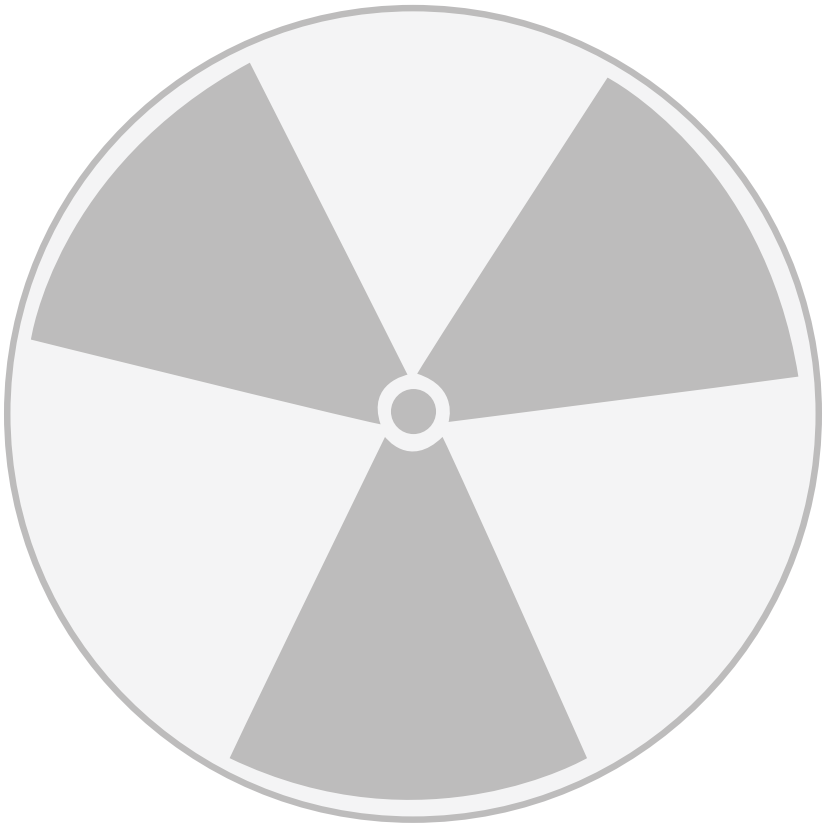
Always Changing, Forever Yours: Nuclear Fuel Wastes



Leader's Guide

Produced by The United Church of Canada/L'Église Unie du Canada 2008
3250 Bloor St. West, Suite 300, Toronto, ON M4K 1C5

Designed by Carina Cruz Domingues, Graphics & Print

Acknowledgements and Appreciation:

Principal research and writing of Always Changing, Forever Yours: Nuclear Fuel Wastes was done by Dr. Mary Lou Harley. Her outstanding contribution to the preparation of this resource is very much appreciated.

This study guide is built on the work of many task groups and consultations over nearly three decades in The United Church of Canada, which have included contributions from many elected members, volunteers, and staff. Special appreciation is expressed for the work of Carl Ridd, Shirley Farlinger, Graham Simpson, Lois Carson Boyce, Mary Lou Harley, Lisa Gue, Bob Fillier, the Very Rev. Dr. Lois Wilson, past Moderator, and the Right Rev. David Giuliano, Moderator. General Council Office staff past and present from the Justice, Global and Ecumenical Relations Unit who contributed to this work include David Hallman, Richard Chambers, Omega Bula, and Joy Kennedy.

Particular thanks for helpful review of this study guide go to Shirley Farlinger, Graham Simpson, Eric Tusz-King, gkisedtanamoogk Nkeketonseonqikom, John Bullas, Doug MacKay, and Lois Carson Boyce, and a special note of thanks to the 16 members of the St. Andrew's United Church of Canada in Wolfville, Nova Scotia, who participated in a test run of the workshop format for Session 1.

Supported by the Mission and Service Fund.

Contents

This study for faith communities is an initiative of The United Church of Canada offered to encourage reflection on the complex ethical issues related to nuclear fuel production and use, and to support public participation in decision-making related to nuclear issues, particularly long-term management of nuclear fuel wastes.

This Leader's Guide is a companion to Three Workshops for Faith Communities. It provides in-depth background for workshop leaders.

General Points on Leading Workshops

- Some form of group prayer should be part of each workshop. For the prayers, make it clear that anyone who feels uncomfortable reading aloud can pass the opportunity to read onto the next person.
- In these workshops, people may voice significantly different perspectives based on their varying experiences, jobs, and awareness of the relationships between economics, politics, ecology, and spirituality. Tensions that arise should be explored in an atmosphere of respect and with openness to learn from one another.
- Some groups will need to spend more time on group sharing of worldviews and values than others, depending on the diversity in the discussion. It is important that each person is heard, respected, and willing to move through the rest of the workshop.
- Each of the three workshop agendas has suggested times for a two-hour session. However, group size, local situation, diversity of perspectives, familiarity of the group with the documents *One Earth Community* or *Energy in the One Earth Community*, and other factors will affect the time. Facilitate the session to meet the timeframe that you advertise.
- Download the reflections on the principles from United Church of Canada Submission 2 to the Nuclear Waste Management Organization, *Commentary on a United Church of Canada Ethical Lens for Viewing the Problem of Nuclear Wastes* (United Church 2005) available at www.united-church.ca/ecology/energy.
- There are several related documents on these pages of the website, and others under the section on United Church Social Policy Positions (www.united-church.ca/beliefs/policies)

SESSION 1
SHARING THE ONE EARTH COMMUNITY

Objective

Using United Church of Canada policies and work at General Council and Conference levels as guidance and support, to introduce the theological and ethical reflection and history of involvement in nuclear issues that has lead the United Church to view nuclear fuel waste within

- the complex of problems in nuclear fuel production and use
- the international problems of nuclear wastes, particularly with respect to Canadian exports
- the risks of proliferation of military applications of radioactive materials
- the question of the future of nuclear power

We live in God's world, in gratitude for the richness of Creation, with growing awareness of the complexity of life-sustaining systems, of our ability to do far-reaching damage, and of our humble place as one species among millions in this interdependent web of life.

As a faith community, we are called to the transformative work of principle-based approaches to environment and development issues. We have before us a number of nuclear fuel system issues, including refurbishments, consideration of new nuclear power plants, expansion of uranium exploration and mining, plans for the fabrication and use of enriched uranium, and a decision from the Minister of Natural Resources to move toward deep geological disposal as the long-term management option for nuclear fuel waste in Canada. The principle-based approach of The United Church of Canada views nuclear fuel waste as inseparable from all of these nuclear fuel system issues and as interconnected with many broader issues directly related to how we view the world and see our place in it.

Background

Living with Respect in Creation: Theological and Ethical Basis

In society in general, as well as in the church, there was a growing awareness in the 1960s that the worldview of humans as having an inherent right of dominion over the Earth was an environmentally destructive concept. Theological reflection began to be brought into the liturgy to place passages previously used to support "dominion" (such as Genesis 1:26–28) into the broader message of the Bible on the beauty and interrelationships of all God's Creation. In 1968, The United Church of Canada General Council approved "A New Creed." In 1995, it was amended to include in our responsibilities: "We are called…to live with respect in Creation."

When the 27th General Council adopted a report by a Task Force on the Environment in 1977, the church acknowledged a new view of environmental problems as symptoms of the disease "growth"; that is, the demand for ever-greater and unfettered growth in our industrial consumer-oriented society. The report of the task force pointed to the need for a change in worldview, suggesting that a worldview in which we take responsibility as partners in Creation is more appropriate than seeing ourselves as the dominant species.

Through the 1980s, an ethical framework of Justice, Peace and the Integrity of Creation (JPIC), introduced by the World Council of Churches, and based on values such as equity, participation, and sustainability, was incorporated into some United Church of Canada policy development. The language of stewardship became common. There was also a growing expression of a more humble worldview in which we are one part in an interdependent, complex web of precious life (in its millions of forms) and sustaining systems.

The secular and spiritual dialogue on the interrelationship of environmental, social, political, and economic challenges caught world attention in 1992 through the United Nations Conference on Environment and Development, the Earth Summit in Rio de Janeiro. The *Earth Charter* was initiated then, released by the Earth Council in 2000, and endorsed in 2003 by The United Church of Canada.

Building on the church's involvement at the Earth Summit, the United Church brought the growing theological reflection on living with respect in Creation together in the policy statement, *One Earth Community: Ethical Principles for Environment and Development* adopted in 1992 by the 33rd General Council. In this policy, the statement of 12 ethical principles is a framework which seeks to include environmental, social and economic justice considerations, and personal, corporate, and governance responsibilities in environment and development issues:

1. Human societies must bear a responsibility toward the Earth in its wholeness.

2 To be both people-oriented and ecologically-sound, all development strategies must be founded on a just international economic order, with priority for the world's poor.

3. Lifestyles of high material consumption must yield to the provision of greater sufficiency for all.

4. Environmental destruction must stop and humanity must understand itself collectively responsible both for the destruction and for the repair thereof.

5. The rights of future generations must be protected.

6. The carrying capacity of the Earth, regionally and globally, must become a criterion in assessing economic development.

7. The bio-diversity of the Earth must be respected and protected.

8. Militarism must yield to non-violent approaches to conflict resolution.

9. Decision-making for just and ecologically-sound development must ensure the participation of individuals and groups, especially those most affected by the project.

10. Both opportunities for learning and access to knowledge must be assured in order to facilitate sustainable development.

11. Development decisions must emphasize prevention of ecological damage.

12. Procedures and mechanisms must be established ensuring a transnational approach to environmental issues and disputes.

These 12 ethical principles served as a foundation for the work by the United Church on energy, issues including nuclear energy and nuclear fuel waste. In its submission to the Canadian Environmental Assessment Panel (Seaborn Panel), reviewing the nuclear fuel waste

disposal concept of Atomic Energy Canada Ltd. (AECL), the United Church presented some components of the worldview that underpins its involvement in such issues:

> · *The world is a sacred space*. In our tradition most of us theologize this by saying it was created by "God" and belongs to "God." Others of us, and many in the world, including Canada's Aboriginal people, say it *is* "God"/"Mother"/"Father." To still others it is a sacred space "only" in a secular human, metaphorical sense: it provides us with our life, and so is sacred. Under whatever auspices we think of it, though, we know that, uniquely in the universe, over a long time, Earth became able to generate and sustain the extraordinarily delicate balance needed for life like ours.
>
> · *Time in our world is a sacred time*, in at least two senses. First, because many of the world's religions regard it so, among them those whose profound sense of "God" acting in time and history (not just in nature) gave birth, in the fullness of time, to our modern sense of "the historical" itself—the secular, and by now virtually worldwide, sense that happenedness (sic) is central to reality and meaning. Second—and probably even more important—time is sacred because, in whatever culture, *narrative* is a principal means of orientation, identity and meaning; such that the question of whether the world's narrative can be sustained over time raises, especially for self-conscious, historically constructed, Western persons, the threat of nihilism, non-being. Can we sustain the narrative not only to the third and fourth generation but to generations infinitely on in time—until cosmic events not precipitated by human agency bring this narrative to a close?
>
> · *The world is a sacred trust*, in a more than metaphorical sense. In our tradition most of us theologize this by saying that we are to be "stewards" of it—passing it on uninjured in its life-giving capacities, and repaired where injury has occurred. Others of us, and probably the majority in the world, reject the perhaps proud and certainly separating language and thought of "stewardship," and think and speak, rather, of "ecological *inter*dependence" or "participation" in the (for many) "holy" life of the world. In any case, to speak of the world as a "trust" is to speak of our responsibility for making space and time *actually* sacred, not just in metaphor but in history (United Church 1996, Submission, 2-2).

In presenting this worldview, the United Church acknowledged that it comes from a western, Judeo-Christian perspective influenced by modern science and technology, and called for inclusion of the paradigms and worldviews of Aboriginal and First Nations Peoples in an ethical framework to guide Canada's social, economic, and environmental decisions.

Reflecting on the view of the world in which Earth is a Sacred Space, Now is a Sacred Time, and our respectful interconnection in the Web of Life is a Sacred Trust, the need to rebalance consumerism, globalization, and right relationship with the Earth, calls out for a renewed emphasis on values such as gratitude, humility, accountability, responsibility, respect and sufficiency for all (Hallman 2000). In 2006, the 39th General Council elaborated our responsibility further in "A Song of Faith": "In grateful response to God's abundant love, we bear in mind our integral connection to the earth and one another; we participate in God's work of healing and mending creation."

Global partners in developing countries of the global South who experience the disproportionate impacts of the economic and political activities of those in the global North also have much to contribute to a holistic perspective and understanding of our place in Creation.

Indeed, reflection on the report to the 37th General Council in 2000, called *To Seek Justice and Resist Evil: Towards a Global Economy for All God's People,* led to a report to the 39th General Council in 2006: *Living Faithfully in the Midst of Empire*. In this document the church has articulated a framework to better understand the roots and impacts of systemic economic globalization. Increasingly this concept of "empire" is being used as a lens to analyze and understand the use of power in decision-making and relationships and to characterize a system under which Creation is groaning, in bondage, waiting for its liberation (Romans 8:22).

Recent involvements of the United Church in energy issues, including climate change, fossil fuels, conservation, energy efficiency, non-fossil fuel renewable alternatives, and nuclear power, are founded on a comprehensive policy framework and the shared wisdom from over 50 years of directed attention at different levels to these issues. Policy statements and submissions by Conferences and by units of General Council to various hearings and public engagements on nuclear issues hold a wealth of relevant information.

Historical Overview of United Church of Canada Involvement In Nuclear Issues

The 16th and 17th General Councils of the United Church, 1954 and 1956 respectively, expressed grave concerns about the military applications of nuclear power and hope for the development of beneficial peaceful applications of atomic energy. Forty years later, in the United Church submission to the Seaborn Panel, that hope is put into perspective:

> The optimism for a peaceful application, which many people shared, had a component of atonement, of hope for healing a wounded spiritual self that felt such sorrow and fear at the destructive power…we cannot be blinded by that hope; we must make a realistic evaluation of where our progress with nuclear power has taken us (United Church 1996, Submission).

In the 1960s and 1970s, within the church and in society in general, rethinking support for peaceful applications of atomic energy was part of a growing anxiety about its ties to continued military applications and part of a general concern about environmental issues and the role of technological developments. The United Church began to participate in discussions in both international and regional aspects of the nuclear fuel system debate.

In the 1970s, while the United Church participated in the World Council of Churches' events on nuclear power and faith, science, and technology, the strongest action was being taken at the Conference level. Both Saskatchewan and British Columbia Conferences raised serious concerns about uranium mining in their provinces, particularly the impact on First Nations communities near mines and on the environment.

In 1976, the Saskatchewan Conference called for a moratorium on expansion of uranium mining and processing in the province and it has reaffirmed that position repeatedly over the years. Saskatchewan Conference made submissions to various public hearing processes including the Bayda-Cluff Lake Board of Inquiry (1977) and the Warman Environmental Assessment Panel (1980).

The British Columbia Conference formed a Uranium Mining Task Force to educate church members about nuclear power issues, and to press government for a public hearing. In 1979,

the Uranium Working Group of B.C. Conference submitted their report, *Ethics and Uranium Mining in B.C.*, to the Bates Royal Commission of Inquiry into Uranium Mining.

There was then, as now, a diversity of views in the church, and in society, about nuclear power, including uranium mining. The national Division of Mission in Canada prepared an education resource for publication in 1978 entitled *Issue 15: Nuclear Power, Blessing or Blight?* Interestingly, its publication was delayed by controversy that was resolved by including with the publication an annotated bibliography.

The B.C. Conference brought a resolution on the "nuclear option for Canadians" to the 27th General Council in 1977, and, with additional theological material, this resolution was adopted by the 28th General Council in 1980. *The Nuclear Option for Canadians* resolution sets out the many concerns about uranium mining/nuclear power and calls for a national public inquiry into all aspects of the nuclear fuel system and, in the meantime, the declaration of a moratorium on the expansion of existing facilities and /or the establishment of new nuclear facilities or mines. This policy still stands as one of the operative policy statements of the United Church on nuclear power and portions have been brought forward in recent comprehensive policies on energy.

In 1982, the 29th General Council adopted the statement *Energy and the Church*, which called for Canada to shift its energy policy from an emphasis on large-scale fossil fuels and nuclear energy generation projects to a focus on "soft-path" energy, including conservation, increased energy efficiency, and the development of renewable alternative energy sources.

Throughout the 1980s, the United Church was active in education and advocacy, producing resources and meeting with industry and government on energy issues. It played an active role in the ecumenical coalition, The Task Force on the Churches and Corporate Responsibility (TCCR), participating in discussions with Atomic Energy Canada Ltd. (AECL), the Atomic Energy Control Board, Ontario Hydro, and the Canadian Nuclear Association. In 1984, the United Church's National Working Group on Energy and the Environment submitted a brief to the Inter-Faith Program for Public Awareness of Nuclear Issues, to raise concerns about uranium mining and milling, nuclear reactors, high-level radioactive waste, and the economic costs of nuclear power. In response to these concerns and the findings of Project Ploughshares that Canadian uranium exported to the USA was being used in nuclear weapons, the 32nd General Council (1988), in the policy statement *Uranium Exports*, called for a moratorium on uranium exports to states producing or selling nuclear weapons.

In the late 1980s, the nuclear industry had begun to promote nuclear power as the answer to global warming. The 33rd General Council in 1990 adopted two resolutions relating to nuclear energy:

- The policy statement *Global Warming and Atmospheric Destruction* affirmed the appropriateness of the "soft-path" energy approaches in response to global warming rather than nuclear power production.
- The statement of faith on *Peace in a Nuclear Age* strongly reiterated the church's opposition to the proliferation of nuclear weapons and warned, "War and nuclear weapons are constant threats to survival" (United Church 1990).

The United Church responded to the AECL proposal for deep geological disposal of nuclear fuel waste by oral presentation and a major written submission to the Seaborn Panel in March 1996. The ethical principles of *One Earth Community* were explicitly used as the framework for that submission.

The Seaborn Panel released its report (1998), and concluded that safety must be viewed from both a technical and a social perspective and that the latter had not been adequately demonstrated regarding the disposal concept. The United Church took exception to the government response to the report (NRCan 1998), expressing deep concern with the government's misrepresentation to the public of the conclusions and recommendations of the panel (United Church Feb. 1999) in that the government presented only part of the panel's conclusions when, in fact, there was *no consensus* about the safety of the disposal concept.

The United Church 1999 submission to NRCan also pointed out ways in which "the Government Response, while purporting to endorse most of the panel's recommendations, actually proposes actions which are often in contradiction to those recommendations" (1999). The Seaborn Panel discussed the need for an ethical and social assessment framework and an explicit means by which public participation would be an important factor in *determining acceptability* and *informing decision-making*. The government response instead discussed public consultation to *build* acceptability for the *preferred* approach. Also, the government voiced plans to establish a nuclear waste management organization as recommended by the panel. However, unlike the panel's recommendation to create an agency at arm's length from the utilities and AECL, with the decision-making body including representatives from all sectors of society, and multiple layers of oversight, the government plan (later established by the *Nuclear Fuel Waste Act,* 2002) did not include the panel's recommendations on the structure of the agency or the oversight mechanisms.

In 1997, the 36th General Council requested that the federal government refuse to accept plutonium from other countries and stop experiments on the use of mixed oxide fuel (MOX, plutonium oxide and uranium oxide). The use of MOX fuel in commercial reactors had been proposed as a way to contaminate excess weapons grade plutonium in order to make it less easily accessible. The General Council also recommended that the government declare a moratorium on the sale of CANDU reactors.

The 37th General Council in 2000 adopted the comprehensive energy policy statement *Energy in the One Earth Community*, which states in part:

> Energy policy in Canada should be based on ethical principles of respect for and justice within the One Earth Community, and should shift away from the strategy of expanding supply through energy mega-projects and focus more on managing demand and development of renewable, alternative sources. Specifically, Canada should:
>
> [multiple recommendations related to various energy forms including the following]
>
> · reduce our reliance on nuclear power, a technology which entails a level of risk many find unacceptable and for which there are still unresolved problems such as the safe disposal (or safe storage) of high level wastes of nuclear reactors;

> – a moratorium should be instituted on the expansion of existing facilities and/or the establishment of new nuclear facilities or uranium mines, such moratorium to extend to the disruption of radioactive deposits and the export of nuclear technology and materials;
>
> – in terms of nuclear waste management and disposal, the government should ensure that the full set of options for approaches to nuclear waste management are adequately explored in an open and transparent process with the necessary expertise in social and environmental science and in ethics. Any waste management agency that is set up should operate at arm's length from both the utilities and AECL, with a board and advisory council having broad representation (United Church 2000).

In the *Nuclear and Uranium Mining Social Policy Position*, the United Church called for greater accountability for the hazards and by-products of the industry and called on the Government of Canada to initiate research on the damage being done to the biota and humans by alpha radiation and to halt exports of uranium to countries manufacturing ammunitions with depleted uranium (United Church 2003).

In 2005, the Maritime Conference called for the rejection of refurbishment of Point Lepreau nuclear power station and urged the provincial government to focus on energy efficiency, energy conservation, and support for renewable energy.

In September 2007, in response to the Algonquin Alliance and local residents' blockade of uranium prospecting near Sharbot Lake, Ontario, the Bay of Quinte Conference called on the Ontario Premier, Dalton McGuinty, to immediately halt all exploration and development of uranium mining on disputed lands.

From 2003 to 2005, the United Church participated in workshops and public engagement opportunities offered by the Nuclear Waste Management Organization (NWMO) for dialogue on long-term management approaches for nuclear fuel waste. The United Church continued in 2005 and 2006 to present submissions and letters to the government related to NWMO's recommendations, and will actively engage with any processes organized by NWMO in the future.

The church's current advocacy and educational work on nuclear issues is founded on the policy *Energy in the One Earth Community*, the ethical principles in *One Earth Community* and *The Earth Charter*, the guidance of *Living Faithfully in the Midst of Empire*, and an awareness of the policies and the work of the church on these issues developed over the past decades.

Some of the Concerns

A comprehensive discussion of concerns relating to nuclear fuel waste, based on the ethical framework presented in the preceding section, is given in the United Church submission to the Seaborn Panel (1996), and in a more summarized format in *Submission 1* to NWMO (2004).[1] Some points are highlighted here; more detail is discussed and other issues are raised in other sections of this resource.

The United Church of Canada has expressed concerns for over 30 years about the radioactive, chemically toxic nuclear wastes—from uranium mining, through the production of nuclear power, to used nuclear fuel—that are inherently hazardous to humans and the environment, some posing a high risk unless containment and isolation can be guaranteed indefinitely.

All options for the long-term management of nuclear fuel waste have significant shortcomings and uncertainties, and none can provide the indefinite verifiable containment required by the inherent toxic hazards of the waste.

The Adaptive Phased Management (APM) of nuclear fuel waste, recommended by NWMO and selected by the Minister of Natural Resources Canada (NRCan) is not a final or complete solution to the hazards of this radioactive, highly toxic waste. It is an approach for longer-term nuclear waste management that offers an opportunity to further explore options by remaining flexible and open to continuous learning, although it comes with its own complex of challenges, uncertainties, and limitations.

The United Church has called for the public and the workers in the industry to have a voice in how the risk is defined and the setting of the limits for "acceptability" of risks associated with nuclear systems as a whole. At best, the reality of nuclear power involves the routine, chronic releases of radioactive substances which are controlled to keep human exposures below the regulation guidelines or set limits. These regulations are not guarantees of safety but rather feasible limits to permit utilization of nuclear technology with a radiological risk, presently based on fatal cancers or serious genetic effect and set without public or worker input.

The United Church has asked for a review of existing regulations to correct a lack of ethical consideration for non-human life. There is no regulation specifically to control exposure of non-human life to ionizing radiation and current protection standards set for human exposures can result in significantly higher doses to non-human life.

The Government of Canada and provincial governments have failed to respond to repeated calls for a national public inquiry into all aspects of the nuclear fuel system and, in the meantime, the declaration of a moratorium on the expansion of existing nuclear facilities and/or the establishment of new nuclear facilities or uranium mines.

The United Church has warned that refurbishment of nuclear power plants or new nuclear power plants will add to the toxic legacy and add to the burden on future generations. The placement of nuclear fuel waste in a deep geological repository is a management approach

[1] Downloadable from The United Church of Canada website, as are most United Church policy documents. www.united-church.ca/files/ecology/energy/submission1.pdf

with its own set of ongoing responsibilities and hazards for future generations. To misrepresent the Adaptive Phased Management plan as a solution to nuclear fuel waste's hazards, and thereby facilitate the production of more nuclear waste, would not be morally responsible to the immediate or future generations.

The United Church has called for full disclosure of the costs associated with the nuclear fuel option, from uranium mining to the decommissioning of nuclear facilities and the long-term management of all the wastes. Nuclear power is an expensive energy option heavily subsidized by tax dollars, with still unknown costs for decommissioning reactors and the perhaps unknowable long-term waste management costs. Further, the Canadian nuclear industry has been relieved for the most part of its legal liability, which now falls to the taxpayers.

Militarization

The United Church has pointed out that nuclear proliferation, in spite of agreements, is a continuing concern. The number of countries with nuclear weapons capability has grown and the present movement is to modernize nuclear weapons rather than work toward eliminating them. The threat by other countries to join those with nuclear military capacity is a powerful tool in international affairs.

The susceptibility of nuclear facilities to sabotage, the potential for diversion of radioactive material for violent purposes, and the number of countries that now have nuclear military capability have an impact on international security and are a threat to life worldwide.

Stockpiles of radioactive materials are susceptible to unethical applications for profit and for war. The use of depleted uranium (uranium-238 from the wastes of enriched nuclear fuel fabrication) for military application is presently exposing the environment and the civilian population as well as military personnel in war zones to a radioactive, chemically toxic by-product of the civilian use of nuclear power.

Climate Change

Protection of the atmosphere is a practical as well as ethical and spiritual imperative for humanity to respect Creation and retain its life-giving capacity. Repair of the atmosphere is our moral responsibility for the damage done through our misuse of the living surfaces of the planet and our energy choices. Restoration of stability of the atmosphere is an urgent priority for the whole world to prevent dangerous climate change.

The United Church of Canada has been and will continue to be actively involved in climate change issues, through education, policy, and advocacy from the congregational level to national and international partnerships. The United Church participates in the World Council of Churches' (WCC) Climate Change Working Group and in the United Nations' climate change conferences. In December 2007 in Bali, Indonesia, the WCC delegation to the high-level plenary at the UN climate conference emphasized that

> …a Change of Paradigm from one way of thinking to another is needed if we are to adequately respond to the challenge of climate change; [that societies must move away from] promoting endless growth and production of goods and a seemingly insatiable consumption,

> [while] the poorer carry the burden of the irresponsible waste of resources, energy and extreme consumerism of the richer. (World Council of Churches 2007)

The carbon cycle is out of balance. Carbon dioxide is an essential part of the Earth's carbon cycle. The problem is that we have released too much carbon dioxide into the atmosphere, along with other greenhouse gas (GHG) emissions, at the same time as we have reduced the Earth's ability to absorb and sequester carbon by our destruction of plant communities, particularly forests and coastal ecosystems.

The loss of biologically diverse living surfaces to more biologically impoverished or inanimate cover is an important factor in the rising carbon dioxide levels. Failure to protect plant life (from toxins, over-use, loss of habitat), including terrestrial, marine, freshwater, and wetland communities, will have a significant impact on carbon dioxide levels as well as other negative impacts on all lifecycles. Protection of terrestrial and aquatic habitat, valuing of wetlands, reforestation, greening urban spaces, and regreening brown fields all have a role in stabilizing carbon dioxide levels.

Emissions of carbon dioxide from the use of fossil fuels for energy is a major contributor to the carbon cycle imbalance and the resulting global warming. Important as it is to curtail and radically reduce the production of greenhouse gas emissions, we must also reevaluate our energy options to reduce the environmental, health, and security risks of those energy choices. Also, for a valid comparable evaluation, available energy options must be assessed through a lifecycle analysis from starting materials to waste products.

Building on more than two decades of work by various church courts, the United Church policy statement *Energy in the One Earth Community* details the conclusion that Canada needs to shift its energy policy from an emphasis on large-scale fossil fuel and nuclear energy generation projects to a focus on "soft-path" energy options. This policy promotes energy conservation, increased energy efficiency, and the development of renewable alternative energy sources. Further, this policy affirms the appropriateness of responding to the global warming trend by using soft-path energy approaches as the primary strategy for reducing fossil fuel emissions rather than expanding nuclear power production. In developing this policy statement, climate change issues were explored together with the ecological and social justice dimensions of each energy source.

When the nuclear fuel system is viewed throughout the production chain from uranium exploration through to decommissioning facilities and long-term waste management, nuclear power is a significant greenhouse gas emitter. Although it is argued that nuclear power generation contributes small amounts of GHG emissions once a nuclear electricity generation plant is up and running, the mining and milling of uranium for nuclear power is very energy intensive, as is fuel fabrication, and transportation, which all add to the ongoing GHG emissions involved in operation of a nuclear power plant. The emissions contributed by the production of the cement and building materials, the transportation, and the other activities associated with nuclear facility construction, add to the major emissions across the full lifecycle of a nuclear power plant (KAIROS 2007). In addition, enriched nuclear fuel fabrication requires a large energy input, and it can involve the release of greenhouse gases more damaging than carbon dioxide, so if Canada moves to enriched uranium production as proposed, the overall system would be a more significant emitter of greenhouse gases.

As well as greenhouse gas emissions, the nuclear fuel system releases radioactive gases. In fact, it is the gaseous, liquid, and solid radioactive and chemically toxic wastes from uranium mining and milling, fuel fabrication, and nuclear power plants that are the principle hazardous waste of the nuclear fuel system.

As a member of the Climate Action Network—Canada, The United Church of Canada participates with other environment, development, and faith groups to call for and promote low-carbon, no-carbon, non-nuclear climate change solutions. The policies and statements that the United Church along with other faith communities have issued have consistently said that nuclear energy is not a viable solution to climate change and a clean energy future, nor a safe, affordable replacement for fossil fuels. The United Nations Framework Convention on Climate Change and the Kyoto Protocol do not include nuclear energy as part of the way forward to a sustainable climate change regime.

Exports

The United Church policy framework supports the sharing of knowledge and technology to assist countries in meeting their energy requirements within approaches that emphasize energy efficiency, conservation, and renewable resources that are used in an environmentally sound way, and are applicable to the ethical, cultural, social, economic, technical and political situation of the client country. Nuclear power is not based on a sustainable resource, it produces extremely hazardous wastes, and it is expensive, especially when costs of decommissioning and waste management are assessed. Therefore, the policy of sales of CANDU reactors to impoverished countries does not serve the principle of a just international economic order or the principle of a transnational approach to prevent environmental damage. This is another reason why the United Church has called for a moratorium on sales of CANDU reactors.

The United Church has stressed that Canada's responsibility for the wastes from export sales of CANDU reactors should be openly debated. It has recommended that Canadian nuclear fuel waste management not be addressed in isolation from the waste management requirements of CANDU-client countries; Canada has a responsibility to ensure that waste management approaches are physically, technically and financially feasible for its clients.

The United Church has been concerned about job loss and related economic impact for individuals, families and communities who would be adversely affected by a transition away from fossil fuels and nuclear power. It has recommended that the Canadian government provide the necessary supports, including intentional programs by public and private sectors in consultation with the affected communities, to assist alternative economic developments, retraining, relocation, etc., because

> …funds invested in nuclear energy could provide more ecologically sustainable forms of energy and yield many more jobs if invested in programs for energy conservation, efficiency, and the development of alternative, renewable energy sources (United Church 2000a).

Looked at as a whole, despite claims to the contrary, the nuclear fuel production and use system is costly; it produces gaseous, liquid, and solid hazardous wastes; and the safe containment of its most hazardous wastes cannot be assured for the long-term. We have not at

this time and may never have the ability to ensure protection of the biosphere from the inherent hazards of used nuclear fuel which NWMO has acknowledged will need to be contained and isolated from the environment essentially indefinitely (NWMO 2005, 348). Further, we do not have the ability to rapidly reduce the inherent hazardous nature of those wastes in any way that does not produce its own hazardous wastes, environmental problems, and security risks. Added to these waste hazards are the security risks and military applications of nuclear power by-products.

The United Church of Canada continues to call for a moratorium on the expansion of nuclear facilities and/or the establishment of new nuclear power stations or uranium mines, and on the further sales of CANDU reactors.

For groups wanting to explore energy options in discussions and workshops, two United Church resources are recommended: *Energy in the One Earth Community* (2000), and *Greening the Church: Reducing Your Church Building's Ecological Footprint* (2007).

Also recommended are materials from KAIROS: Canadian Ecumenical Justice Initiatives, in which The United Church of Canada is a member, and which is engaging the Re-energize campaign on energy issues through 2006-2010. It will provide numerous resources for reflection and action, beginning with *Re-energize the Future: Faith and Justice in a Post-Petroleum World* (KAIROS 2007).

SESSION 2
NUCLEAR FUEL WASTES IN THE ONE EARTH COMMUNITY

Objective

To share information based on recent work by The United Church of Canada on nuclear fuel waste issues by providing information from the experiences of the United Church in the consultation process of the Nuclear Waste Management Organization (NWMO); and the assessment by the United Church of the NWMO recommendations in order to

- stimulate discussion of the issues
- inform Canadian communities who may be involved in a continuation of this process, with NWMO as the implementing agent for Adaptive Phased Management toward deep geological disposal, which the Minister of Natural Resources has selected as the management approach for nuclear fuel wastes

Some Next Steps

All the relevant issues that form the context within which nuclear fuel waste is perceived by society will need to be fully addressed through the collaborative process for the implementation of Adaptive Phased Management.

The Additional Consultations section of this session's background does not reflect all the relevant policy statements and their associated actions. Therefore some actions suggested by the study group may have been taken already. As leader you are not expected to know all the relevant policies. The issues being brought forward by the group clearly need more or different action than that taken to date, so their suggestions of next steps in any area are relevant.

Depending upon issues in the community and your experience with nuclear issues, a group may want a detailed focus on one issue rather than a host of relevant issues.

Background

The Nature of the Hazard

The radioactivity and the chemical composition of nuclear fuel waste will change with time; however, nuclear fuel waste will continue to be radioactive and chemically toxic at hazardous levels indefinitely.

Some of the elements in the mixture of different chemicals in nuclear fuel waste will transform over time, as a result of emitting alpha or beta radiation, to different elements with different toxicities. Lots of chemicals we produce are toxic; however, their elemental nature does not change. In discussing hazards, the changing elemental nature of nuclear fuel waste over time demands different considerations of changing solubilities, changing absorption characteristic for its contact in living tissues and associated health impacts, and many other aspects, even changing states (solid to gas). The chemical toxicity of the changing mixture that is nuclear fuel waste persists at a high level forever.

While the radioactivity of nuclear fuel waste decreases with time, it persists indefinitely. In presentations on nuclear fuel waste, uranium ore is often used as a comparison. After about 10 million years, the radioactivity and potential internal exposure health hazard of used CANDU fuel has reduced to about that of uranium ore which is itself a hazardously radioactive mixture. (Mehta et al 1991) Relating nuclear fuel waste to uranium ore gives a comparison to a known substance, not to a level of safety.

How we package nuclear fuel waste, and how we and future generations manage the packaged waste, will affect the risk of exposure to the inherent hazards of the waste. However, there is not at this time and may never be a management option that is capable of isolating the waste indefinitely or solving the problem of nuclear fuel waste's long-term inherent hazards.

United Church Involvement in the NWMO Engagement Process

> Let us not be guided by corporate agenda, by political motives, by military urging, by fear or by overconfidence. Let us be guided by ethical considerations and social values arising from the best efforts of respectful, participatory consultation with the citizens and experts, and by the best of social sciences, natural sciences, and technologies, with the wisdom to acknowledge the uncertainties and the limitations of our best (United Church 2004).

From 2004 to 2006, United Church involvements in the NWMO study process included representation at the Future Scenarios workshops, the Nature of the Hazard workshop, and at national and regional Dialogue Sessions; an oral presentation and written communication to the NWMO Advisory Council; communications with members of the NWMO Roundtable on Ethics; meetings with NWMO staff and several written submissions to NWMO; and communication to the Minister of Natural Resources and the Prime Minister of Canada. The United Church approached its work related to NWMO in a spirit of hopeful co-operation, acknowledging that there are aspects in the structure, mandate, and process of NWMO with which the United Church has not agreed.

NWMO Structure, Mandate, and Process

The NWMO was established under the *Nuclear Fuel Waste Act* (2002), which followed from the *Federal Policy Framework for Radioactive Waste* (1996) and the Seaborn Panel report (1998). Rather than the agency at arm's length from the industry that the Seaborn Panel recommended, the NWMO has a Board of Directors predominantly representative of Canada's nuclear electricity generators. Further, under the Act, decisions on long-term nuclear fuel waste management are made by the federal Minister of Natural Resources, who is also the minister responsible for Atomic Energy Canada Limited and for policies governing the Canadian Nuclear Safety Commission, which raises questions of jurisdiction and conflict of interest.

Under the Act, the NWMO tasks included investigating over a three-year period the proposed approaches for the long-term management of nuclear fuel waste, recommending an approach to the Minister of Natural Resources, and implementing the approach selected by the Minister. The NWMO has now entered the implementation stage. Also, as of January 2007, the NWMO is responsible to manage and direct all aspects of the established technical research program on nuclear fuel waste in Canada.

Management approaches were reviewed based on each of the three technical methods specified under the Act (deep geological disposal, storage at reactor sites, and centralized storage) and a combination of these methods. The NWMO website (www.nwmo.ca) has their reports, background documents by various authors, submissions by participants including all United Church submissions, results from their public engagement activities and other downloadable material related to their recommendations made in November 2005. Their website continues to be updated with information related to the work of NWMO.

The United Church of Canada Contributions

The United Church participated in the NWMO study process to contribute its perspectives to the substantive discussion of the complex ethical issues related to nuclear wastes. The church sought to bring a framework of ethical principles into the debate and some fundamental concerns into consideration by the NWMO for its report to the government.

During the NWMO engagement process, the church responded to NWMO reports, and other postings on the NWMO website, to contribute to defining the issues and expanding the knowledge base and thinking strategies. Throughout the NWMO process, the United Church shared the application of the ethical principles of the *One Earth Community* and the *Earth Charter*, supported a priority for Aboriginal perspectives, and responded to the ethical considerations in the work of others such as the NWMO Roundtable on Ethics.

Ethical and Social Considerations

One of the main concerns was that the NWMO assessment framework needed to better reflect the ethical and social considerations that were raised and Aboriginal perspectives. The NWMO approach was supposed to have embedded ethical considerations across all the areas in the assessment topics; however, their inclusion was not obvious.

The lack of visibility of ethical considerations and how much weight they were given was an issue of concern for the United Church through the process:

> It is not transparent what principles have actually been applied and how they have informed the thinking in the evaluation of an issue; or in the language [of values] more commonly used in NWMO material, which values have been considered in approaching any given aspect of the issue and what trade-offs were seen as necessary. (United Church 2004)

The embedding approach was further confused by the use of “Fairness” as one of the key topics in the assessment. This treatment set the fairness value in a different position from all the other values while there was no explicit influence of all the other ethical considerations throughout the rest of the assessment topics.

The United Church suggested that NWMO develop an ethical and social framework that clearly identifies the diversity of ethical and social considerations and is transparent about the choices of priorities. The United Church presented an ethical lens (United Church 2004, Appendix), a commentary on the ethical lens (United Church 2005, Submission 2), and an influence diagram based on the “Ethical and Social Framework” of the NWMO Roundtable on Ethics (United Church 2005, *Submission 3* Appendix) to stimulate further discussion.

Social Acceptability

Another major concern that the United Church expressed about the NWMO process was its failure to address social acceptability in the full context of the issues in which it is perceived by society. The process excluded certain aspects from the discussion and assessments that were repeatedly raised by participants at public consultations. In particular, topics related to the usefulness of limiting production of the waste as a first step in management or the need to assess the impact of future nuclear waste production on the social acceptability and the effectiveness over time of each of the management options were excluded from public engagement activities.

After having excluded impacts of future waste from the assessment process and public engagement activities, as being outside of the NWMO mandate, NWMO selectively included future *additional* waste in its final report in terms of the technical feasibility of the management concepts to handle increased used fuel capacity. The United Church warned that to claim that the NWMO study shows that it is technically feasible to handle additional waste and thereby facilitate the production of more nuclear waste would not be morally responsible to the immediate or future generations.

The impact of future used fuel on social acceptability of the nuclear waste management approach was not included in the deliberations of the NWMO process and most issues of long-term safety of the concepts have not been explored. These topics were repeatedly raised by different participants at different exercises, which reflects the central position of these concerns for many in society.

United Church of Canada Position

The United Church presented the position that all relevant issues must be brought to the table. The participation and submissions by the United Church focused on the topic of the NWMO mandate while indicating the need to broaden the thinking. Using the United Church of Canada policy base (presented in Session 1), particularly *Energy in the One Earth Community*, founded on the ethical principles presented in *One Earth Community* and the *Earth Charter*, the United Church concluded:

> Canada's approach to dealing with nuclear waste issues must:
>
> 1. reflect a responsibility to the Earth in its wholeness;
>
> 2. be founded on a just international order which is people-oriented, respects human rights, ensures the voice of the world's poor and is ecologically-sound;
>
> 3. promote change of lifestyle from high material consumption to greater equity and sustainability;
>
> 4. promote humanity's understanding of its collective responsibility for environmental damage and repair and that environmental damage must stop;
>
> 5. protect the rights of future generations;
>
> 6. not threaten the sustaining capacity of the Earth;
>
> 7. respect and protect the biodiversity of the Earth;
>
> 8. not contribute to militarization but promote a culture of tolerance, non-violence and peace;

9. ensure meaningful participation of individuals and groups in the decision-making processes;

10. assure opportunities for learning and access to knowledge;

11. be based on adequate environmental, social and cultural impact assessments;

12. hold authorities and corporations responsible for their actions domestically and internationally and ensure that Canada accepts its global responsibility to prevent environmental damage.

Such a framework, requires that nuclear fuel waste be viewed in an holistic manner:

- as an issue within the complex of problems in [nuclear fuel production and use]
- as an issue within the international problem of nuclear wastes, particularly in the context of Canada's export sales;
- as an issue within the risks of proliferation of military applications for nuclear materials;
- as an issue within the question of the future of nuclear power. (United Church 2004)

United Church of Canada Assessment of the NWMO Recommendations

Some of the key points by the United Church related to the NWMO recommendations (November 2005) are summarized here. These points include material from the United Church response to the final study report by the NWMO (November 2005) and other United Church submissions in 2004 and 2005 which assessed the NWMO study throughout the process.[2]

Adaptive Phased Management

The NWMO reviewed extended storage at reactor sites, centralized storage, and deep geological disposal in the Canadian Shield and other geological formations as approaches to nuclear fuel waste management. Each of these options was found to have some advantages in some areas over the other options, all had shortcomings, and all had significant uncertainties. The NWMO evaluated an adaptive phased management approach which combines aspects of the three reviewed options. The NWMO concluded that none of the management options is capable of isolating the waste over the long time period for which the waste is inherently hazardous.

In November 2005, the NWMO recommended Adaptive Phased Management (APM), in which nuclear fuel wastes would be aged for at least 30 years at the reactor sites, followed by continued storage at reactor sites or at a centralized storage for a flexible time period, with the intention of ultimately putting the waste in a deep geological repository, in the Canadian Shield or another geological formation.

Adaptive Phased Management is a multiple-step approach that has flexibility and adds potential for some citizen involvement (in decisions about timing and safety) to what is essentially a modification of the concept of deep geological disposal previously proposed by Atomic Energy Canada Ltd. (AECL). The original AECL deep geological disposal concept was reviewed by the Seaborn Panel and found to have nearly 100 technical issues that needed

[2] Most of these referenced documents are available in full at www.united-church.ca/files/ecology/energy or are posted on the NWMO website at www.nwmo.ca

to be addressed. The Seaborn Panel rejected the deep geological disposal concept because safety had not been demonstrated from a social perspective and the concept did not have the required level of acceptability.

On June 14, 2007, the federal Minister of Natural Resources announced the selection of Adaptive Phased Management as the approach for nuclear fuel waste in Canada and noted that taking this step was vital to the future of nuclear power in the energy mix for Canada (NRCan 2007).

United Church Response

The United Church agrees that ideally, the Adaptive Phased Management approach could offer an opportunity to continue to explore management options by *remaining open* to **continuous learning** *and* **informed public participation** *and* **directional change** while moving through a series of public decision points on the implementation of available management approaches. However, Adaptive Phased Management could be merely step-wise implementation of deep geological disposal in which citizen engagements may be public relations exercises, and early engineering decisions and financial commitments may bar directional change, negating all but minor modifications. The processes used for decision-making and implementation will be crucial.

The United Church has advised NWMO that:

"For the adaptive management approach to be something other than implementation of deep geological disposal:

· the importance of social acceptability must be upheld as a fundamental decision-making criterion;

· site selection must not be biased by early placement of the waste in centralized storage at [the proposed deep repository] site;

· decision points must have sufficient choice to allow change in the core concept and reversal of course of action;

· public participation must be meaningful and remain broad, engaging communities directly impacted and those indirectly impacted as taxpayers, electricity rate-payers, and citizens" (United Church, November 2005)

Ethical and Social Framework

The NWMO included in its report values summarized from a consultation with citizens and adopted the *Ethical and Social Framework* by the NWMO Roundtable on Ethics, with the suggestion that the framework be considered further by NWMO and Canadians.

United Church Response

The United Church welcomes the suggestion that a dialogue continue on the ethical and social framework. The United Church recommended that the NWMO

· continue its research into enduring ethical principles and values that can help guide long-term thinking;

· clearly present ethical considerations in future work; and

· develop both a substantive (what is to be done) and a procedural (how it is to be done) ethical and social framework, and consider the full context in which nuclear fuel wastes are generated starting from uranium mining.

The United Church noted that the NWMO Roundtable on Ethics revised statement was in agreement with the United Church of Canada stand that an ethically acceptable approach

to managing existing stockpiles of nuclear fuel waste would not ethically justify the production of new nuclear fuel waste.

Reduction of the Inherent Hazards

The NWMO reviewed the present status of reprocessing, partitioning, and transmutation. Reprocessing uses chemical and physical techniques to recover fissionable material from used nuclear fuel, generating residual high-level radioactive, chemically toxic wastes and introducing the risk of nuclear weapons proliferation. Partitioning is a further separation of various components from used nuclear fuel. Transmutation, the transformation of an unstable nucleus of an atom of one element into a more stable nucleus of a different element, occurs when a radioactive element emits an alpha particle or a beta particle. Transmutation can be initiated in a laboratory by bombarding the target atoms with neutrons or other particles in order to transform radioactive atoms into stable atoms. The NWMO recommended that Canada maintain a "watching brief" on the findings related to partitioning and transmutation.

United Church Response

The United Church agrees with NWMO that the present practice of reprocessing is not an acceptable component in the management approach for nuclear fuel waste.

In addition to a "watching brief," the United Church recommended that Canada actively support fundamental research in atomic physics toward an accelerated reduction of some of the inherent hazards of the existing nuclear fuel waste in a manner that is environmentally sound and does not add to the proliferation risk.

No Solution

The NWMO acknowledged that none of the available options or combination of options can provide the indefinite containment required by the inherent toxicity hazards of the waste.

United Church Response

The United Church advised that the language of solution should be avoided and warns against misrepresentation of the NWMO recommendation as a solution to the problems of nuclear fuel waste.

The United Church notes that to speak of the Adaptive Phased Management approach for nuclear fuel waste as "safe" would be a misrepresentation of the NWMO study and unsupportable at this time.

Study Limited to Current Nuclear Power Facilities

The conclusions in the NWMO study were based on assessments in which the limiting of the quantity of used nuclear fuel to the levels projected for the life of the current facilities played a central role. The impacts of additional nuclear fuel waste or different nuclear fuel wastes (from enriched or mixed oxide fuel) on the full set of factors in the assessment objectives were excluded from consideration. The NWMO included a very limited, selective use of future used fuel scenarios in the final study report to indicate the technical feasibility to accommodate additional waste, while possible impacts of future nuclear waste production had been excluded from the assessments and public discussions and no consideration was given to the impact of additional or different used fuel waste on social acceptability.

United Church Response

The United Church called attention to the fact that the NWMO study failed to evaluate social acceptability in the context of the values and objectives of citizens, and in the context of those factors included in technical feasibility, in part by its treatment of the potential impacts of future production.

The United Church pointed out that it is unacceptable to misconstrue the NWMO study as applicable to different fuel or additional production over that waste projected to be produced from current facilities.

The United Church warned that it would be an abuse of the NWMO process and misuse of the recommendation to use the NWMO study in order to promote nuclear power.

Need Impartial Educator

The NWMO acknowledged the need to raise public awareness of nuclear fuel waste issues and to reach generally agreed upon information on the nature of the hazard, the uncertainties, and the controversies.

United Church Response

The United Church supports the NWMO initiatives to raise public awareness of nuclear issues, to facilitate cooperative dialogue, and to distribute information. However, to earn trust and to be seen to avoid a conflict of interest, the NWMO is not the most appropriate body to carry the primary education responsibility. An impartial educational body is needed to get correct information on nuclear issues and communicate that information accurately to NWMO, and to others, for distribution.

Need Impartial Decision-Maker

In the NWMO final study report, the Board of Directors made a commitment to review its membership.

United Church Response

The United Church welcomes the recent appointments that broaden representation on the Board; however, it is still disproportionately representative of and influenced by the nuclear industry. Additional checks and balances are needed in the decision-making and implementation of the management approach.

To properly address the conflict of interests, the United Church recommended to the federal government the amendment of the *Nuclear Fuel Waste Act*

· to establish the waste management organization at arm's length from the industry as recommended by the Seaborn Panel, with a broadly representative Board of Directors; this organization to be funded by the waste producers consistent with the polluter pay principle

· to change the Minister named as responsible for the NWMO in the Act from the Minister of Natural Resources to the Minister of the Environment

· to amend the Act to require a role for parliamentary debate and oversight

· to explicitly require meaningful participation of broad civil society as part of the legislated requirement of public consultation as implementation proceeds

Additional Consultations

United Church Position

The United Church sees the NWMO study as one step among many consultations that are necessary. Further, the United Church has highlighted that an ethical process must address social acceptability of nuclear fuel waste management options in the full context of the issues in which it is perceived by society; the terms of the NWMO public engagement process did not allow this. The legislated public consultations that are part of the implementation process for the Adaptive Phased Management of nuclear fuel waste need to properly address those issues that were excluded. The importance of social acceptability should be upheld as a fundamental decision-making criterion.

Public debate on uranium in Canada's future energy mix and export sales

The NWMO has recommended that the decisions about the appropriate role of nuclear power generation in Canada should be the subject of a separate assessment and public process.

United Church Response

As an initial step in addressing nuclear waste management, the United Church has called repeatedly over several years for a federal and provincial government process of open public debate on Canada's energy policy and the place of nuclear power in Canada's future energy mix and export sales. This public debate should be held prior to a decision about any new developments related to nuclear power, including any further refurbishments, new uranium mines, new nuclear power generators, or any decisions toward the implementation of Adaptive Phased Management.

The United Church

· continues to call for Canadian energy policies to be transformed to emphasize energy efficiency, conservation, safe and environmentally clean processes, and renewable energy sources used in a sustainable manner

· urges the federal government to redirect its international trade promotion policies to favour energy development based on renewable sources used in a sustainable manner

· warns that the NWMO recommendation cannot be used ethically to justify expanded or prolonged reliance on nuclear power or exports of nuclear technology

· urges recognition of the inseparable aspects of civilian and military nuclear materials and the short-term and long-term security risks and potential for harm

· asks that the costs of the entire nuclear fuel production-and-use chain be openly discussed, including all issues and wastes in this chain from uranium mining to nuclear fuel waste with costing for the maintenance and cleanup of tailings, the decommissioning of uranium mines, refineries, and nuclear generation facilities; and all subsidies, research support, and liability relief.

Consultations as implementation proceeds

The NWMO has indicated its intention to move away from broad public consultation to engaging with small multi-party dialogues and potentially impacted communities as implementation proceeds.

The United Church recommends that both broad participation of civil society and engagement of potentially affected communities continue throughout the implementation processes.

The NWMO has committed to engage with potentially impacted Aboriginal Peoples and to respect Aboriginal rights, treaties, and land claims as implementation proceeds.

> The United Church welcomes the commitment by NWMO to respect Aboriginal rights, treaties, and land claims. Consultation with Aboriginal Peoples through processes defined by Aboriginals is essential, and the NWMO should not impose an isolating process on potentially impacted Aboriginal Peoples. The United Church supports allocating funds to support capacity-building toward the meaningful participation of Aboriginal communities. Within consultation and decision-making processes, the United Church has called for greater inclusion, understanding, and valuing of Traditional Knowledge and the previous experience of First Nations with uranium and the nuclear industry.

The NWMO has suggested that potentially impacted communities be involved in the determinations of risk and safety assessments.

> Again, the United Church recommends that both broad participation of civil society and engagement of potentially affected communities continue during determinations of risk and safety assessments of potential sites.
>
> The United Church has called for the mechanism by which "acceptable" risk is determined to be re-evaluated. The United Church urges that there be an open, transparent process whereby the public and the workers in nuclear-related industries have input into the setting of regulations with respect to acceptable risk from ionizing radiation. This focus of the process should include:
>
> · how the risk is defined and the level of risk that is acceptable including evaluation of both release-based regulations and health-based regulations
>
> · short-term and very long-term environmental impacts and action to correct the absence of ethical consideration for biota in present regulations by establishing regulations for the protection of non-human life from ionizing radiation hazards
>
> · a *full range* of human health impacts, including age and gender influences on health impacts of ionizing radiation because women, children and foetuses are more severely affected
>
> · the use of indicators of early stages of biochemical damage to be used in defining risk rather than fatal cancers and serious genetic diseases.
>
> Further, the United Church urges the government to establish whistle-blower protection for workers in the nuclear industry. Participation without intimidation is essential. Employees of the industry, regulators, and the government have to be able to express their views without fear of job loss or demotion. Within any management plan, the required legislative framework should include whistle-blower protection as one of the essential mechanisms to ensure meaningful participation of the workers.

In decision-making and implementation of decisions, the ethics of what is being done, the ethics of the way it is being done, and the ethical considerations that arise from the context within which it is being done are fundamentally important. The United Church of Canada will continue to bring ethical and social considerations forward as the NWMO continues its work.

SESSION 3
BRINGING THE ONE EARTH COMMUNITY TO THE TABLE

Objective

To help individuals and groups recognize that nuclear issues affect them and to encourage them

- to bring their concerns and ethical considerations on the production and use of nuclear fuels into public discussions
- to reflect on nuclear power issues using the One Earth Community ethical principles in preparation for opportunities to participate in the NWMO implementation processes and environmental impact assessment hearings on a number of proposals related to nuclear power

Background

At the Kitchen Table

Concerns about energy issues including nuclear issues are widespread. The production and use of nuclear fuels are interconnected with a host of specific and inter-related concerns within a variety of areas. Different groups will have different nuclear issues that challenge their communities and those with whom they are in solidarity. While some communities are affected more directly than others, these issues affect us all.

By Location

Aspects of nuclear wastes have a presence across Canada. While there are currently four provinces directly associated with the nuclear fuel system, all provinces and territories are presently involved to differing degrees either by chemically toxic radioactive waste generation from uranium mining and milling, fuel fabrication, nuclear power stations, use of power from a nuclear station in another province, research reactors, or by their uranium deposits in which there is renewed interest. Canada is currently the largest producer of uranium in the world and intensive exploration is underway to establish new uranium mines in Canada.

As well as pressure for new uranium mines, communities in Canada are facing refurbishments, proposed new nuclear power plants, including the proposed use of nuclear power to extract oil from Alberta's tar sands, action toward deep geological disposal of low and intermediate level nuclear wastes, and plans for the fabrication and use of enriched uranium. As implementation proceeds on Adaptive Phased Management (APM) of nuclear fuel wastes, additional communities will find themselves directly involved in issues of large-scale nuclear fuel waste transportation and the siting of long-term nuclear fuel waste facilities. If Canada joins the Global Nuclear Energy Partnership, most of the country could feel the impact of the importation and permanent storage in Canada of the worldwide nuclear waste generated from Canadian uranium.

By Costs

Canadians pay large sums through their tax dollars to subsidize nuclear power. For example, Atomic Energy Canada Limited (AECL) cost taxpayers $16.6 billion in federal

subsidies between 1956 and 2000 (David Suzuki Foundation 2007) and their subsidies continue—$300 million in the 2008 Federal Budget; operation of the Canadian Nuclear Safety Commission costs millions each year; export loans to support sales of CANDU reactors have reached hundreds of millions of dollars. A significant portion of today's federal debt is attributable to nuclear power.

Additionally, under the *Nuclear Liability Act*, the liability of operators of nuclear facilities is limited to $75 million in the case of third-party claims relating to a nuclear accident and the time period for claims is also limited. The taxpayer is also responsible for the full cost of other risks that the insurance association will not cover. Given the potential consequences of a nuclear accident, this Act leaves the taxpayer carrying huge liability.

Nuclear power is significantly more expensive per kilowatt hour than either fossil fuels or renewables, even without including the costs of subsidies, plant decommissioning, and long-term radioactive waste management (David Suzuki Foundation 2007).

As rate-payers and/or as taxpayers, we are affected now and will be far into the future by the cost of nuclear power, with the unknown full cost of decommissioning facilities and long-term management of radioactive wastes. Nuclear power is a diversion of funds away from energy efficiency and renewable energy initiatives needed to curb climate change, and away from social needs.

By Risks

Regulated Exposures

The production and use of nuclear fuel involves routine releases of radioactive, toxic chemicals. Regulations set limits or guidelines for releases based on feasible levels to permit the utilization of nuclear technology with an associated human risk of fatal cancers or serious genetic effect, deemed acceptable by the regulators. The public has had no input into defining the risk or setting acceptable limits. A regulated limit does not equal a socially acceptable limit under these circumstances. (See Session 2)

Further, the United Church has voiced concern about multiple source exposures with an increasing level of background ionizing radiation and the need for gene pool protection for human and non-human life. In particular, the sources and levels of exposure must be a serious consideration in the siting of multiple nuclear facilities in "nuclear friendly" communities.

Background Radiation

Natural background radiation is ionizing radiation from naturally occurring radioactive elements in the Earth's crust and from cosmic sources in deep space. Human-made and human-released ionizing radiation add to natural background radiation, bringing the total average annual background radiation in Canada to almost double that from natural sources for the general public (NWMO November 2005, 342).

Ionizing radiation includes high-energy forms of electromagnetic radiation (such as X-rays, gamma rays) and high-energy particles (such as beta and alpha particles) that are capable of upsetting the chemistry of matter that they strike by generating positively

charged ions from neutral atoms. Ionizing radiation is undetectable by any of the human senses. The effect of ionizing radiation is dependent on several factors such as type of radiation, type of exposure (outside or within the body), dose, and duration of exposure. While the body has some capacity for healing and recovery from radiation damage, effects can include cancers, genetic defects, reduced mental capacity, and a host of other health consequences that continue to be studied (BEIR reports; ECRR 2003; IARC 2005).

Background radiation is elevated globally from past atmospheric nuclear weapons tests and nuclear accidents. There are personal additional exposures to ionizing radiation from medical diagnoses and therapy techniques, from some electronic devices, and from lifestyle choices like air travel. Additional local exposures can occur from uranium ore deposits, radon venting, and releases of radioactive elements during various stages of uranium mining, milling, nuclear fuel use, and radioactive waste disposal. For example, in areas of uranium mining and nuclear fuel fabrication, releases of uranium-238, uranium-234, radium-226, and radon-222 and its decay products elevate the background level (Health Canada 1995).

Radioactive Goods

Deregulation of low-level radioactive wastes presents a growing threat. Economics and sustainability are the principles being applied by industry as it pushes for "recycling" low-level radioactive wastes from nuclear facilities into the commercial market or at least out of expensive protective storage. In particular, radioactive scrap metals are moving into the marketplace.

Large quantities of metals that are used in the various structures of nuclear power plants become radioactive during the life of the plant. More and more of these radioactive scrap metals will be added to the nuclear wastes as nuclear power plants and other nuclear facilities are decommissioned.

In several countries, companies have licences to process and release radioactive metals.[3] The companies can melt radioactive metal, dilute it with clean metal, and recycle it into the metal market. This process is sometimes referred to by the industry as "decontaminating" the radioactive metal. However, the radioactivity is not removed; it is spread throughout the recycled metal, thereby contaminating the clean metal used to dilute it.

Additionally, illegal movement of vehicles and goods with various levels of ionizing radiation and trafficking of contaminated metals add to the deliberate and inadvertent recycling of radioactive metals.

[3] At the time of writing, there are at least three companies in the United States that have licences to process radioactive metals for market (including those in scrap metal and depleted uranium). Studsvik (Sweden) and Ecomet-S (Russia) are taking radioactive metal from the decommissioning of European nuclear power plants and putting it through the dilution process for the metal market. Studsvik UK Ltd is talking of using up to 95 % of the contaminated scrap metal from the decommissioning of the Sellafield nuclear facility to "recycle" into the international metal market.

In the international metal market, radioactive contaminated metals could become part of our everyday goods from cars and buildings to zippers, toys, and tableware, adding to our exposure to chronic low levels of ionizing radiation.

Contaminated Food

With nuclear power and radioactive wastes has come the necessity to address potential contamination of food and water with human-made as well as naturally occurring radioactive chemicals.

There is no completely safe level of contamination of food and water with radioactive elements (radionuclides), so the decisions by regulators are a balance of risks and costs. For example, in Canada the maximum acceptable concentration (MAC) for uranium in drinking water has been set higher than chemical toxicity research would advise; however, to keep water treatment costs down, the health impacts of this higher level are considered acceptable by the regulators (Weir 2004).

Unlike other chemical contaminants, radionuclides have both a radiotoxic hazard and a chemical toxicity. Externally, the body can be damaged by the radiation, particularly by gamma rays and beta particles. When food or water contaminated with radionuclides is ingested, the body can be affected by both the chemical and radiological damage. For each radionuclide, it is important to know both the chemical and radiotoxic hazards. The Health Canada guideline for selected radionuclides in drinking water uses maximum acceptable concentration based on radioactivity, with the exception of uranium, for which the chemical toxicity sets the MAC (Health Canada 2007).

Canada has guidelines on the import/sale of radioactively contaminated foods and water following a nuclear emergency (Health Canada 2000). The need for guideline levels for radionuclides in foods under non-emergency circumstances has not been addressed in Canada.

The feasibility of trade in food and animal feed following a nuclear accident was addressed after the Chernobyl accident.[4] Recently, the Codex Committee on Food Additives and Contaminants redrafted these guidelines to permit elevated levels of contamination to apply for 20 radionuclides and for a longer time period than one year after a major nuclear accident. Also, they drafted guideline levels for radionuclides in foods for long-term use; however, there was controversy about damage to trade because these levels of radioactive contamination are exceeded already in some food markets by exposures to the chronic routine releases from nuclear facilities (for example, the large shellfish fishery in Morecambe Bay near Sellafield, UK). Revised guidelines for accidental nuclear contamination have been established (Codex 2006); however, routine monitoring of foods for radionuclide contamination has been excluded.

[4] The Food and Agriculture Organization (FAO) of the United Nations and the World Health Organization (WHO) Codex Alimentarius Commission adopted *Guideline Levels for Radionuclides in Foods Following Accidental Nuclear Contamination for Use in International Trade in 1989*.

Even though the Codex document applies only to emergency situations in which elevated contamination is temporarily allowed, these levels of contamination have been misused to imply a reference level of safety in some research (Health Canada 2000).

Human-made radionuclides and additional natural radionuclides that are human-released are in air, water, and soil. Nuclear fuel production and use requires acceptance of various levels of contamination by these radionuclides; however, the public has not been consulted and for the most part, not informed. Addressing the "acceptable" level of contamination by radionuclides of potable water, human food, and animal feed, in domestic sources and in imports, will affect us all.

Military Applications of Radioactive Materials

Nuclear proliferation is a concern for all of us. In spite of non-proliferation agreements, the number of countries with nuclear weapons has grown. As a major supplier of the world's uranium, Canada is implicated in military applications of radioactive materials (Harding 2007).

The irradiated fuel of nuclear reactors is the source of plutonium. By 1991, civilian atomic energy and military applications had resulted in 1,000 metric tons of plutonium worldwide, about a third of it in military inventories, and commercial reactors were producing an additional 70 metric tons of plutonium each year (NAS 1995). While the number of nuclear warheads has been reduced over the last 20 years, still there are currently about 27,000 nuclear warheads worldwide (Norris et. al. 2006).

Also, the increasing use of depleted uranium in military applications is exposing our military personnel, the people in war zones, and the environment to chemically toxic, radioactive by-products of the nuclear industry.

As noted in the United Church's 1990 statement of faith on Peace in a Nuclear Age: "War and nuclear weapons are constant threats to survival…We, the church, commit ourselves to peacemaking."

Around the Table as a Faith Community

As a faith community, there is potential to support one another in preparing to meet the challenges of taking personal action to push for public debate on nuclear issues and to speak to these issues in public consultations. It may seem intimidating, frustrating, and perhaps divisive to bring different perspectives forward within the church; yet, it is through discussion about nuclear issues with humility, openness, and respect for one another that we come to understand different views and the considerations that need to be brought to public discussions.

When opportunities for public participation in discussions on nuclear fuel waste issues arise, the amount of information can be overwhelming and there is usually only a short reading/reflection period. Added to the challenge is the difficulty of getting accurate information on nuclear issues. According to the Very Rev. Dr. Lois Wilson a member of the Seaborn Panel, the main problem they met in all the hearings was the secrecy

surrounding this subject and the problem of getting accurate information from both the opponents and the proponents. (Wilson 2001)

The process may not meet the hoped-for level of ethical process. The agenda of these engagement activities is time pressured and geared toward generating a report focused on a particular aspect or getting support for a particular decision. Topics of central concern to many participants may be excluded from these discussions.

The United Church has taken an active role to bring ethical and social considerations as well as environmental concerns into decision-making related to nuclear issues. United Church of Canada policies and submissions to previous hearings offer a rich foundation, especially the material built on the *One Earth Community*. (See Session 1)

The United Church of Canada policy *Energy in the One Earth Community* gives a foundation for ethical and practical consideration of energy issues. It promotes people-oriented responsibility and ecologically sustainable energy options for individuals, businesses and communities; reducing reliance on the electricity grid, and encouraging green spaces, less waste, and freedom from consumerism-driven buying. It focuses on increasing energy efficiency, energy conservation, a variety of technologies for renewable energy, movement away from mega-projects to small-scale energy, co-generation, co-operation, sufficiency for all, and jobs from it all. In *Spiritual Values for Earth Community*, Dr. David Hallman speaks of the joy that can come from an approach to lifestyle and social choices based on gratitude, sufficiency, and justice.

Partnerships

> Partnership means becoming involved with others in God's mission for wholeness of life especially on behalf of the poor and powerless. Partnership brings people together in community for mutual empowerment through the sharing of gifts, recognised as gifts freely given by God for the benefit of all… (United Church 1988a).

Within the United Church, there is the opportunity for partnership at many levels to work together on nuclear issues:

- to take concerns and resolutions to Conference and General Council levels
- to share United Church policy and reflection within faith groups, like KAIROS and the World Council of Churches
- to share reflections on policies and impacts with Canadian and global partners in mission and development
- to bring ethical principles and social consideration into a priority within public consultation processes
- to stand in solidarity with those who seek help in the face of problems precipitated by aspects of nuclear fuel production and use

There are many aspects of separation in the nuclear fuel waste issue. Responsibility for the present waste is set as separate from the decision on future waste which unduly narrows the focus of the present process. "Directly impacted" communities may be set as separate from other citizens in ways that do not empower the impacted. Remote areas are proposed

as sites for wastes, in ways that minimize the value of that area and its people by seeing *that* land, *that* water, *that* air, *that* life in *that* area as separate from the Whole.

These separating approaches can be countered through partnership and solidarity. People in remote communities may be asked to take the consequences of dealing with high-level nuclear wastes from reactors that have generated electricity used largely by the industrialized and heavily populated urban areas. The strength and support of partnership can give two-fold vision to uphold the rights of Aboriginal Peoples and remote communities. For example, Toronto congregations expressed solidarity and prayers for the northern communities and their churches after the Manitou Conference helped Toronto congregations to understand the problems and conflicts around Kirkland Lake caused by the proposal to bury Toronto garbage in Adams Mine.

The sharing of perspectives with a respectful effort to understand different views can help communities to critically evaluate such materials as advertising that promotes nuclear power; articles that generate fears related to jobs and energy shortages; information on renewable energy and sustainable practices; and presentations by proponents of proposals related to aspects of nuclear fuel production and use.

In the Long-Term

Since there is no known way to isolate the nuclear fuel waste for the time required by its inherent hazards, in scenario workshop sessions the concept arose of a type of "priesthood" that would take responsibility for the monitoring and safe transfer of information on the wastes to each successive generation (GBN 2003). The need for a "rolling stewardship" has been promoted by Dr. Gordon Edwards (Edwards 2007). Dr. Gary Kugle, as NWMO Board chair, uses the term "long-term stewardship" when discussing Adaptive Phased Management (NWMO 2007).

Spiritual practice gives an insight into thinking into the long-term. Carrying forward stewardship through generations has been most successfully associated with spiritual practices (Timmerman publication pending). Sharing insights gained from the *One Earth Community* and documents based on these ethical principles, and prayerful reflection on these issues can help faith communities to contribute to the necessary long-term thinking.

At the Public Consultation Table

Three Acts of Ethical Integrity*:*

> The biases, assumptions and interests of all parties in this process, as in every process, must be out on the table, visible, declared.
>
> The process by which a proposal is subjected to scrutiny and criticism must be a truly open, inquiring, public one, with power deliberately weighted in favour of the less powerful but affected.
>
> We must be especially cautious of possible risks, especially when consequences may be enormous and irreversible . . . An unusually heavy burden of proof is on the proponent in all such circumstances (United Church 1996, 2-6).

As people of faith, we can bring to the table on nuclear fuel waste issues and other nuclear issues:

- encouragement for further development of ethical and social frameworks
- calls for ethical considerations in face of empirical information: for example, when a projected level of risk is stated, not only the validity of the assumptions and methods in calculating the risk but also the ethical question of whether that level of risk is justified needs to be addressed with meaningful public input
- requirement for transparency in the treatment of ethical and social considerations and pressure for ethical principles, trump values, and baselines of proponents to be stated
- insistence that social considerations and meaningful participation in decision-making have a priority; that the central roles of social acceptability and safety from a social perspective be upheld
- personal gifts of many kinds that lead to valuable input, some based on scientific study, some on experience, some on common sense and the common good
- critical thinking with the guidance of *One Earth Community* principles and the work developed from these principles
- awareness of concerns that are central for a just outcome but previously excluded from the process
- insistence that the growing nuclear issues be debated in Parliament as a matter of national importance, including the moves to have new nuclear power stations, new uranium mines, and new associations that could require Canada to accept the radioactive wastes from Canadian uranium sales, each of which would commit Canada to an increasing radioactive and chemically toxic burden indefinitely
- recognition that there is no solution currently, nor may there ever be, that removes the inherent hazard of nuclear wastes, only management in which aspects of the responsibility for present radioactive, chemically toxic waste will be on-going indefinitely, a burden passed to future generations.

"We are not alone, we live in God's world" (United Church 1968).

National and International Contexts

It is important both to know the relevant available support systems within non-governmental organizations, local council, MLAs, MPs, etc., and to be open to dialogue with those of different views on the nuclear issues. Also, there are voices from other countries that can enrich our understanding as they face similar concerns about nuclear power issues.

In Sweden, the planned nuclear phase-out by 2010 helped to advance the nuclear fuel waste disposal program; however, parliament continues to debate nuclear power. Communities close to reactors are the ones being selected for waste site consultations; the conflict of job dependence on the industry with the ability to make an informed choice is an issue. There is a push to try to open national debate in order to get an independent process, independent research, and impartial decision-makers.

In the United Kingdom, a three-year public consultation on nuclear fuel waste management has concluded with selection of a geological repository approach. There are discussions about the possibility that implementation may move to a technocratic imposition of a facility if no nuclear-friendly community with appropriate geology is found.

France, Finland, USA, and Japan are all involved in nuclear fuel waste disposal plans with some controversy. French law requires a comparative study of two sites before proceeding to siting a deep geological disposal facility, yet France is going ahead with only one site. In Finland, the nuclear waste industry has presented their deep geological disposal as "solution," and there is some concern that there is no action in parliament to debate this. The Yucca Mountain disposal site in USA remains embroiled in problems. In January 2007, Japan increased the subsidies offered to any local government that would construct a high-level radioactive waste disposal facility from 200 million yen to 1 billion yen in the early stage, and 2 billion yen total, raising concerns about bribery and ethical questions about volunteerism and informed consent.

> …justice means no-one and nothing is ever excluded (the powerless and unequal are lifted up, made equal with the powerful, given voice); that God not only does justice but *is* justice. Animated by this vision and in God's name *we*, therefore, seek justice for all, especially "the needy and those who have no helper." (Psalm 72:12) That includes not just humans but what the Bible understands as "the creation": the very earth (geologic rock, like that of the Canadian Shield), water, air, and all life to the smallest microscopic life itself. This is the sort of thing we mean by the world as a sacred trust. Our ethic arises out of that and so, therefore, do our questions and comments concerning this nuclear waste proposal (United Church 1996, 2-7).

The United Church commented on some of the issues surrounding implementation of an approach to long-term management of nuclear fuel waste in its submission to the Seaborn Panel and in its submissions to the NWMO during its study. However, both of these periods of consultation were focused on selection of a method of management. Therefore, the comments by the United Church on the siting and implementation phase were generalized.

From the Seaborn Panel Table

Some conclusions in the United Church submission (United Church 1996) to the Seaborn Panel apply to the present NWMO process toward implementation of Adaptive Phased Management (APM):

- the level of adequacies in the information which is provided by NWMO on APM must meet technical *and* social requirements for safety and acceptability, acknowledge uncertainties, and identify areas of ignorance where possible
- the process of determining the acceptability of the risks must include an ethical way to be inclusive of societal evaluation of acceptability as well as the domestic and international regulatory framework that is presently in place
- the process must have meaningful inclusion of the Aboriginal and First Nations perspective on social, economic, environmental, and ethical acceptability
- the feasibility of retrievability and corrective action in the face of containment breach throughout the timeframe of inherent hazard must be evaluated and presented in terms of existing technology
- site requirements must be set at the earliest stage, not after possible host communities are identified, and the setting of the standards for site selection must be done in consultation before the process for implementation is initiated

- the United Church has recommended repeatedly a moratorium on the expansion of any further nuclear capacity in order to limit the amount of waste; without such moratorium, implementation can proceed only with inclusion of assessment of social as well as technical impacts of ongoing production and the potential impact of the use of different fuels and different reactors in ongoing production

The Seaborn Panel report contains much that is relevant to the present situation on nuclear fuel waste management, including comments on acceptability criteria, safety criteria, and ethical and social considerations (p 33–40, 72–73), and siting and transportation (p 73–79). The Seaborn Panel pointed out the need for public involvement in establishing siting and transportation criteria and they set out some essential considerations, principles, and safeguards. They note that siting criteria and the map of siting regions should be available *before* calls for interest in hosting a waste facility.

The presentations to the Seaborn Panel hearings offer a treasury of information. The transcripts of the public hearings are available at www.ceaa.gc.ca; unfortunately, the written submissions are not posted. The Very Rev. Dr. Lois Wilson highlights some of the insights from these presentations, of which the past experiences of communities with siting waste facilities are particularly relevant (Wilson 2000, 43).

From the NWMO Table

The NWMO website (www.nwmo.ca) has posted all the background documents, public engagement reports, submissions, and NWMO reports. In *Choosing a Way Forward*, the NWMO outlined some implementation information in Part 5 (225–323).

Some summary points from the work of The United Church of Canada on nuclear issues, which have been brought forward to NWMO, are given in Session 1. The assessment by the United Church of the NWMO recommendations are given in Session 2 Background. A little additional information is given here.

Trust

The Seaborn Panel documented the need for any nuclear management agency to earn trust given the history that has lead to public distrust of the nuclear industry, the regulators, and the government in relation to nuclear power issues. But the very structure of the NWMO as an organization dominated by the nuclear industry is not necessarily conducive to building trust. The recent addition of members from outside the industry to the NWMO Board is a welcomed improvement, and the Advisory Council is more representative of other society interests; however, the industry still holds the strongest influence on decisions about the approaches the NWMO will take.

For those coming to the NWMO table, it is sensible to be aware that NWMO reflects the overall interests of the nuclear industry. It is the implementing agency for Adaptive Phased Management of nuclear fuel waste, and it will be the proponent for any Environmental Impact Studies that arise as attempts at siting proceed; its job is to get the APM process rolling. Added to its mandate as of January 2007, NWMO is to manage and direct all aspects of established technical research on used nuclear fuel in Canada. This is the reality of the structure of the nuclear waste agency, established by federal legislation that should be amended.

Ethics

The United Church of Canada has endeavoured to present the ethical principles of the *One Earth Community* in a way that facilitates dialogue between different mindsets. The United Church (2005, Submission 3) highlighted the deficit in the proposed factors leading to implementation of a management approach (NWMO Assessment Team 2004, 21); ethical considerations were not included and only a narrow influence for social values appeared in the plan. Additional work on ethical issues is presented in more recent publications by NWMO.

For those wanting to promote continued work on the ethical and social framework and to effectively bring ethical and social considerations to the NWMO table, it will be helpful to be familiar with the more recent NWMO principles and framework. In *Choosing a Way Forward*, the NWMO adopted the *Ethical and Social Framework* of the NWMO Roundtable on Ethics (Appendix 7) and set out six siting principles and other factors for the siting process (231–232). From *Moving Forward Together*, the NWMO speaks of an approach to managing nuclear fuel waste that is safe, secure, and fair, with the phrase "long-term stewardship" indicating recognition that it is not a solution.

Energy Future

In *Choosing a Way Forward*, NWMO looks into the future as far as the possible refurbishment of existing reactors and suggests that potential hosts be made aware of this possibility when considering their interest (223). Building on this awareness, it may be possible to have other likely energy future scenarios included in consultations, including the impact of an unknown number of new nuclear plants and new fuels (present proposals include at least six new nuclear stations and production and use of enriched uranium fuel).

Meaningful Participation

The importance of social acceptability and emphasis on participatory processes needs to be continued and strengthened. The NWMO intention to consult with "communities of interest" should consistently include civil society in Canada. Any implementation process must engage communities directly impacted by a proposed nuclear fuel waste repository; however, a participatory approach would not exclude broader civil society.

For communities that are potentially directly affected by transportation and/or siting of nuclear waste facilities, the process should provide funding for them to educate themselves, with freedom to choose the people whom they consult and the methods. The principle of *free, prior, and informed consent*, with the right of refusal and the right to veto should be upheld for those communities directly affected by transportation and/or siting.

The past method of NWMO consultation involved dialogue, report, discussion-of-report. The timing in this method left little avenue for consideration of the outcomes from the discussion-of-report to have an impact on the process. The process had already moved to next stages. This method of consultation has good potential provided that timing allows for outcomes of the discussion-of-report to be transparently incorporated in the next steps of the work with the support of government.

Limitations and Uncertainties

The NWMO should consistently acknowledge the limitations of the APM approach. NWMO will need to identify technical uncertainties and social uncertainties, indicating the level of lack of knowledge.

The implementation plan has to acknowledge the necessity in the repository option for social, institutional, and governance functionality and technical expertise in order for monitoring and mitigation to be possible. It should discuss the social and institutional requirements for ensuring ongoing transfer of knowledge, wisdom, and values to future generations, for managing routine operations, and for coping with unanticipated events.

Despite the provision for extended monitoring, it does not necessarily follow that timely corrective or mitigating action could reasonably be taken when monitoring reveals a breach in containment. There has been no suggestion as to how containment breach would be handled: during transportation, during emplacement, in storage, or in repository before and after backfilling. There needs to be a plan of action if contamination is detected in the various timeframes. Also, the emergency response plans and the longer-term response plans that take into account natural or other events should be presented with the associated costs.

Financial Burden

The social acceptability of the financial burden is an important aspect. Given that legislation protects the operators of nuclear facilities by limiting liability and that the taxpayers must pay for claims beyond the $75 million, NWMO must estimate the total cost that could pass directly to the taxpayer, including those resulting from natural and other events that have a reasonable probability of occurring over the life of a proposed nuclear fuel waste facility.

The nuclear industry from uranium mining to nuclear waste management should be required to prove its claim of safety and to accept its long-term financial responsibility for liability—the “polluter pay” principle. If the industry cannot be insured and establish its own long-term funding for liability and unanticipated risk, continued support for the industry is called into question.

Oversight and Independence of Research

The Seaborn Panel called for multiple layers of oversight. Since the NWMO manages and directs all aspects of established technical research on used nuclear fuel in Canada, and its decisions are highly influenced by industry, the organizational structure could be biased as to what research gets supported and what information will be brought forward to publication. The NWMO and the Government of Canada need to transparently address how independence of research will be ensured.

Frequently Asked Questions That Remain Relevant

During the work on nuclear fuel waste issues by The United Church of Canada task groups and representatives, the United Church has raised sets of questions at the consultation tables that remain relevant. Some of these questions are specific to nuclear fuel waste issues; however, many apply to all consultations related to nuclear fuel production, its use and/or its wastes.

From the United Church of Canada to the Seaborn Panel (United Church 1996, 2-6)

> … the following are early ethical questions to be asked about anything:
> Who conceived this?
> For whose benefit is this? Who wins, who loses? How much?
> Who (or what) pays? Who, having benefited most, ought to pay most?
> Are there "externalities" built in, so that the land "pays"—and the public in the land—for private or institutional profit?
> Who has the political power in this process? Whose voice gets heard?
> Whose worldview is axiomatic here?
>
> Nuclear power and waste generate, in addition to the above, their own subset of ethical questions, such as:
>
> Who has an 'energy shortage,' such that we must respond to it by nuclear power?
> Who has decided that we must, and how and when?
> What were the arguments?
> Are the rational reasons given for our investment in nuclearism the full set of reasons?
> Is anything else operating here?

Other, broader questions include:

- What is the level of risk to air quality and the contribution of greenhouse gas emissions associated with the lifecycle production of nuclear energy and its management of waste?
- What are the development and trade impacts of the promotion and sale of Canadian nuclear technology and CANDU reactors to overseas partners, particularly as they are related to the disposition and management of wastes?

The United Church has questioned the acceptability of the regulatory framework. Some questions to be asked of regulations relating to radioactive releases or contamination by radionuclides include:

- Is the regulatory framework set on releases or health impacts?
- What level of risk is associated with the regulated limit? Is it justified? Who decided its "acceptability" and what public and worker input has there been?
- How is the risk defined? Is the risk assessment based on adult males?
- What is the risk of other health impacts as well as fatal cancers and serious genetic damage? What is the associated chromosomal damage for this exposure?
- What is the risk for fetuses, for infants, for children, for adult females?

It is sensible and reasonable to politely inquire what are the qualifications and affiliations of the communicators who are presenting the information at public consultations.

The United Church had representation at NWMO scenario workshops and contributed to the more than 65 questions in *Looking Forward to Learn* that highlight environmental implications, security risks, financial implications, public participation in decision-making, the management process, and the relationship to the future of nuclear energy/waste production (GBN 2003, 42–45). All of these questions need to be raised and considered in public consultations for implementation, siting, and environmental impact assessments.

Background Documents and Resources

BEIR Reports. National Research Council (Committee on Biological Effects of Ionizing Radiation and other committees) on health risks from low-level radiation [BEIR V(1990) and BEIR VII(2006)] and on health risks from radon [BEIR IV(1988) and BEIR VI (1999)]. http://books.nap.edu

Codex Alimentarius Commission. 2006. *Guideline levels for radionuclides in foods contaminated following a nuclear or radiological emergency for use in international trade.* (CAC/GL 5-2006). Adopted at 29th Session of the Joint FAO/WHO Codex Alimentarius Commission. Rome: Codex Secretariat publication pending. http://www.codexalimentarius.net/web/index_en.jsp

David Suzuki Foundation. 2007. Energy: Nuclear. http://www.davidsuzuki.org/Climate_Change/Energy/Nuclear.asp

Earth Council, Earth Charter Commission. 2000. *The Earth Charter*. http://www.earthcharter.org

Edwards, Gordon. 2007. The decision making process for dealing with spent fuel. Presentation and discussion at Coping with Nuclear Wastes Conference, April 27–29, in Stockholm, Sweden. http://www.nuwinfo.se/waste2007documentation

European Committee on Radioactive Risk (ECRR). 2003. *2003 Recommendations of the European Committee on Radioactive Risk.* Regulator's edition. Aberystwyth, UK: Queen Audit Press.

Global Business Networks (GBN). 2003. Looking forward to learn: future scenarios for testing different approaches to managing used nuclear fuel in Canada. NWMO Background Paper 8-5. http://www.nwmo.ca/scenarios

Government of Canada. 2002. *Nuclear Fuel Waste Act*. Canada Gazette, Part III, Volume 25, No. 2, Chapter 23. Ottawa. http://canadagazette.gc.ca/partIII/2002/g3-02502.pdf

Hallman, David. 2000. *Spiritual values for Earth community*. World Council of Churches, No 89 in the *RISK* Book Series. Geneva: WCC Publications

Harding, Jim. 2007. *Canada's deadly secret: Saskatchewan uranium and the global nuclear system.* Halifax, Canada: Fernwod Publishing Co. Ltd.

Health Canada. Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. March 2007. Guidelines for Canadian drinking water quality: Summary Table. http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index_e.html

Health Canada. 2000. Canadian guidelines for the restriction of radioactively contaminated food and water following a nuclear emergency. http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/emergency-urgence/index_e.html

———2000. Concentrations (Bq/Kg) of radionuclides in foods from Total Diet Study in Ottawa, 2000. Food and Nutrition. http://www.hc-sc.gc.ca/fn-an/surveill/total-diet/concentration/radionuclide_conc_radionucleide_ottawa2000_e.html (last updated 2004-07-09)

———1995. Radiological characteristics guidelines. http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/radiological_characteristics/index_e.html (last updated 2005-08-05)

IARC. 2005. Risk of cancer after low doses of ionizing radiation: Retrospective cohort study in 15 countries. British Medical Journal.

KAIROS: Canadian Ecumenical Justice Initiatives. 2007. *Re-energize the future: Faith and justice in a post-petroleum world*. Developing an ecumenical response to the fossil fuel crisis, October 2007. http://www.kairoscanada.org/e/ecology/climateChange/EnergyPolicyPaper_KAIROS_December2007.pdf

Mehta K., G.R. Sherman and S.G. King. 1991. Potential health hazard of nuclear fuel waste and uranium ore. Atomic Canada Limited Report AECL-8407, Pinawa, Manitoba.

National Academy of Sciences (NAS). Committee on International Security and Arms Control. 1995. *Management and disposition of excess weapons plutonium: Reactor related options.* Washington: National Academy Press.

Natural Resources Canada (NRCan). 1998. *Government of Canada response to recommendations of the Nuclear Fuel Waste Management and Disposal Concept Environmental Assessment Panel.*

Norris, Robert S. and Hans M. Kristensen. 2006. Global nuclear stockpiles, 1945–2006. *Bulletin of the Atomic Scientist* 62 (4), 64-66.

Nuclear Waste Management Organization (NWMO). 2007. *Moving forward together*. http://www.nwmo.ca

———November 2005. *Choosing a way forward: The future management of Canada's used nuclear fuel Final study*. http://www.nwmo.ca

NWMO Assessment Team. 2004. Assessing the options: Future management of used nuclear fuel in Canada. http://www.nwmo.ca

Seaborn, Blair (Chairman) Nuclear Fuel Waste Disposal Concept Environmental Assessment Panel. 1998. *Report of the Nuclear Fuel Waste Management and Disposal Concept Environmental Assessment Panel*. Canadian Environmental Assessment Agency. http://www.ceaa.gc.ca/010/0001/0001/0012/0001/report_e.htm

Timmerman, Peter. The long haul: Ethics in the Canadian nuclear waste debate. In *Nuclear waste management in Canada: Critical issues, critical perspectives,* ed. Darrin Durant and Genevieve Fuji Johnson. Publication pending.

United Church of Canada. Bay of Quinte Conference. 2007. *Statement regarding the Algonquin and Local Residents Blockade of Uranium Prospecting near Sharbot Lake.*

United Church of Canada. Bay of Quinte Conference. 2007. Letter to Ontario Premier, Dalton McGuinty, regarding the Algonquin and local residents blockade of uranium prospecting near Sharbot Lake. September 12, 2007.

United Church of Canada. 2007. *Challenging Empire: Justice Seeking in Your Faith Community*. Educational Kit based on the Report *Living Faithfully in the Midst of Empire* to the 39th General Council of the United Church of Canada.

United Church of Canada. 2006a. *Living Faithfully in the Midst of Empire*. Report to the 39th General Council of the United Church of Canada.

United Church of Canada. 2006b. *A Song of Faith.* A Statement of Faith of the United Church of Canada. Statement of the 39th General Council of the United Church of Canada.

United Church of Canada. Justice, Global and Ecumenical Relations Unit. 2005. Letter to Prime Minister of Canada: The response of the United Church of Canada to the Nuclear Waste Management Organization report, Choosing a way forward: The future management of Canada's used nuclear fuel. November 12, 2005. http://www.united-church.ca/en/ecology/energy/051112

United Church of Canada. November 2005. The response of the United Church to the NWMO report, Choosing a way forward: The future management of Canada's used nuclear fuel. http://www.nwmo.ca

United Church of Canada. September 2005. *Comments of The United Church of Canada to the Nuclear Waste Management on the draft study report: Choosing a way forward*. http://www.nwmo.ca

United Church of Canada. Maritime Conference. 2005. *Refurbishment of Point Lepreau.* Resolution passed at the Annual General Meeting of the Maritime Conference.

United Church of Canada. 2005. *Submission 3. United Church comments on NWMO discussion document Understanding the choices, and related reports*: *Part 1. Response to*

NWMO questions: Is the assessment framework comprehensive and balanced? Are there gaps, and if so, what do we need to add? http://www.nwmo.ca

United Church of Canada. March 2005. *Submission 2: Commentary on a United Church of Canada ethical lens for viewing the problem of nuclear wastes*. http://www.united-church.ca/files/ecology/energy/submission2.pdf

United Church of Canada. 2004. *Submission 1: United Church of Canada general comments on nuclear wastes and the work of the Nuclear Waste management Organisation (NWMO)*. http://www.united-church.ca/files/ecology/energy/submission1.pdf

United Church of Canada. 2003. The nuclear and uranium mining industry. *Record of Proceedings of the 38th General Council of the United Church of Canada*, 2003 ROP: 73. http://united-church.ca/beliefs/policies/2003/n776

United Church of Canada. 2000a. *Energy in the One Earth Community: Current challenges and future options for energy use in the Canadian and global contexts*. Statement of the 37th General Council of the United Church of Canada. http://www.united-church.ca/ecology/energy/oneearth

United Church of Canada. 2000b. *To Seek Justice and Resist Evil: Towards a Global Economy for All God's People.* A Report on "the global reality of systemic economic injustice" to the 37th General Council of the United Church of Canada.

United Church of Canada. Church-In-Society Coordinating Group, Division of Mission in Canada. 1999. *Comments relating to the "Government of Canada response to recommendations of the Nuclear Fuel Waste Management and Disposal Concept Environmental Panel."* Submitted to Natural Resources Canada.

United Church of Canada. 1997. *Record of Proceedings of the 36th General Council of the United Church of Canada*. See 3.3 Nuclear Fuel Cycle in *Energy in the One Earth Community*. http://www.united-church.ca/files/ecology/energy/oneearth.pdf

United Church of Canada. Program Unit on Peace, Environment and Rural Life, Division of Mission in Canada. 1996. *A Submission from the United Church of Canada to the Public Hearings of the Canadian Environmental Assessment Panel reviewing the Nuclear Fuel Waste and Disposal Concept* (known as the Seaborn Panel). Available by request from The United Church of Canada.

United Church of Canada. 1992. *One Earth Community: Ethical principles for environment and development*. Statement of the 34th General Council of the United Church of Canada.

United Church of Canada. 1990. *The Earth is the Lord's*. Liturgy commended to congregations by the 33rd General Council of the United Church of Canada.

United Church of Canada. 1990. Statement of faith: Peace in a Nuclear Age. *Record of Proceedings of the 33rd General Council of The United Church of Canada*, 1990 ROP: 511.

United Church of Canada. 1990. Global Warming and Atmospheric Destruction. *Record of Proceedings of the 33rd General Council of The United Church of Canada*, 1990 ROP: 166.

United Church of Canada. 1988a. *Seeking to understand "partnership" for God's mission today*. Statement of the 32nd General Council of the United Church of Canada. http://www.united-church.ca/files/partners/appendixa.pdf

United Church of Canada. 1988b. Uranium Exports. *Record of Proceedings of the 32nd General Council of the United Church of Canada*, 1988 ROP: 197. http://www.united-church.ca/beliefs/policies/1988/u286

United Church of Canada. National Working Group on Energy and the Environment. 1984. The United Church of Canada brief submitted to the Inter-Faith Program for Public Awareness of Nuclear Issues.

United Church of Canada. 1982. Energy and the Church. *Record of Proceedings of the 29th General Council of The United Church of Canada*, 1982 ROP: 171–186.

United Church of Canada. 1980. The Nuclear Option For Canadians. *Record of Proceedings of the 28th General Council of The United Church of Canada*, 1980 ROP: 987.

United Church of Canada. Saskatchewan Conference. 1980. Submission to the Warman Environmental Assessment Panel.

United Church of Canada. British Columbia Conference. 1979. *Ethics and uranium mining in B.C.* Report of the Uranium Working Group of British Columbia Conference submitted to the Bates Royal Commission of Inquiry into Uranium Mining.

United Church of Canada. Saskatchewan Conference. 1977. Submission to the Bayda-Cluff Lake Board of Inquiry.

United Church of Canada. 1977. *Report of the General Council Task Force on the Environment*. In the United Church resource, *In the public arena: Social policy positions of the United Church of Canada*.

United Church of Canada. 1968. A New Creed. In *Voices United: The hymn and worship book of The United Church of Canada*, 918. Toronto: United Church Publishing House.

United Church of Canada. 1956. *Record of Proceedings of the 17th General Council of The United Church of Canada*, 1956 ROP: 52.

United Church of Canada. 1954. *Record of Proceedings of the 16th General Council of The United Church of Canada*, 1954 ROP: 26.

Weir, Erica. 2004. "Uranium in drinking water, naturally." *Canadian Medical Association Journal*: March, 170(6):951. http://www.cmaj.ca/cgi/content/full/170/6/951

Wilson, Lois. 2001. Transcript of Standing Committee on Aboriginal Affairs, Northern Development and Natural Resources hearing of 6 November 2001 on Bill C-27 of the 37th Parliament.

Wilson, Lois. 2000. *Nuclear waste: Exploring the ethical dilemmas*. Toronto: United Church Publishing House.

World Council of Churches. 2007. *This far and no further: Act fast and act now!* Statement from the World Council of Churches (WCC) to the High-Level Ministerial Segment of the 13th Session of the Conference of the Parties—COP13 to the UNFCCC 3rd Session of the Meeting of the Parties to the Kyoto Protocol—CMP3. Nusa Dua, Bali, Indonesia, Friday, December 14, 2007, available at http://www.oikoumene.org/en/resources/documents/wcc-programmes/justice-diakonia-and-responsibility-for-creation/climate-change-water/14-12-07-statement-to-cop13-un-climate-conference-bali.html