing the risk of failure.

## **INTERIM WASTE MANAGEMENT**

Until the LLRWMO starts construction of the Port Hope Project and provides a long-term solution to low-level radioactive waste issues in the Municipality of Port Hope, interim measures are necessary to reduce the radiological risks associated with the waste. The LLRWMO Interim Waste Management Program comprises the Construction Monitoring Program, the Property

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<sup>2</sup> The urban Municipality of Port Hope and the adjacent rural municipality of the Township of Hope amalgamated in January 2001.

<sup>3</sup> Port Hope, the Township of Hope and the Municipality of Clarington were each given \$10 million upon signing the Legal Agreement. The transfer becomes final on receipt of project licences from the Canadian Nuclear Safety Commission. Until a licensing decision is taken, signatories may use the interest accrued and would be responsible to pay back the capital if the projects were not licensed.

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Compliance Program and the Environmental Monitoring Program. These programs are discussed below in terms of how they mitigate risk and communicate that risk reduction to the public and the regulator alike.

Under the Property Compliance Program, the LLRWMO provides a letter on the radiological status of a property at the request of owners, their lawyer or their realtor (with the owner's permission) at no charge. This assessment of the radiological status of the property communicates updated information, including a summary of any previous investigations or cleanup activities, to buyers, sellers and financial institutions alike.

Visits to a property to conduct a radiological survey provide a unique opportunity for the LLRWMO to communicate risk to the public. These day-to-day encounters between staff and residents help put the risks in perspective and build trust. When property owners learn that a staff member is a local person with years of experience in the safe handling of low-level radioactive waste, they become more accepting of the assurances of safety the LLRWMO provides. The very fact that Port Hope is the only community in Canada where property owners can learn the radiological status of their home or business provides reassurance. Knowing there is documentation that can be independently verified, if desired, puts decision-making in the hands of the citizen.

When a homeowner applies for a building permit in the urban area of Port Hope, one of the conditions established by the municipality is compliance with the Construction Monitoring Program. The program ensures that if contaminated soil or building material is found during any construction project, it will be appropriately handled through the direction of the LLRWMO. A major communications advantage of the Construction Monitoring Program is its visibility. People see contaminated soil being removed and replaced with new material. With the removal of contaminated material, property owners know that their lot is cleaner and that there has been a reduction in risk.

The LLRWMO measures radon in ambient air, samples surface water and groundwater and analyzes samples for indicator contaminants such as radium, uranium and arsenic. Through the Environmental Monitoring Program, the LLRWMO monitors the performance of its management facilities for low-level radioactive waste and fulfils its monitoring obligations to the Canadian Nuclear Safety Commission (CNSC), Canada's federal regulator, by documenting and reporting on the results.

## **MANAGING RISK THROUGH PROACTIVE COMMUNITY CONSULTATION**

From Surrey, British Columbia, to Toronto, Ontario, the LLRWMO has been involved in historic low-level radioactive waste projects where the communities held definite ideas about how the waste should be managed. The LLRWMO communications approach focuses on maximizing the benefits of having an engaged and interested public by working in an open and cooperative fashion. Effective community relations reflects an understanding of the needs of local communities and demonstrates a proactive approach to integrating stakeholder participation. Community meetings and workshops, kitchen table discussions and storefront information offices in malls or on main streets offer crucial opportunities for two-way communication that

responds to local concerns. These are among the diverse community engagement techniques common to LLRWMO projects across Canada.

As the largest project ever undertaken by the LLRWMO, the Port Hope Area Initiative illustrates how a community relations program built on proactive communications and varied community involvement techniques can build trust and community support for a project. Given the complex factors that influence people's interpretation and acceptance of risk, an effective communications strategy addresses the public's need for substantive information through a transparent and accountable process that legitimizes concerns. It encourages an ongoing exchange of information so, as the process moves through information gathering to decision-making, communication channels remain open for reporting back, clarifying and checking to make sure stakeholders understand what has been done, why and by whom.

Effective communication begins with research to reveal the capacity of the community to receive and understand the messages. What are the community's values, its experiences, its level of trust in decision-making, its objectives and desires? The first step in the creation of the Port Hope Area Initiative Consultation and Communications Plan was to develop community profiles based on local knowledge and experience. Attitudes and issues were identified and approaches to communications were agreed upon with municipal and federal officials in order to develop a communications approach that would fit the projects and the communities.

After nearly 30 years of living with the issue of historic low-level radioactive waste, the Port Hope community possesses valuable local experience and a broad spectrum of opinions and biases. All of this influences community acceptance of proposed solutions. The Legal Agreement that formed the basis of the Port Hope Area Initiative grew out of three community proposals, developed by local citizens' committees and endorsed by the local Councils. Acknowledgement that many residents feel a strong sense of community ownership of the projects was an important consideration in developing the LLRWMO communications strategy. Similarly important was the recognition that the Port Hope community is well educated, informed and opinionated about the nuclear industry and what to do with the radioactive waste.

While the local community is a key audience, the LLRWMO, as a national agency, must also consider the needs of a broader public in its communications planning. This audience includes informed stakeholders and environmental groups across Canada (in two official languages). Special communications vehicles such as the web site were designed to reach these publics. Techniques to consult federal, provincial and municipal government officials and elected representatives were incorporated. A separate consultation and communications plan for aboriginal groups was developed to recognize that First Nations in the area contribute a unique perspective to assessing the effect of the projects on the environment.

Establishing trust and credibility are key components in managing the perception of risk. By the start of the Initiative in 2001, the community of Port Hope and the LLRWMO already had a long-term working relationship through decades of safe interim waste management activities. The local community was less aware of the track record of the LLRWMO across Canada for ensuring public, worker and environmental safety in all of its projects. Building on this reputation by positioning the LLRWMO as the competent organization to clean up and manage

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the historic waste, work effectively with all stakeholders and act as a trustworthy and credible source of information and technical expertise is an important message to convey, especially as the Initiative heads into the construction phase.

To address the challenges of communicating the specific nature of the risks that will be faced during the cleanup, waste transportation and facility construction phase, a participatory approach to communications planning is underway. Communications activities will maintain public awareness of project activities by presenting open, transparent and accessible information. Environmental stewardship will be demonstrated and developed through community and public involvement in project monitoring.

In Port Hope, the urban community will be assessed for radiological contamination and thousands of properties will require new surveys. Remediation of several hundred homes and properties and more than a dozen large-scale sites and consolidation areas, including the two existing waste management facilities, is anticipated. In other words, cleanup activities will occur *up close and personal* in homes, backyards and neighbourhoods, affecting people's daily lives. During the first phase of the Initiative, explaining how these risks would be managed may have seemed theoretical to the average resident. During the next phase, the communications plan will entail identifying and responding to people's concerns and complaints on a property-by-property, neighbourhood-by-neighbourhood basis. In other words, the cleanup, waste handling, transportation and storage will be evident to all and *sidewalk-supervised* by many. Citizens, municipal officials and First Nations delegates will be involved in monitoring the implementation of the project, including immediate and long-term social and natural environmental impacts and mitigation measures put in place to reduce or eliminate negative effects and accentuate the benefits.

The LLRWMO continually evaluates and adjusts its communications tools and approaches based on stakeholder feedback. During the four-year detailed EAs for the Port Hope and Port Granby Projects, talking with the community and reporting back on complex scientific and technical issues have been accomplished through a variety of techniques. Quarterly Port Hope Area Initiative newsletters, community meetings, presentations to special target audiences (parent groups, chambers of commerce, service clubs, etc.), media articles and tours are some of the vehicles the LLRWMO has used. Every comment, issue and question has been recorded in a stakeholder database. From these, a separate issues database has permitted the LLRWMO to highlight key issues and track how project team members address them.

One of the most valuable tools the LLRWMO uses to consult with the public is the Project Information Exchange. Designed to be a friendly and accessible place where people can have their concerns addressed quickly and easily, the office doubles as the project library. Staff assists visitors to find specific answers to their questions such as *How much noise will I hear at my house when the construction starts?* or *How much dust will there be along my street when waste haulage begins?* The Project Information Exchange houses complete sets of the EA Study Reports for the projects, all federal Public Registry documents including stakeholder comments made since the start of the projects, a variety of reports on issues such as cancer and health and handouts on a range of subjects from radiation to property value protection.

So how are we doing? Four consecutive years of public attitude surveys [2] have provided valuable insights into how the communications approach has fared in reaching audiences, facilitating understanding of difficult information and building confidence and community acceptance. From the earliest days of instilling “branding” recognition for the Port Hope Area Initiative name and logo to the evolving exchange of information during the extensive EA studies, the LLRWMO has observed a steady progression in community awareness and understanding of the projects. In Port Hope, polling results demonstrate that the more knowledgeable people are about the issues, the greater their confidence in the proposed waste management solution. Confidence in the Port Hope Area Initiative has increased significantly since the start of the EA process. Seventy-three per cent of Port Hope residents say they are “very” to “somewhat confident” the waste can be safely managed at the proposed long-term waste management facility, compared to 67% in 2004. The results also offer findings about whom people trust most for information about the Project. After five years of proactive public consultation, the LLRWMO is named, along with independent scientists, as the preferred source for reliable information about the Port Hope Area Initiative. (See Figure 2)

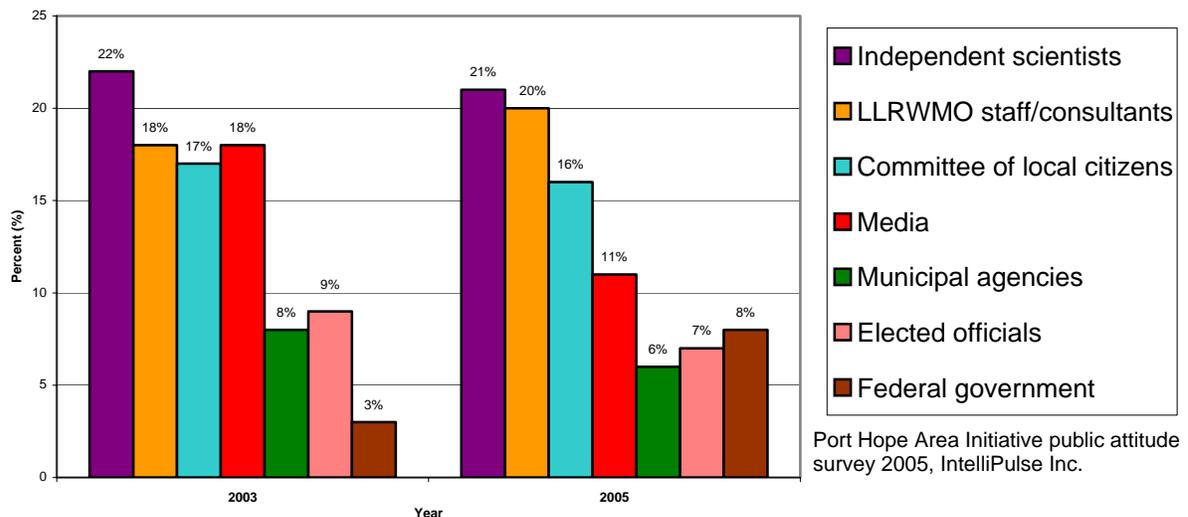


Figure 2. Preferred sources for reliable information about the Port Hope Area Initiative.

## HUMAN HEALTH AND SAFETY IN THE PORT HOPE AREA INITIATIVE

Under the requirements of the Canadian Environmental Assessment Act, risks of the project on people (in this case radiation and radioactivity) must be assessed. Previous to the Port Hope Area Initiative, projects involving radioactivity had assessed effects on people within the framework of reports that dealt with other aspects of the environment (e.g. as part of the socio-economic or atmospheric environment or in technical sections of EAs dealing with radiation and radioactivity). From the outset, the Port Hope Area Initiative has been a community-initiated project, and the most important issue in the community is risk to human health and safety. The LLRWMO responded to the community by considering public and worker potential effects from both radiological and conventional impacts through separate human health and safety studies for both projects.

Before the EA health effects assessments began, the LLRWMO reached out to a broad base of stakeholders for their input on how the assessments could be developed to give them confidence in the findings. Specialists at the federal and provincial government levels, medical professionals including Medical Officers of Health, special interest groups and local community members were consulted. This information exchange elicited important responses: stakeholders wanted the studies to assess cumulative exposures from all possible pathways: water, soil, air, groundwater, to name just some. They also wanted them to integrate approaches used in internationally recognized models, such as the World Health Organization model for conventional health and safety, a model that included a broad variety of determinants of health including “sense of general well-being.” [3]

The initial consideration for human health included both radiological and non-radiological exposure. The pathways considered included inhalation and ingestion of suspended particulate in air (from soil handling) and external radiation among others. Key stakeholders who had input in the development of the study included a community group of citizens and professionals who advise the Durham Regional Government on health impacts of projects such as the Port Hope Area Initiative. Valuable insights into possible risks to human health were offered by committee members, including a suggestion from a grandmother/retired dietician that food, as a major determinant of health, should be included in the pathways assessment. As a result, not only local produce, fish and meat were included in the study but the assessment of special diets including vegetarian and “country food,” which included wild game. Traditional land use mapping with local First Nations also identified wild game and fish as dietary components that should be assessed.

The LLRWMO has established a project dose constraint for members of the public of 0.3 mSv per year, or a fraction of the incremental public dose limit of 1.0 mSv per year. Results of the cleanup criteria development process concluded that actual public doses to an adult member of the public after remediation would be unlikely to exceed 0.05 mSv per year or five per cent of the incremental public dose limit [4]. Thus, the EAs for the Port Hope and Port Granby Projects determined that the predicted dose that area residents would receive from excavation and transportation of the wastes and construction of the long-term waste management facilities would be small and not represent an adverse effect. These findings have shown that the projects can be carried out safely. The challenge, of course, is how to communicate this.

To help residents gain additional confidence that the health of an average resident would be protected, a number of scenarios were assessed using maximum or upper-bound exposures to hypothetical adjacent and area residents in three age categories – infant, child and adult. These special cases exaggerated the exposure a typical person might receive by studying situations such as a vegetarian whose diet consisted of 50% homegrown produce, an infant who swam in the outfall of the leachate discharge pipe and a person who lived at the fence line of the facility construction and was exposed to maximum project impacts over a lifetime. In each case, the effects assessments concluded that the predicted incremental doses would not result in risk to human health. Worker exposures were also shown to be well within acceptable occupational limits, demonstrating to the public that the most exposed people – those who actually handled the waste or ran the machinery – would be protected by the health and safety practices and mitigation measures the projects would incorporate [5].

The EAs based their radiological health risk assessments on conservative assumptions that overestimate exposure and resulting dose. As part of the licensing process now underway, the most realistic exposure to members of the public and workers will be determined. The procedures submitted to the CNSC in the licence submission will incorporate important trigger points for investigation and/or corrective action called “administrative control levels” and “action levels.”

Stakeholder concerns have been incorporated into the foundation of the EA studies. Input from stakeholders including the public, technical agencies and authorities, municipal officials, environmental groups, health professionals and even school groups has shaped the assessment of risks to human health and safety and increased the potential for success of the Port Hope Area Initiative. The on-going risk communications challenge will be to provide data and information to as broad an audience as possible using real-time reporting so the public will continue to be able to assess project effects for themselves. This full disclosure will continue to assist in reducing the impact of the project on people’s “sense of well-being” – the one potential residual effect the EAs for the Port Hope Area Initiative have identified.

### **A RISK COMMUNICATION CHALLENGE – CLEANUP CRITERIA**

Like most professionals in the radioactive waste management field, the LLRWMO continues to grapple with the question, *How clean is clean?* In 2001, with the signing of the Legal Agreement for the cleanup and long-term management of the low-level radioactive waste, the Mayor of Port Hope announced that once the cleanup was completed Port Hope would be a pristine community! This laid out a challenge to the federal government and the community. What does pristine mean? How much disruption would residents tolerate for what level of benefit? What is a practical and achievable level of cleanup?

Is defining a clean community a matter of meeting scientific and regulatory standards? Is it about limiting levels of exposure to contaminants or is it about individual perception, much like the question of risk? Should the social and political question of reputation and perceived stigma associated with the presence of low-level radioactive waste on the town be considered when planning the extent of cleanup? Many of these questions receive different answers from different stakeholders. However, by applying a cooperative communications strategy with the municipalities, technical agencies and the public, the LLRWMO has been able to achieve concurrence on cleanup criteria.

With years of experience working in Port Hope, the LLRWMO had developed a relationship of trust and respect with community leaders. Therefore, before the actual process of developing criteria began, the LLRWMO was able to assist municipal decision-makers to enhance their knowledge and understanding of the issues. It was important for the LLRWMO to inform the decision-makers of the potential impacts of cleaning up to background radiation levels in terms of the increased volumes, size of the waste management facility and increased construction traffic that would result. Equally important was the message that increasing the amount of waste removed would not significantly reduce the public health risk.

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Development of the actual cleanup criteria began with a draft Cleanup Criteria Discussion Document prepared by LLRWMO staff, a technical document based on a risk assessment model and guided by the current regulatory regime in Canada and international standards. The Legal Agreement required that, while the CNSC regulates cleanup criteria, the municipalities must be consulted. Consultation started in 2003 with presentation of the Draft Document to technical agencies and the Municipalities of Port Hope and Clarington.

For the Mayor, providing Council and the community with the assurance that the cleanup would “stand the test of time” was paramount. He added that the criteria must be sufficient to ensure the “foreseeable unrestricted use” of remediated properties. About halfway through a series of 19 Working Group meetings, municipal and LLRWMO participants decided to step back and reconsider their basic goals and desires – that the cleanup must protect current and future human and environmental health and that cleaned-up sites must be available for all current and future unrestricted uses. A breakthrough came with the understanding that lands currently designated as industrial could conceivably be used for community vegetable gardens within the next 20 or 30 years, and that these lands, therefore, needed to be cleaned up for such sensitive uses.

Sitting down together, the municipalities and the LLRWMO were able to jointly work out a set of Principles for the Cleanup Process [6]. These principles guarantee, among other things, that contaminated sites will be cleaned up so current and future owners can use their properties for any use such as housing, vegetable gardens, play areas, and other recreational uses. Some special circumstances apply for sites that are unlikely ever to be used as residences, farms or parks.

Together the LLRWMO and the municipalities moved forward to consult the public in a series of eight workshops and open houses. Residents who attended expressed strong opinions about how the cleanup would be conducted and the effects of remediation on neighbourhoods. Only positive comments were made, however, on the Principles for Cleanup Criteria.

It has been four years since the discussion of cleanup criteria began. Looking back, it is now clear that they have been four years of partnering to agree on a cleanup that will restore the environment for present and future generations. The long and challenging process was successful: Port Hope and Clarington Councils, as well as the CNSC and the Ontario Ministry of Environment, have endorsed the cleanup criteria for the Port Hope Area Initiative.

## **SOCIAL IMPACT MITIGATION: THE PROPERTY VALUE PROTECTION PROGRAM**

Port Hope is a community with a tremendous spirit and pride that comes with overcoming challenges. Through decades of one-on-one communication between property owners and LLRWMO interim waste management staff, the issue of low-level radioactive waste has become familiar and is not something residents spend a lot of time thinking about [2]. For outsiders, however, the perception of low-level radioactive waste frequently raises questions. For prospective homebuyers, in particular, it can present serious barriers, affecting people's confidence in their feelings of safety and their decision-making about moving to the community.

The sector for which this has potential to cause the greatest risk is the real estate community. (See Figure 3)

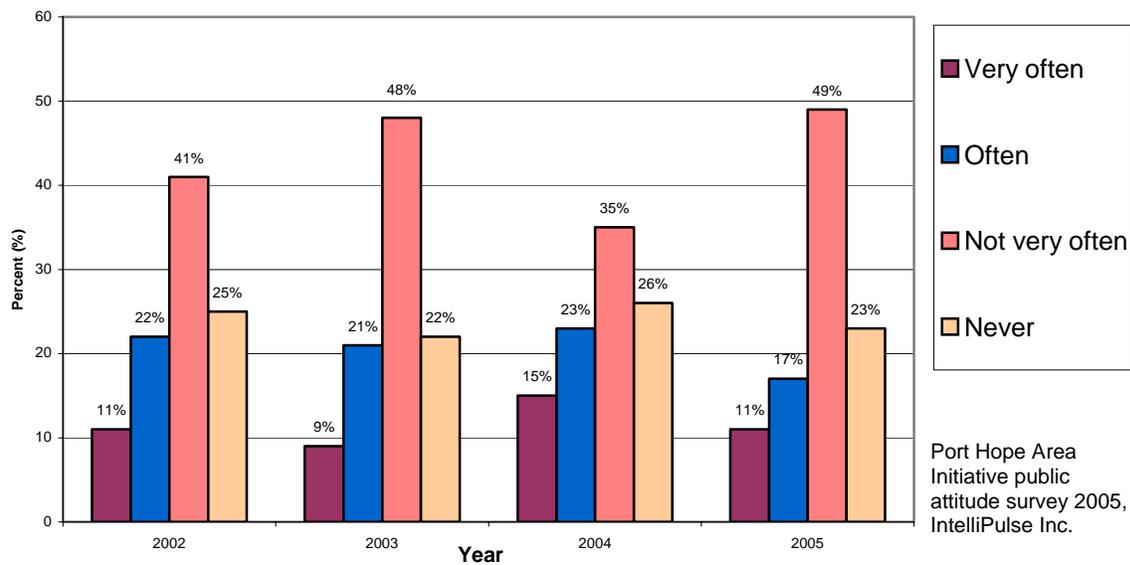


Figure 3. Frequency with which residents think about living in a community with low-level radioactive waste.

The Property Value Protection Program was established through the Legal Agreement to address the risk of individual property value loss resulting from the cleanup and long-term management of the historic low-level radioactive waste. It is an innovative impact management measure that compensates property owners for a loss in fair market value on the sale or rental of their properties. Increased mortgage refinancing costs and expenses incurred as a result of delayed sales that can be attributed to the projects are also compensated.

Few precedents have been found for programs as comprehensive as the PVP Program. Predictions, therefore, about the total cost of compensation over its approximate 12-year life have been difficult to make. Nevertheless, the municipal signatories of the Legal Agreement lobbied hard for the program and continue to believe that protecting local property owners from the risk of property value loss is critical to their acceptance of the projects. The PVP Program took effect from the start of the Port Hope Area Initiative (retroactive to December 2000) and

will run until two years after the completion of the long-term waste management facilities in order to provide time for the real estate market to recover from possible effects.

During the first five years of operation, prior to the start of construction, no generalized decline has occurred in the real estate market because of the Initiative. Compensation awards have been limited to about a dozen cases involving site-specific effects, i.e. properties along proposed waste haulage routes or near future large-scale remediation sites. Initial concerns that the presence of the Program, with its offer of compensation, could contribute to an increased desire on the part of area property owners to sell have proven unfounded. Instead, the PVP Program has enhanced stakeholder confidence and created market stability by providing owners with the assurance their investment in their home and properties will be protected. The Program has reduced the risks typically associated with property value loss from large-scale remediation projects.

To support the PVP Program, an ongoing communications program reminds owners of properties within the 90 km<sup>2</sup> PVP zone that the program, similar to an insurance policy, is there if they ever need it. This is accomplished through information sheets, presentations to stakeholders, displays and media articles and advertising. During its formation, the PVP Program consulted local real estate board members to identify the challenges they face in selling properties in urban Port Hope and develop ways to assist them. Through this cooperative effort, an attractive brochure entitled *Have you ever heard of the Port Hope Area Initiative?* was developed. Using a question-and-answer format to respond simply and directly to issues clients raise, such as *What is radon?* and *What are radiological status letters?* the brochure supports realtors in the sometimes difficult process of disclosure. After five years of relationship building, realtors refer their clients with ever-increasing confidence to the LLRWMO Project Information Exchange for information about the historic waste problem and the proposed solution.

As the Initiative moves closer to the construction phase, an increased risk to property values posed by nuisance effects such as traffic and noise is anticipated. The Socio-Economic Environmental Effects Assessment predicts that residential property values within the likely zone of influence<sup>4</sup> may be diminished between two to eight per cent during the construction phase and into the maintenance and monitoring phase of the projects [5]. With this, the PVP Program expects to experience a heightened number of claims. Property values are predicted to return to normal market levels once these effects are eliminated and a positive end use for the facilities is established. No lasting effects are predicted, and public attitude results indicate that about 80% of residents believe the Port Hope Area Initiative will positively affect the community's image [2].

## CONCLUSION

For 25 years the LLRWMO has implemented environmental remediation solutions to address Canada's historic low-level radioactive waste problems. These projects have been conducted across a vast and varied geography that takes in the far reaches of Canada's north as well as populated urban centres in southern Ontario. The LLRWMO has carried out cleanups in remote

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<sup>4</sup> The likely zone of influence for the Port Hope Project ranges from a radius of 90 m in the case of small-scale remediation sites to 800 m in the case of the long-term waste management facility site.

areas where supplies were nonexistent and weather was so extreme it impeded work. In other communities, soil investigation and removal has taken place in densely populated neighbourhoods while residents stayed in their homes and went about their daily activities.

Regardless of the situation, common to every project has been a steadfast commitment by the LLRWMO to work cooperatively with communities to develop locally acceptable waste management solutions that address the unique needs of the affected stakeholders.

In the absence of long-term low-level radioactive waste storage facilities in Canada, the LLRWMO has demonstrated that risk can be reduced through diligent interim waste management practices. However, through the landmark partnership between the Government of Canada and the Municipalities of Port Hope and Clarington, the Port Hope Area Initiative promises to provide a much sought-after long-term solution. As the Proponent for the Port Hope Area Initiative, the LLRWMO is proposing the cleanup of hundreds of small properties and more than 12 large-scale sites including licensed storage facilities. Under the Port Hope Project and the Port Granby Project, approximately two million cubic metres of historic low-level radioactive waste will be safely managed for hundreds of years in two engineered aboveground mound facilities. The Port Hope Area Initiative will effectively reduce risk and create an honourable legacy for generations to come.

## **REFERENCES**

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