



Written submission from Ecojustice Working Group

Mémoire d'Ecojustice Working Group

In the Matter of the

À l'égard d'

Ontario Power Generation Inc.

Ontario Power Generation Inc.

Application for a licence to construct one BWRX-300 reactor at the Darlington New Nuclear Project Site (DNNP)

Demande visant à construire 1 réacteur BWRX-300 sur le site du projet de nouvelle centrale nucléaire de Darlington (PNCND)

**Commission Public Hearing
Part-2**

**Audience publique de la Commission
Partie-2**

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Energy in the One Earth Community: Current Challenges and Future Options for Energy Use in the Canadian and Global Contexts

*A policy statement adopted by the 37th General Council of
The United Church of Canada, August 2000*

1. Executive Summary

Energy is integral to God's creation. Sources ranging from fossil fuels to the sun are transformed into the physical energy used by human societies. Nutritional elements combine with water and air to give our bodies the biological energy to maintain life. Our relationships with God, the natural world, and other people provide us with the spiritual energy to thrive.

During its history, The United Church of Canada has addressed these various aspects of energy in policy, study, and advocacy, usually treating them as distinct challenges in human society. Various General Councils and other church courts have explored the ecological and social justice dimensions of nuclear power, fossil fuels, hydroelectric developments, conservation, efficiency and renewable energy sources (see in particular General Council policy statements from 1980, 1982, and 1990). On other occasions, the church has focused on concerns about food security as critical to meeting our biological energy needs with particular attention to the economic and social well-being of farmers and fisherfolk. Attention to spiritual energy has been a less explicit agenda, but is discernible in much of the church's faith nurture, congregational development, and interfaith dialogue.

This policy statement of the 37th General Council concentrates on current challenges and future options for the physical energy needed by human society in Canada and globally. However, the issues are addressed within the context of our growing awareness of the inter-relatedness of all life. Developments in ecological theology and ethics are opening our eyes to the ways in which energy use is linked to the ecological crises facing the Earth, the health consequences for us and future generations, the global justice implications, and the more profound levels of spiritual well-being for us in relation to other species and to our Creator.

The framework for the statement draws upon insights from the 33rd General Council's policy *One Earth Community – Ethical Principles for Environment and Development* (August 1992), which reads in part:

We believe that creation is a gift of God. We therefore endorse the following principles:

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.

Energy in the One Earth Community draws a number of implications from these principles in terms of energy including:

- Human societies must learn to live in a much more ecologically integrated manner within the Earth community, drawing on energy sources in ways that do not damage ecosystems or compromise the capacity of the Earth to meet the needs of current or future generations.
- The generation and use of energy must be determined primarily by the needs of all people for a good quality of life, with priority for appropriate and accessible energy for the world's poor.
- Energy policy in Canada should be based on publicly stated ethical principles and should shift away from the strategy of expanding supply through energy megaprojects and focus more on managing demand and development of renewable, alternative sources. Specifically, Canada should:
 - reflect in its domestic and foreign policies a move away from large-scale energy projects, which inevitably entail major disruptions to the environment and human communities;
 - move beyond our dependence on high-carbon fossil fuels, which produce emissions leading to climate change;
 - 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 from nuclear reactors;
 - manage demand through a high priority on conservation and energy efficiency including significant reductions in the energy needed per unit of production and transportation;
 - significantly increase research and development into renewable energy sources such as solar, wind, biomass;
 - support development and utilization of appropriate technologies for small-scale, decentralized energy systems, including small-scale hydroelectric development;
 - provide the necessary supports for individuals, families, and communities adversely affected by a transition away from fossil fuels, nuclear power, and large-scale hydro in order to allow for alternative economic development, retraining, and relocation.

Energy in the One Earth Community begins with theological and ethical reflections on energy within the Canadian and global contexts, and continues with a more specific discussion of

current challenges and futures options related to a range of energy sources. An accompanying resolution includes recommendations for government, industry, church, and individuals.

2. Theological and Ethical Reflections

*“The earth is the Lord’s and all that is in it,
the world, and those who live in it.” (Psalm 24:1)*

*“For in him (Jesus Christ) all things in heaven and on earth were created, things visible
and invisible...all things have been created through him and for him.”
(Colossians 1:16)*

“In [God], we live and move and have our being.” (Acts 17:28)

Awareness of the importance of the inter-relatedness of the various elements of the natural world has been a fundamental part of some human societies for generations, but the world of science, which has fed the thinking of the Western world, has begun to see the significance of this interdependence only gradually over the past 50 years. Physics has come to focus on relationships as the essential defining characteristic of matter. Biology and ecology have described the ways in which life forms interact and depend upon one another and the physical environment. Human beings are inextricably part of and dependent upon the natural world. Increasing documentation of the ways in which human activity is having destructive impacts on the biosphere is leading many scientists to move beyond their role as researchers and become more active in calling for dramatic changes in the way in which we live as human societies.

Christian theologians and ethicists have responded to the challenge of the ecological crisis by revisiting our scripture, tradition, and theology. Building on insights from the sciences, they have developed the spiritual dimension of this new understanding of the inter-relatedness of all life. The entire Earth is the Lord’s. Through Jesus Christ, all things exist. The Spirit of God is present, active, and pervasive throughout all creation. As humans within the natural order, justice, prudence, and piety all summon us to acknowledge our inter-relatedness with other life processes and our dependence upon the God who is Creator and sustainer of creation. The United Church of Canada recognized the implications of these eco-theology perspectives by revising its creed in 1995 to include the words “to live with respect in creation” among the vocations to which we are called as people of faith. Living with respect in creation has implications for our individual and collective lives in terms of our use of physical energy, our dependence on biological energy derived from the gifts of creation, and how we open our souls to the spiritual energy granted by God and experienced by us through many aspects of the natural world.

It is not only the Christian faith from which calls are coming for a reappreciation of the sacredness of creation and of the need to live in more respectful ways with the rest of the natural world. Currently, one of the most exciting areas of inter-faith dialogue and collaboration is in addressing ecological concerns and sharing insights from our respective faith systems regarding

care for creation. The United Church's statement from the 36th General Council on *Mending the Earth* is an eloquent testimony to this inter-faith potential and reality.

Within Christianity, certain voices have been critical in opening perspectives to encompass not only an appreciation for the inter-relatedness of all life, but a recognition that many societies must stand judged for the unjust manner in which policies and practices have oppressed the vulnerable among the human community and the broader natural world. Aboriginal peoples, eco-feminists, and activists from Southern countries articulate their insights from within the contexts of centuries of oppression from the dominant cultures, largely Western industrialized societies. Such oppression continues in our day through the trends toward economic globalization. These analyses have led to an understanding within the ecumenical community of the many ways in which contemporary society is structured as a destructive culture of death, especially for the vulnerable within the human community and broader natural world. Our challenge as people of faith is to bear witness to life. We are called to work toward sustainable community in which all people have sufficient for life in abundance, where future generations are not ecologically impoverished because of the actions of this generation, and where other species are respected as having an integrity of their own.

This theological and ethical understanding of our call to work toward an ecologically sustainable and socially just world has specific application in terms of our use of physical energy. The 33rd General Council Statement (1992) *One Earth Community – Ethical Principles for Environment and Development* (12 principles included below) provides a framework for identifying some of the implications related to energy.

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

The full range of environmental and social consequences from the exploration, development, and use of energy must be considered in assessing various options. Life-cycle analyses are useful in that they force us to broaden our perspective beyond the immediate use of energy and consider the long-term and long-range impacts. For instance, large-scale hydroelectric projects have serious consequences for ecosystems which are flooded and for communities which are displaced. Fossil fuel emissions contribute carbon dioxide to the atmosphere, leading to climate change which will affect people and ecosystems around the world. Toxic wastes from nuclear generating facilities, if improperly stored or disposed of, pose a threat to the health of many generations to come. As Canadians, we cannot concern ourselves with just the immediate and domestic consequences of our energy choices, but must recognize and take responsibility for the impacts on the Earth as a whole, both currently and in the future.

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.

Large and powerful economic interests have had a determining influence on energy decisions around the world. Until quite recently, almost all World Bank energy funding has gone for projects that fed industrial and urban development in countries of the South. This development has supported the wealthy élites, but paid little attention to the needs of the vast majority of the

poor. Research into new energy options has paid insufficient attention to what technologies and systems would be most appropriate and accessible for peoples living near subsistence levels. The risk that international trade treaties may take precedence over international environmental and social agreements threatens to exacerbate the economic gap between the rich and the poor, including inequality of access to energy resources. Canada should work to model alternative approaches which shift priority toward values of relationship, so that meeting the needs of the poor is the highest priority of energy policy.

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

The vast majority of energy produced and used in the world goes to meet the needs and luxury demands of the world's rich. In Canada, where energy has been relatively inexpensive, we have constructed individual and collective lifestyles which make prodigious and inefficient use of energy resources. Technologies already exist which are much more energy efficient, and many more could be brought on stream quickly if the research and development resources were applied. These technologies could dramatically reduce the amount of energy that we use per unit of production, consumption, and transportation. Further, as Christians, we should challenge the level of material consumption which has come to be viewed as natural in our society, and model alternative approaches which shift toward values of relationship, simplicity, and health. We should ask ourselves what is enough or sufficient for a good quality of life. We should also press for policies and actions that ensure all in Canadian society and globally have access to sufficient resources for a good quality of life.

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

Human societies are now less able now to plead ignorance when it comes to the negative environmental and social consequences of energy development and use. Environmental and social assessment processes, as well as the accumulating scientific evidence, point to massive destructive impacts from many of the energy sources currently in use. We must accept our responsibility and shift energy policies and approaches so that we use less energy and draw it from sources which are less polluting and less environmentally destructive than the current ones.

5. *The rights of future generations must be protected.*

The consequences of the energy patterns of current human societies represent the most serious environmental threats to the health and well-being of future generations. Consider, for example, the predicted climate changes over the next centuries caused by the burning of fossil fuels. High-level nuclear wastes will remain radioactive for tens of thousands of years, and there is no known safe way to protect future generations from the toxicity which may ensue. Energy from these two technologies are serving the demands of people living now and over the past number of decades, and yet the negative environmental consequences will last for hundreds and thousands of years into the future. Future generations are not represented in our legislatures, boardrooms, or international negotiations to argue their own case. One role for Christians who see themselves as caring for God's creation is to assume responsibility for speaking on behalf of future generations of human and non-human species as energy decisions are made which could affect positively or negatively their capacity to live full and healthy lives.

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

The emissions from the burning of fossil fuels are pushing carbon dioxide concentrations levels in the atmosphere higher than at any time in recorded history. Scientists with the Inter-Governmental Panel on Climate Change estimate that human societies need to reduce their annual emissions of carbon dioxide by around 60% in order to stabilize the CO₂ concentrations in the atmosphere at levels which avoid serious interference with climate systems. Renewable energy technologies offer the most encouraging potential for energy sources which carry modest enough environmental impacts that they can be used without exceeding the carrying capacity of the Earth.

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

Coal and uranium mining, oil and gas exploration and development, and large-scale flooding for large hydroelectric projects all have destructive impacts on ecosystems. These are compounded by the long-term consequences of these energy sources, such as radioactive uranium mine tailings and the destruction of ecosystems through climate change. Though we are aware of some of these impacts now, there are others which will only become apparent when it is too late to prevent them and further plant and animal species have been threatened. Protecting the Earth's bio-diversity requires us to utilize energy judiciously so as to avoid waste and inefficiency and to shift toward energy sources which carry fewer inherent destructive impacts.

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

War, military manoeuvres, and the production of military equipment utilize vast quantities of energy. Environmental impacts are among the less analyzed consequences of war. Oil refineries and energy systems are favourite targets for bombing, causing severe pollution of land, air, and water sources. Nuclear power generation and nuclear bomb production are inter-related through common use of uranium, the potential for high-level nuclear wastes to be diverted for bombs, and the proposed use of mixed-oxide fuels from bombs in nuclear reactors because there is no known safe method of disposing of the waste. Environmental protection can be added to the many other good reasons for pursuing 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.*

Peoples displaced by large projects such as big hydroelectric dams, oil and gas development, nuclear plants, and hydro transmission lines, should have the opportunity for full and meaningful participation in decision-making regarding such projects, especially since the energy benefits are likely to be reaped by industry and urban dwellers far away. Participation is often difficult for community groups with limited resources. It is important for governments to provide adequate intervenor assistance for those most affected by the projects and to use an open and transparent decision-making process.

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

The Internet and other forms of electronic communication are making it easier for people to share information around the world regarding the destructive environmental and social impacts of current energy sources and the potentials for energy efficiency and renewable energy technologies. However, governments and companies in industrialized countries, claiming intellectual property rights, resist making new energy technologies available to countries of the South which are seeking ways to avoid repeating the energy-inefficient and fossil fuel dependent development path of the North. If sustainable energy options are to be pursued, information needs to be readily accessible to those who need it.

11. Development decisions must emphasize prevention of ecological damage.

Energy conservation, efficiency, and alternative renewable sources reflect the precautionary principle of avoidance of ecological damage much more effectively than do most of the energy sources currently used. Churches could play an important modelling role in their communities by ensuring that their buildings use energy as efficiently as possible and by being willing to experiment with alternative renewable energy.

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

The intergovernmental negotiations related to climate change, though frustratingly slow, do represent an attempt by the global community to deal with an energy-related environmental issue through negotiation and collective planning. The increasingly trans-boundary nature of energy issues, which have significant environmental and social consequences, is raising questions about the need for new forms of global governance. Concerns have been raised that international trade agreements under NAFTA or the World Trade Organization might restrict Canada's capacity to adopt measures aimed at shifting energy policy to emphasize conservation, efficiency, and renewable sources.

3. Major Energy Issues in Canada and their Global Implications

The implications for Canadian energy policy arising out of *One Earth Community* include the need for a significant shift in direction away from efforts to expand the supply of energy resources through large-scale projects utilizing fossil fuels, hydro, or nuclear power and concentrate instead on reducing the demand for energy and developing cleaner, safer alternative sources. This is consistent with the policy position which the United Church adopted in the 1982 General Council statement on *Energy and the Church*.

3.1 Megaprojects and impacts of resource development projects

Energy megaprojects inevitably entail major disruptions to the environment and human communities.

Hydroelectric production is a renewable source and has great potential in small-scale applications. However, massive hydroelectric projects such as on the Churchill River in northern Manitoba and the James Bay dams in northern Quebec almost invariably produce large-scale flooding that adversely impacts people and ecosystems. First Nations peoples affected by these energy projects have often opposed them or have had to struggle for years to try and gain appropriate input to the planning and compensation for their loss of land and livelihood. The United Church has participated on its own as well as through the ecumenical Aboriginal Rights Coalition in supporting First Nations in their struggles related to these developments.

Similar situations have been repeated in other parts of the world such as the Three Gorges Dam in China where millions of people have been displaced. Some of the dams proposed for India's Narmada River were successfully stopped as a result of local people's resistance.

The ecumenical coalition the Taskforce on the Churches and Corporate Responsibility (TCCR), in which the United Church is an active member, has been involved in the past in raising issues with oil and gas companies in terms of the impact of their activities on the lands and communities of First Nations peoples in Canada (e.g., Lubicon Cree in Alberta). The United Church has long maintained that industrial development should not occur on land which is the subject of dispute in terms of Native land claims and that First Nations peoples should be full participants in co-management planning for natural resources on their lands. Recognizing the importance of ensuring that peoples most affected gain adequate benefit from resource development, the 29th General Council included in the policy on *Energy and the Church* a call for renewed negotiations between the federal government of the day and the Government of Newfoundland and Labrador on offshore oil and gas development.

In recent years, the Taskforce on the Churches and Corporate Responsibility has been involved in efforts related to the environmental and social impact of resource development projects by transnational oil companies in other countries (e.g., Nigeria, Sudan).

Concerns have also been raised in recent years by United Church people in Alberta about the air pollution and the health impacts of the heavy concentration of oil and gas companies in their

province. The continuous burning flares by oil and gas companies is a serious health concern in various regions of the country. Technologies have been developed and are in use in other countries for putting waste gas back into the ground or re-injecting it into the formation.

3.2 Fossil fuel use and its contribution to climate change

Ours is a world that is addicted to fossil fuel. From the Industrial Revolution to the present, much of the technological development has been powered by coal and oil. While fossil fuel-based industrialization has resulted in significant improvements for the quality of life of many people, we are now becoming more aware of the environmental and social costs. High levels of energy and material consumption exacerbated by ever-increasing transportation of persons and goods are producing emissions from the fossil fuels used which are reducing local air quality and leading to climate change.

The recognition of the environmental and social consequences of our intensive use of fossil fuels is providing greater impetus to efforts to develop economically viable alternative renewable energy sources. The international negotiations on climate change which have led to the UN Framework Convention on Climate Change (1992) and the Kyoto Protocol (1997) are forcing Canada and other countries to pay increased attention to using energy more efficiently and supporting the development of alternative renewable energy sources. Under the Kyoto Protocol, Canada would be committed to a 6% reduction in greenhouse gas emissions from 1990 levels by 2010. Given our responsibility as an industrialized country with one of the highest per capita rates of carbon dioxide emissions in the world, it is important for Canada to concentrate on reducing fossil fuel based energy use within our own country and not to depend on mechanisms such as emission trading with other countries to reach our targets for emission reduction under international agreements.

Various legislative, regulatory, and fiscal measures are available to governments to encourage movement away from high-carbon fossil fuels. The low cost of energy on this continent has been one of the most significant factors in maintaining our dependence on fossil fuels and retarding progress on conservation, efficiency, and renewables. While some economic approaches are controversial, such as a carbon tax graduated in relation to the carbon content of the fuel, fiscal measures are an important tool which can have positive ecological and economic benefits. Fossil fuel exploration and development have been and continue to be heavily subsidized by public funds in Canada. If such costs as well as environmental costs were built into the price of fossil fuels, renewable energy options would be much more economically competitive. The regional economic impacts of movement away from fossil fuels are important factors for consideration in Canadian energy policy. Energy conservation, efficiency, and renewable options have significant job-creation potential, which could help offset job losses in the fossil fuel sector.

Transportation is a significant source of carbon dioxide emissions. Progress could be made toward reducing emissions if Canadian energy and transportation policy emphasized public transit over private motorized vehicle use and railroads rather than trucks for freight transport. The development of the fuel cell is an encouraging technology which may revolutionize much of the energy supply for both transportation and centralized power supply.

3.3 Nuclear fuel cycle

The United Church has a long history of discussion and advocacy related to various aspects of the nuclear fuel cycle, including uranium mining, management of mine tailings, nuclear energy production, and high-level nuclear waste management and disposal. In the 1970s, British Columbia Conference and Saskatchewan Conference raised concerns about the impact of uranium mining on First Nations communities which are near mines and on the environment. Saskatchewan Conference has reaffirmed its opposition to uranium mines a number of times over the years, while acknowledging the economic complexities given the fact that the mines have provided some employment in northern communities.

The 28th General Council in 1980 adopted a resolution on the “nuclear option for Canadians” based on the premises that the church has a deep concern for the well-being of this and future generations and believes that science and technology should serve the quest for a just, participatory, and sustainable society and that “an ability to solve many of the problems associated with uranium mining/nuclear power has not been demonstrated.” The 1980 resolution called for a national public inquiry into all aspects of the nuclear fuel cycle 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 mines. The 36th General Council in 1997 added two new elements to this policy base by requesting the Government of Canada to firstly, decline to accept plutonium from other nations and to cease experiments in the potential use of plutonium as a component in MOX (mixed oxide) fuel for burning in CANDU reactors and secondly, to declare a moratorium on the sale of CANDU nuclear reactors.

Proposals to take plutonium from nuclear armaments and convert it into MOX fuels does appear to have an initial attractiveness as a strategy toward global disarmament. Certainly, the Canadian government has promoted it in those terms. The most persuasive argument in favour of MOX would be if it actually represented final disposal, but it does not, since the resulting high-level wastes from the reactors would still need storage or disposal. The option has also been pushed as a way to alleviate a dangerous situation in Russia, that is, concerns about Russian instability and the country’s capacity to manage the material from dismantled warheads. In reality, the MOX fuel option is a long-term option that would take many decades and would do little to get dangerous materials quickly out of an unstable Russia.

On the basis of these policies, the Division of Mission in Canada (DMC) prepared two major interventions related to the Environmental Assessment Panel on Nuclear Waste Management and Disposal. Former United Church Moderator Lois Wilson was a member of this federal environmental assessment panel. In 1996, the DMC made a submission to the panel utilizing the framework of the General Council statement *One Earth Community* and made various recommendations, including that the concept of deep geological burial of high-level nuclear waste should not be approved at present. The Environmental Assessment Panel’s report, which was released in February 1998, makes essentially the same recommendation. The DMC, along with many others including former Moderator Wilson, were deeply disturbed by the federal government’s December 1998 response to the panel report because of the way that its response misrepresents the panel’s conclusions and how the government, while purporting to endorse

most of the panel's recommendations, actually proposes actions which are often in contradiction to those recommendations.

Given the investment that Canada has made in nuclear technology and our current dependence on it as an energy source, especially in Ontario, nuclear power will continue to play a role in the energy mix in Canada for the immediate future. However, concerns continue to grow about the safety of nuclear power with the shutdown of many nuclear power stations in Ontario and the refurbishing of others because they were found to be aging more quickly than had been anticipated. Permanent, scientifically proven, and socially acceptable management options for uranium mine tailings and high-level nuclear wastes are still not available. Further, nuclear power is becoming increasingly uneconomical if one acknowledges the range of costs related to it, including decommissioning of obsolete reactors and the still unknown long-term management costs of wastes. Public and private 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.

3.4 Energy efficiency and conservation

The policy statement on *Energy and the Church* adopted by the 29th General Council in 1982 made a strong argument for moving away from energy megaprojects to supply an ever-increasing energy demand and toward soft path energy which emphasizes managing energy demand more effectively through energy efficiency, conservation, and alternative renewable sources. The General Council based much of its position on analyses done by the ecumenical coalition GATT-FLY of which the United Church was an active member and which is now called the Ecumenical Coalition on Economic Justice. In 1984, a United Church delegation met with Jean Chrétien, then Minister of Energy, Mines, and Resources, to express concern about serious cutbacks in federal support programs for energy efficiency and conservation, as well as research funding for renewables. It is regrettable that the church's voice was not heeded and that Canada did not continue to support the development of energy efficiency and conservation more strongly. Advances over the past 15 years would certainly have placed us in a better position to meet the challenges to reduce our energy use that we are now facing as a result of the commitments made within the context of international agreements on climate change.

There have been considerable developments around the world which provide specific examples of ways in which energy efficiency and conservation can result in dramatic reductions in the amount of energy needed per unit of production and transportation:

- Super-efficient homes in Frankfurt, Germany, which use 90% less heat and 75% less electricity than normal German homes;
- Super-efficient and ultra-light "hypercars" using hybrid engines giving 100 mpg in local driving and 200 mpg-plus for long-distance travel;
- An integrated transportation system in Curitiba, Brazil, has bucked the "norm" of extensive car use. With a cheap and effective bus network, 70% of the inhabitants use the system, leading to 30% lower gas use when compared to other Brazilian cities;

- Clever appliance design and minimum standards-setting in Denmark which can cut electricity use by 74% compared to 1988 levels. (cf. Lovins & Weizsaecker, *Factor Four*).

Within the church community, we have a challenge to significantly improve the energy conservation and efficiency of our own buildings and the extent to which attendance at worship and church programs can be organized to reduce individual use of cars. Technologies exist and experiments are in progress in various regions of Canada whereby United Churches are retrofitting buildings and finding that the energy they save pays back the capital costs of the renovations in a relatively short period of time. The ecumenical Taskforce on the Churches and Corporate Responsibility, and its subunit the Inter-Church Committee on Ecology, have launched a project, with financial assistance from the federal government, to help churches across the country to improve energy efficiency and conservation. In every region of the country, resources on energy efficiency and conservation are available from governments, utilities, and environmental organizations to assist individuals and families take practical steps toward better stewardship of energy use.

3.5 Potential for alternative renewable energy sources

The statement on *Energy and the Church* from the 29th General Council in 1982 placed emphasis on the need to support the development of renewable energy options as an alternative to Canada's existing dependency on fossil fuels, nuclear power, and hydroelectric megaprojects. In the years since that General Council, considerable progress has been made in the field of renewables, bringing the technologies closer to economic viability.

Wind energy and solar power are two of the most promising renewable technologies. Though they still meet only a small fraction of the world's energy needs, wind and solar power are growing faster than any other energy source. In 1998, use of wind energy increased 30% worldwide, and solar increased 16% worldwide. Increasing the market share for renewable energy is a problem because it is still more expensive to produce electricity from wind or through photovoltaic solar panels than it is from traditional hydroelectric, fossil fuel, and nuclear sources. Part of the difficulty is that traditional sources are priced inappropriately cheaply: the price charged for fossil fuels and nuclear power does not reflect either the environmental costs of using those fuels nor the amount of investment of public funds that has gone into fossil fuel developments and nuclear power over the past decades. Canada has a relatively vibrant renewable energy sector made up of many small companies which are developing promising technologies, but face considerable obstacles given the preferential treatment (e.g., grants, tax concessions) accorded to traditional sources over the years. Governments have a variety of fiscal measures at their disposal which could make renewable sources more economically competitive and thus encourage the development of the renewable sector.

Consumers across Canada will be able to influence the mix of energy sources as the opportunities grow for them to request a certain percentage of their electricity to come from "green energy" sources. There initially will be a premium that consumers will have to pay for the green energy, but it is anticipated that this will gradually diminish as the economies of scale improve.

3.6 *Small-scale, decentralized energy systems*

Currently, electricity production and distribution in Canada relies on highly centralized systems of control, with grid networks connecting large electricity generating facilities with markets through extensive transmission corridors. Such a system leaves people and businesses vulnerable to major disruptions as a result of storms, fluctuations in generating capacity, etc.

There are considerable benefits to be gained through a redesign of our electricity system in the direction of small-scale generating facilities utilizing renewable energy sources. The vulnerability of the system is reduced, local people have more control and can assume greater responsibility for their own energy production, and environmental and social problems associated with transmission of electricity over long distances are diminished.

Small-scale hydroelectric development offers significant potential in Canada and elsewhere for meeting local industrial or community energy needs with a relatively modest impact on the environment.

To help make such ventures economically viable, legislation is needed which would allow small-scale projects to sell excess power to the electrical utility at a fair price.

3.7 *Challenges in the transition to a new energy approach*

There will be difficult social, economic, and political challenges in making a transition from an energy system based largely on fossil fuels, nuclear power, and large-scale hydro to an energy system that prioritizes conservation, energy efficiency, and alternative renewable sources. Significant numbers of jobs exist currently in construction and operations in the coal, oil, and gas industries, the nuclear sector, and large-scale hydro. A long history of government subsidies and private sector investments in our current energy system leads to political resistance to seriously contemplating a major change.

Considerable research over the past several decades confirms that a new energy approach based on conservation, efficiency, and renewable sources would have a positive impact on Canada's economy, including a net increase in employment opportunities. However, the majority of those employment opportunities may not be in the same areas that currently host energy-related jobs. If Canada shifts its energy policy away from dependence on fossil fuels, nuclear power, and large-scale hydro, various regions of the country which already struggle with significant levels of unemployment would face further economic challenges and social upheaval.

These social, economic, and political challenges should not be minimized, but neither are they reasons for maintaining the status quo. The transition to a new energy approach would not be easy, and individuals, families, and communities that would be adversely affected should be provided with the necessary supports from government, the private sector, and other organizations, including the church. Alternative economic development options would need to be pursued. There is encouraging experience in other sectors that have undergone major change, such as forestry, where eco-tourism has provided employment opportunities in some communities which no longer host logging or milling industries.

4. Relevant Reference Materials

General Council Policies available in the resource In the Public Arena:

- *The Nuclear Option for Canadians*, 28th General Council, 1980.
- *Nuclear Power*, 28th General Council, 1980.
- *Energy and the Church*, 29th General Council, 1982.
- *Uranium Exports*, 32nd General Council, 1988.
- *Global Warming and Atmospheric Destruction*, 33rd General Council, 1990.
- *One Earth Community – Ethical Principles for Environment and Development*, 34th General Council, 1992.

Division of Mission in Canada Policies and Briefs:

- *Resolution re. James Bay II Hydroelectric Development*, DMC Executive, June 1991.
- *Submission to the Public Hearings of the Canadian Environmental Assessment Panel Reviewing the Nuclear Fuel Waste Management and Disposal Concept*, March 1996.
- *Comments Relating to the Government of Canada Response to Recommendations of the Nuclear Fuel Waste Management and Disposal Concept Environmental Assessment Panel*, February 1999.

5. Suggestions for Practical Implementation of Policy Proposals

The Division of Mission in Canada wishes to inform the 37th General Council that,

- The United Church's *Mandate Mission Study Special Edition*,
- the Taskforce on the Churches and Corporate Responsibility (and its sub-unit the Inter-Church Committee on Ecology),
- the Canadian Ecumenical Jubilee Initiative, and
- Ten Days for Global Justice

will be concentrating jointly on creation issues, including climate change and energy use, as one of their major foci for the third year Jubilee theme "Renewal of the Earth," starting in September 2000. They will be developing resources for programs and practical actions at the congregational level that can be used to help implement, within communities, the policy directions laid out in *Energy in the One Earth Community*.

There is also a new NFB video, *Turning Down the Heat: The New Energy Revolution*, that has been placed in United Church AVEL outlets as a helpful companion resource to study of *Energy in the One Earth Community*.

6. General Council Policy Resolution

Energy in the One Earth Community:

A policy statement adopted by the 37th General Council

WHEREAS during its history, The United Church of Canada has addressed various aspects of energy in policy, study, and advocacy; and

WHEREAS the last major General Council comprehensive policy statement on energy was in 1982 and does not reflect the significant United Church work on fossil fuels and climate change over the past 10 years; and

WHEREAS the Division of Mission in Canada has made submissions on nuclear waste to an environmental assessment panel (March 1996) and to the federal government (February 1999) based on the last major General Council policy statement on nuclear energy which was in 1980 and which now could use updating in light of this recent United Church work on nuclear waste; and

WHEREAS United Church of Canada statements on specific energy issues over the past 20 years are largely unconnected one to the other. United Church education and advocacy on energy issues would be enhanced by having an integrated policy statement which is placed within the context of recent developments in ecological ethics and theology; and

WHEREAS the 33rd General Council's policy *One Earth Community – Ethical Principles for Environment and Development* (August 1992) provides a framework in which to articulate a new General Council policy statement on energy;

THEREFORE BE IT RESOLVED THAT the 37th General Council affirm the following principles:

1. Human societies must learn to live in a much more ecologically integrated manner within the Earth community, drawing on energy sources in ways that do not damage ecosystems or compromise the capacity of the Earth to meet the needs of current or future generations;
2. The generation and use of energy must be determined primarily by the needs of all people for a good quality of life, with priority for appropriate and accessible energy for the world's poor;
3. Compliance with international trade agreements should not be given precedence over compliance with international environmental agreements or prevent Canada from adopting measures to reorient its energy policy;
4. 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 megaprojects and focus more on managing demand and development of renewable, alternative sources. Specifically, Canada should:

- 4.1. reflect in its domestic and foreign policies a move away from large-scale energy projects which often entail major disruptions to the environment and human communities;
 - 4.1.1. communities and peoples most affected by oil and gas exploration, large-scale hydroelectric development projects, nuclear facilities, and other energy-related mining, production, or waste projects should have the opportunity and intervenor assistance to allow for full and meaningful participation in decision-making regarding those projects;
- 4.2. move beyond our dependence on high-carbon fossil fuels which produce emissions leading to climate change;
 - 4.2.1. Canada should ratify the Kyoto Protocol under the UN Framework Convention on Climate Change;
 - 4.2.2. Canada should concentrate on reducing carbon dioxide emissions within Canada and not rely on mechanisms such as emission trading with other countries to meet our targets for emission reductions under international agreements;
- 4.3. 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;
 - 4.3.1. 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;
 - 4.3.2. 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;
- 4.4. manage demand through high priority on conservation and energy efficiency including significant reductions in the energy needed per unit of production and transportation;
 - 4.4.1. government policy should facilitate the reorganization of individual and community lifestyles in order to generate and use energy as efficiently and sustainably as possible;
 - 4.4.2. United Church congregations and members should be encouraged to pursue strategies to increase energy efficiency and conservation within their own buildings and use of transportation;

- 4.5. significantly increase research and development into renewable energy sources such as solar, wind, biomass, etc.;
- 4.5.1. Canada should utilize a variety of fiscal measures to make renewable sources more economically competitive and thus encourage the development of the renewable sector;
- 4.5.2. United Church congregations and members should be encouraged to opt for green energy when available in their region to help increase the economic viability of alternate renewable sources;
- 4.6. support development and utilization of appropriate technologies for small-scale, decentralized energy systems, including small-scale hydroelectric development;
- 4.6.1. legislation should be enacted which would allow small-scale electrical generating projects to sell excess power to the electrical utility at a fair price in order to help make such projects economically viable;
- 4.7. provide the necessary supports for individuals, families, and communities adversely affected by a transition away from fossil fuels, nuclear power, and large-scale hydro in order to allow for alternate economic development, retraining, relocation, etc.;
- 4.7.1. intentional programs should be established by public and private sectors in consultation with affected communities to assist in economic transition including alternate economic development, retraining, relocation, etc.;
- 4.7.2. the United Church, through mechanisms such as its participation in the Canadian Alternative Economic Cooperative, should support alternate economic development initiatives in regions that would be adversely affected by a transition to a new energy approach.

AND BE IT FURTHER RESOLVED THAT the 37th General Council request the Division of Mission in Canada to communicate recommendations to and take other appropriate initiatives with governments, industry, congregations, and United Church members.

AND BE IT FURTHER RESOLVED THAT THE 37th General Council request the Division of Mission in Canada to prepare resources which enable congregations to become “One Earth Communities” or “Creation Communities.”

7. Workshop Outline for the study of *Energy in the One Earth Community*

Overview

This workshop is intended to provide participants with ideas of some of the constructive things that we can do to help reduce the polluting gases which are leading to climate change.

The primary resources are:

- *Energy in the One Earth Community*: A statement on current challenges and future options for energy use in the Canadian and global contexts adopted by the United Church's 37th General Council (August 2000) as a new church policy.
- *Turning Down the Heat: The New Energy Revolution*: An NFB video narrated by David Suzuki which describes the exciting opportunities for the development of clean, renewable energy sources. Conservation, efficiency, and renewable energy sources can reduce our dependence on the burning of fossil fuels which produce carbon dioxide, the major greenhouse gas leading to climate change. (Available through AVEL outlets.)

The leaders should have an opportunity to read *Energy in the One Earth Community* and preview the video in advance of the meeting. The workshop consists of an initial introductory time, viewing the video or part of it, and then a discussion period focused on *Energy in the One Earth Community*.

Workshop Process

5 minutes: Open the workshop with prayer and a song.

20 minutes: You might begin by using the accompanying Bible Study on "Climate Change and Global Ethics" (see page 21).

10 minutes: To open the workshop period, pass out copies of "10 ways to reduce greenhouse gas emissions" and ask people to check off how many they do.

5 minutes: Prior to showing the video, make the following comments:

- There is growing scientific consensus that the Earth's atmosphere is warming as a result of the accumulation of greenhouse gases trapping more of the sun's heat close to the Earth.
- The main greenhouse gas is carbon dioxide produced by the burning of fossil fuels such as coal, oil, and gas.

Energy in the One Earth Community

- The predicted consequences of this global warming include significant climate changes with hotter temperatures, more erratic rainfall patterns resulting in drought and floods, rising sea levels, and increased storm activity.
- Since our use of fossil fuel energy is one of the major sources of the greenhouse gases accumulating in the atmosphere, it is important to find ways to reduce our reliance on fossil fuels.
- Energy conservation and increased energy efficiency is one important strategy.
- In addition, the development of alternative, renewable energy sources holds great promise as a means to reduce our dependence on fossil fuels.
- This video shows what is happening in Canada and around the world in this new energy revolution.

48 minutes or less: Show the video. The video is 48 minutes long so if you do not have sufficient time to watch the entire video, you could stop it after 20 or 30 minutes when participants already have gained a good grasp of the video.

10 minutes: Break

10 minutes: Provide a time as a whole group to share reactions to the video.

10 minutes: Distribute copies of the resolution portion of the statement *Energy in the One Earth Community*. Ask people to read the resolution and to pick out one or two of the points that they think are particularly important.

15 minutes: Invite people to break into groups of six to eight to discuss their reactions to the statement and the specific points that they identified as important.

15 minutes: Join back together as a total group and open the floor for comments from the discussion groups.

5 minutes: Close the workshop with prayer and a song.

8. Bible Study: Climate Change and Global Ethics

Enter through the narrow gate; for the gate is wide and the road is easy that leads to destruction, and there are many who take it. For the gate is narrow and the road is hard that leads to life, and there are few who find it. (Matthew 7:13–14)

Background

Jesus' call to find and enter through the narrow gate is consistent with the difficult challenges that he posed throughout his ministry. He told the disciples that they had to become as little children to enter the kingdom of heaven (Matthew 18:1–5). He admonished Peter to forgive not seven times but 77 times (Matthew 18:21–22). He commissioned his followers to go into all the world and proclaim the good news to the whole creation (Mark 16:14–15).

Climate change places before us as Christians the challenge of having to choose the easy or the hard road. Climate change represents a major threat to the well-being of peoples and ecosystems around the world. Countries in the developing world and future generations will suffer particularly severe consequences of sea levels rising and the increase in droughts, disease, and tropical storms.

Scientists are clear that the rich, industrialized countries such as Canada have produced the majority of polluting gases accumulating in the atmosphere that are leading to climate change. Our society's extravagant use of energy is largely related to the pursuit of materialistic consumption and economic globalization.

We have to change our lifestyles and pressure government and industry to reduce pollution. There will be difficult choices to make.

But here comes Jesus' surprise. The road that is hard through the narrow gate does not lead to deprivation, sorrow, despair. It leads to *life*! Perhaps we have lost our awareness of what life is really all about and where the sources of true satisfaction and richness lie.

Changing our lifestyles and societies to live more in harmony with the systems of the natural world will not only reduce the potential of climate change. It will also lead to greater justice in our relationship with our brothers and sisters around the world and with future generations, and we will find sources of deep fulfillment beyond our imaginings.

Quiet Reflection Time

After having someone read the scripture passage (Matthew 7:13–14) and the background material above, ask people to spend some time quietly on their own. It might be helpful to provide some quiet music or a recording of nature sounds in the background.

Energy in the One Earth Community

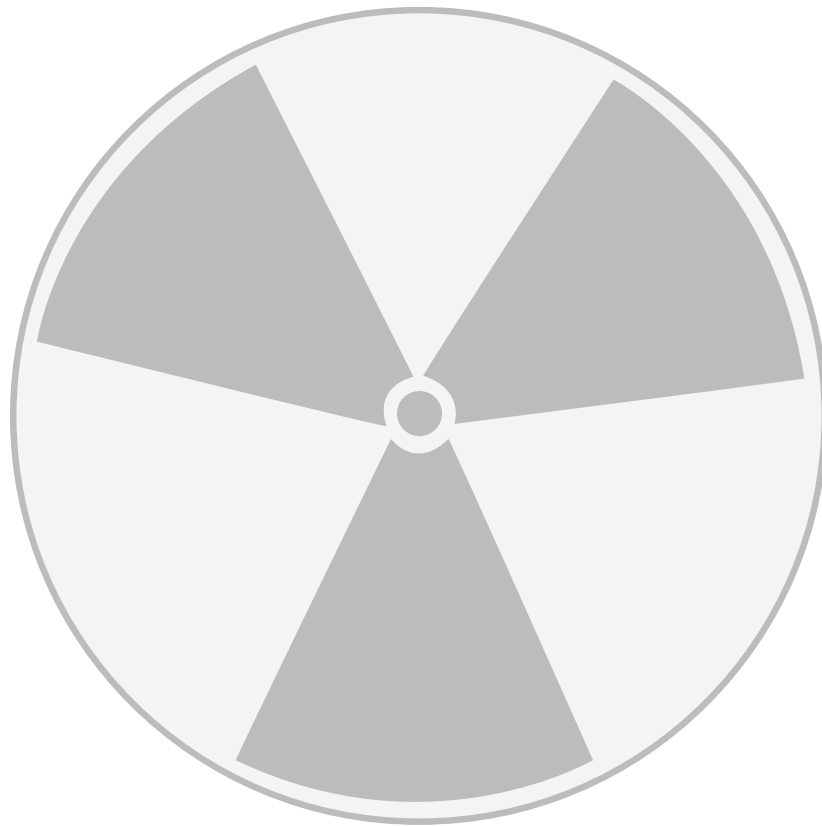
Invite them to write responses to the following three questions:

- What is most important to them in life, what do they value the most highly?
- What would they be prepared to change in their lives if it meant helping to create a healthier, cleaner world?
- What difficulties would they anticipate in being able to make the changes?

Form small groups of four or five persons to share reflections from their writings.

Come together again as a full group for any comments that people would like to make arising out of their discussion.

Always Changing, Forever Yours: Nuclear Fuel Wastes



Leader's Guide

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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 led 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 *interdependence*” 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 led 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.

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November 3, 2024

Submitted via email: interventions@cnsccsn.gc.ca

Submission to Canadian Nuclear Safety Commission on the application Ontario Power Generation Inc. for a licence to construct one BWRX-300 reactor for its Darlington New Nuclear Project

By Ecojustice Working Group, Regions East, United Church of Canada

Thank you for this opportunity to submit comments to the Canadian Nuclear Safety Commission (CNSC) on the application by Ontario Power Generation Inc. (OPG) for a licence to construct at its Darlington New Nuclear Project one novel design boiling water reactor, BWRX-300.

The United Church has acknowledged the harmful role that past false assumptions of human separation from and superiority over the natural world has had in the commodification of nature and environmental destruction. In its policies, The United Church has clearly articulated humanity's fundamental integration with the rest of creation along with a call towards responsibility for the care of Creation. Further, The United Church notes that such crucial understandings are at the root of the richness and wisdom of Indigenous worldviews and draws your attention to the importance of that wisdom for our Age.

The United Church of Canada has a long history of policies, documents, and submissions to public calls for input on social, environmental and ethical issues relating to energy issues. This submission is grounded in that extensive base of information, of which two documents are attached:

- the foundational policy, [Energy in the One Earth Community- Current Challenges and Future Options for Energy Use in Canadian and Global Contexts](#) and
- the publication on The United Church ethical position, involvement, and key documents relating to the nuclear power chain from uranium mining to nuclear fuel wastes, [Always Changing, Forever Yours: Nuclear Fuel Wastes](#).

Recommendation:

The Ecojustice Working Group focused on proof of safety and adequacy of the responses for an experimental nuclear reactor in the assessment process of OPG's licencing application and supporting documents and CNSC materials.

We conclude that the Canadian Nuclear Safety Commission should not grant to Ontario Power Generation Inc. the licence to construct a 327-megawatt BWRX-300 nuclear reactor.

Proof of Safety and Adequacy of Responses

The BWRX-300 water-cooled, natural circulation boiling water reactor is an experimental design, as yet incomplete. OPG's licence application and supporting documents have inadequate information to support the safety case for a BWRX-300 reactor at the Darlington site. The OPG application fails to adequately address topics in CNSC [REGDOC-1.1.2, Licence Application Guide: Licence to Construct A Reactor Facility, Version 2](#) .

The CNSC claims that testing done for the design of the Economic Simplified Boiling Water Reactor (ESBWR) is mostly applicable to the BWRX-300. Only some aspects of the design of the BWRX-300 are based on the larger ESBWR and the ESBWR was never operated so overall we conclude that it is of less value in assessing the BWRX-300 than CNSC implies.

CNSC recognized some of the outstanding issues in its statements at Part 1 of the present process. However, the CNSC's use of regulatory hold periods is inappropriate for this incomplete design of an experimental nuclear reactor.

Issues must be addressed to assure a testable design before proceeding to construction of a novel nuclear reactor. The proposed change to use once-through cooling resulted in 60 parameters no longer being applicable. Robust safety systems are needed because of the direct exposure of steam to radioactive materials. In the event of overheating, there is more steam and less capacity to slow down neutrons.

Many serious issues unaddressed or raised as concerns from the Combined Phases 1 and 2 pre-licensing vendor design review remain unaddressed. How emergencies around fires, water issues, and shutdown systems will be handled pose significant questions.

The impact of siting in an area already containing nuclear power plants is not evaluated. Ambient ionizing radiation levels and the cumulative dose of exposure need assessment and mitigation.

The BWRX-300 requires enriched fuel which is a nuclear process that Canada specifically avoided in developing the CANDU reactor. The impacts of the necessity of separation of U-235 and fabrication of enriched fuel, its energy cost, its emissions and wastes, and the impact of enriched fuel on management of nuclear wastes are not adequately identified or addressed to allow the overall assessment of BWRX-300.

It is noted that the airborne radioactive emissions to the atmosphere are in different proportions than the emissions assessed in the EA (see subsection 2.1.2.3 – Airborne Releases); that the volumetric activity of solid radioactive wastes generated by the operation of the BWRX-300 is in different proportions than that assessed in the EA (see subsection 2.1.2.4 – Solid Radioactive Waste Volumetric Activity and Spent Fuel Cask Weight) and that due to the higher activity of BWRX-300 spent fuel, the spent fuel cask weight is higher than assessed in the EA (see subsection 2.1.2.4 – Solid Radioactive Waste Volumetric Activity and Spent Fuel Cask Weight).

In the document [U.S. Nuclear Regulatory Commission Summary of the December 14, 2022, Public Observation Meeting To Discuss Pre-application Licensing White Paper and Topical Report on Safety Strategy for the BWRX-300 Small Modular Reactor](#) (attached) we noticed that CNSC staff participated in that meeting and that the regulatory requirements of both CNSC and NRC were applied. Did CNSC conclude that there would be benefit in the case of an experimental nuclear plant for greater safety assurance through the application of both CNSC and NRC regulatory requirements?

The federal government's unsubstantiated insistence of the necessity of nuclear power for climate action has influenced a push to weaken the impact assessment process and facilitate approval processes to speed nuclear reactor construction.

We recommend that CNSC take necessary steps to strengthen safety assurance and environmental protection in the present process.

Rather than accepting the incomplete design, safety inadequacies and the inadequately and unaddressed issues in the OPG licence application and supporting documents, we ask that CNSC not grant the licence to construct the BWRX-300 at Darlington.

No Justification for New Nuclear Power

The Ecojustice Working Group finds no justification for the federal government to be committing our country to increasing reliance on nuclear power.

Nuclear power is being promoted by the industry and government without information on the total cost borne by taxpayers, timeframe to electricity production, and consequences of this choice in terms of hazardous routine emissions, radioactive wastes, security risks, and the legacy of high-level nuclear

wastes which we are unable at this time, and may never be able, to isolate from the environment for the very long timeframe of their hazards.

The public must be permitted to participate in an open review of these issues of nuclear power and a review of alternatives including, but not limited to, bi-directional grid upgrades with modern renewable energy and storage options that are sited and sized to minimize negative effects on the environment and our communities.

Future generations are not represented in our legislatures, boardrooms, or international negotiations to argue their own case. The consequences of the energy patterns of current human societies represent serious environmental threats to the health and well-being of future generations, specifically, fossil fuel use and nuclear power.

Therefore, the Ecojustice Working Group repeats the call in policy by The United Church for a national public inquiry into all aspects of the nuclear fuel cycle and, in the meantime, the declaration of a moratorium on the expansion of existing nuclear facilities and/or the establishment of new nuclear facilities.

**U.S. NUCLEAR REGULATORY COMMISSION SUMMARY OF THE DECEMBER 14, 2022,
PUBLIC OBSERVATION MEETING TO DISCUSS PRE-APPLICATION LICENSING WHITE
PAPER AND TOPICAL REPORT ON SAFETY STRATEGY FOR THE BWRX-300 SMALL
MODULAR REACTOR**

Meeting Summary and Staff Feedback

The meeting commenced on December 14, 2022, at 10:00 a.m. with the NRC staff's opening remarks that described the pre-application "White Paper," process as a means for the NRC staff to gain understanding of the objectives and provide early feedback on the approach the applicant will propose in a future submittal of a Licensing Topical Report (LTR) on the topic of "Safety Strategy" for the BWRX-300 small modular reactor (SMR). After the introduction of the NRC and Canadian Nuclear Safety Commission (CNSC) principal staff and review team, GE Hitachi Nuclear Energy Americas, LLC (GEH) used the "White Paper," submitted to the NRC and CNSC on December 7, 2022 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22341A058), as a pre-submittal overview of its planned LTR, "Safety Strategy (NEDC-33934)" that is expected to be submitted for NRC staff review in early calendar year 2023.

GEH used the publicly available "White Paper," for its presentation to the NRC and CNSC staff, who participated in the meeting as part of a 2019 memo of cooperation with the NRC on advanced reactor and SMR technologies and as outlined in the September 2022, "Collaborative Information Sharing Charter," on the review of the BWRX-300 (ML22284A024). The presentation began with GEH clarifying its intent and goals associated with submitting the "White Paper" as a prelude to a possible future LTR. GEH further outlined their needed alignment aspects as they relate to their design's overall safety philosophy and design process used in development of the BWRX-300 that utilizes principles of layered defense-in-depth (DID) for the design of safety systems consistent with International Atomic Energy Agency (IAEA), SSR-2/1, "Safety of Nuclear Power Plants: Design." However, GEH specifically stated during a previous public meeting dated June 29, 2022 (ML22215A081), that after implementation of its final design and submitting it for staff's review under Title 10 of the *Code of Federal Regulations* (CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," or Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," the BWRX-300 would expect to meet all the applicable NRC regulations and guidance as well as meet the design requirements in CNSC REGDOC-2.5.2.

Throughout the meeting, NRC and CNSC staff asked clarifying questions in addition to providing constructive feedback to GEH on their Safety Strategy design framework. There were no questions or concerns from the public. The presentation from GEH did not contain any proprietary information so a closed portion of this meeting was not necessary. As a result, the meeting was adjourned at 12:45 pm.

Staff feedback and Comments on the “White Paper”

NRC and CNSC staff provided verbal feedback to GEH regarding the details and information that could be provided to enhance their proposed future LTR regarding the BWRX-300 “Safety Strategy.”

- **BWRX-300 Safety Strategy Design Process and Philosophy**

GEH presented the design process and philosophy for its BWRX-300 small modular reactor (SMR) referred to as the “Safety Strategy.” The objective of this process is to establish a design with a high-level of safety using a layered defense-in-depth (DID) concept using an iterative risk informed process aligned with design requirements using selected guidance of the IAEA’s Specific Safety Requirements SSR-2/1, “Safety of Nuclear Power Plants Design.” During past public meetings with the NRC staff, GEH has specifically stated that for licensing the BWRX-300 in the United States; GEH would meet the regulations prescribed in 10 CFR Part 50, or 10 CFR Part 52 with no exemptions expected and satisfy all applicable guidance including “NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants” (SRP), and other applicable regulatory guides as well as Commission Policy statements specifically for advanced passive nuclear power plant designs.

CNSC staff listened to the discussions during the meeting and asked clarifying questions. At that time, CNSC assessment of GEH’s proposed Safety Strategy (as described in the White Paper) consisted of feedback to GEH that the proposed strategy appeared to be generally consistent with CNSC’s regulations and processes; and that they would give a more detailed assessment at the scheduled follow-up meeting

However, the NRC staff’s assessment of the BWRX-300 Safety Strategy (as described in the White Paper) consisted of feedback that GEH should provide additional information to adequately address all elements of the NRC’s regulatory framework including risk informed performance-based decision making which is based on regulatory compliance, maintenance of safety margin, and treatment of uncertainties. The NRC staff also reiterated that while this novel approach by GEH could be successful, NRC approval of the safety strategy will be based on an applicant showing conformance to NRC regulations or justifying applicable exemptions.

For example, GEH in its White Paper describes a risk-informed and performance-based approach using line of defense concepts supported by probabilistic risk assessment (PRA) fault sequence frequency to identify different categories of events which may not align with the requirements for structures systems and components (SSCs) under 10 CFR Part 50 or 52. This proposed approach has the potential to result in the final BWRX-300 design which is not in compliance with NRC regulations. In addition, consistent with staff requirements to SECY-98-144, on risk-informed and performance-based regulation, the identification and quantification of uncertainties needs to be addressed in a risk informed performance-based application. The treatment of uncertainties is not discussed in the White Paper. Also, the BWRX-300 Safety Strategy would need to demonstrate consistency with the Commission’s policy statements on the use of PRA in regulatory activities (60 FR 42622; August 16, 1995), severe accidents regarding future designs and existing plants (50 FR 32138; August 8, 1985), and the several staff requirements memoranda for advanced light-water designs. Potential inconsistencies or deviations will result in additional NRC resources to ensure regulations are met, exemptions are justified, and Commission’s expectations are addressed.

Further, GEH identified the fundamental safety functions for Defense Line 3 with a fault sequence frequency between 1.E-2/year and 1.E-5/year. The NRC staff commented that this approach of providing numerical cutoff frequencies to delineate event categories may exclude consideration of some hypothetical design basis events required by 10 CFR Part 50. For example, if the final design is determined to have a reactor coolant pressure boundary break frequency less than 1.E-5/year, the proposed strategy could result in a loss-of-coolant accident (LOCA) being defined as a beyond-design-basis accident which would not comply with 10 CFR 50.46. A LOCA is a postulated accident that is required to be analyzed regardless of frequency of occurrence. The NRC staff also provided the postulated accidents of steam-line rupture and a rod drop accident as additional examples of non-mechanistic events that are required to be analyzed as design basis accidents. The NRC then summarized this portion of the meeting by recommending that the proposed Safety Strategy concept must comply with the NRC regulations, or if not, exemptions to specific NRC regulations should be identified.

Next during the meeting, the NRC staff noted that the proposed BWRX-300 Safety Strategy may also need to align better with the NRC regulations and NRC guidance on the characterization of the safety-related SSCs needed for the mitigation of anticipated operational occurrences (AOOs) as defined in 10 CFR 50.2 and as implemented in accordance with the guidance from SRP Chapter 15, "Transient and Accident Analysis." Specifically, in Section 3.2, "Defense Line 2," on page 18, of the White Paper, GEH states that, "there is no regulatory basis for asserting that AOOs must be mitigated by safety-related SSCs." However, 10 CFR 50.2 states that safety-related SSCs are those that are relied on during or following a design basis event to assure, in part: (1) The integrity of the reactor coolant pressure boundary, and (2) The capability to shut down the reactor and maintain it in a safe shutdown condition. AOOs are considered design basis events and are defined in Appendix A to 10 CFR Part 50, as those conditions of normal operation that are expected to occur one or more times during the life of the nuclear power unit.

The NRC staff additionally commented that the general design criteria (GDC) in 10 CFR Part 50, Appendix A provides the minimum requirements and criteria for maintaining the integrity of the reactor coolant pressure boundary, and for shutting down the reactor and maintaining it in a safe condition for AOOs and postulated accidents such that there is reasonable assurance that the facility can be operated without undue risk to the health and safety of the public. For AOOs, the GDCs prescribe a safe shutdown condition to be one where decay heat is being sufficiently removed and the fuel integrity barrier is maintained by demonstration of appropriate margin to the specified acceptable fuel design limits. SRP, Section 15.0, states that "*the reviewer verifies that the applicant has specified only safety-related systems or components for use in mitigating AOO and postulated accident conditions and has included the effects of single active failures in those systems and components.*" This statement was specifically added in 2007 to align with the minimum requirements in the GDC discussed above.

GEH stated during the meeting that the BWRX-300 Safety Strategy is a holistic approach to classifying SSCs. Upon assessment of the proposed information, the NRC staff noted that 10 CFR Part 50, Appendix A, GDC 1, "Quality Standards and Records," require SSCs important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. Further, 10 CFR 50.55a, "Codes and Standards," provides the specific requirements for design, fabrication, erection, and testing standards for certain systems and components of boiling- and pressurized-water reactors. NRC RG 1.26, "Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants," describes the quality standards for SSCs acceptable to the NRC staff for satisfying the requirements of GDC 1. In the NRC staff's

opinion, the White Paper neither defines the various safety classes included in the strategy, nor describes the corresponding regulatory treatment of SSCs. The proposed holistic approach to classifying SSCs for the BWRX-300 may cause inconsistency with NRC regulations and does not specifically address the Commission policy regarding advanced passive light-water reactors SSCs designated for special regulatory treatment (RTNSS).

Further, IAEA SSR-2/1, which provides the foundation for GEH's safety strategy for BWRX-300, focuses both on safety and the environment. The NRC staff commented that the White Paper did not discuss how GEH's Safety Strategy addresses the environmental aspects to conform with NRC requirements. The NRC's licensing process requires an applicant to evaluate Severe Accident Mitigation Design Alternatives (SAMDAs), which provides a systematic assessment using established guidance to examine the residual risk and if incorporation of additional mitigation is practicable to implement. It is unclear to the NRC staff if and/or how the proposed Safety Strategy considers SAMDAs to address environmental aspects identified in SSR-2/1.

- **Additional specific issues raised by the NRC staff from information presented in the Safety Strategy White Paper, include:**
 - a. The White Paper describes the ultimate design goal to control the radiation exposures and restrict the likelihood of a loss of control over a nuclear reactor core, etc. However, it does not provide details on how to address the Commissions quantitative safety goals such as core damage frequency and/or large dose release frequency and their connection to the safety strategy ultimate design goal.
 - b. The detailed technical basis for the numerical threshold demarcating the boundary between design basis events (Defense Line 3) and design extension conditions (Defense Line 4) as described under White Paper Section 3.3, "Defense Line 3" is not provided.
 - c. The technical basis for how design basis hurricanes, hurricane missiles, and tornadoes (which are assessed at 1E-7 annual exceedance frequency) should be better aligned with the NRC regulations in addition to how GEH evaluated them using the numerical thresholds demarcating the Safety Strategy defense lines.
 - d. The Safety Strategy did not seem to include provisions for or references to meeting the mitigating strategies rule under 10 CFR 50.155, "Mitigation of beyond-design-basis events." This includes the provisions related to the Spent Fuel Pool level monitoring and cooling makeup capabilities.
 - e. GEH's use of numerical screening thresholds for Defense Line 5 and the concept of "practical elimination of large releases" should be reevaluated and enhanced because these thresholds could be unnecessary for the purposes of the Safety Strategy review for the NRC and, if included, could lead to a significantly expanded scope of review.
 - f. A detailed roadmap explaining how the proposed safety strategy addresses NRC regulations would be valuable.

- g. CNSC staff raised the comment about potential lack of independence between the defense lines due to sharing of SSCs between Defense Line 2 and Defense Line 4a, which was identified during the BWRX-300 Vendor Design Review.
- **Additional specific issues identified by the CNSC staff will be provided at the scheduled follow-up meeting.**

In summary, CNSC staff listened to the discussions during the meeting and asked clarifying questions. At that time, CNSC's assessment of GEH's proposed Safety Strategy (as described in the White Paper) consisted of feedback to GEH that the proposed Safety Strategy appears to be generally consistent with CNSC's regulations and processes. However, based on the available information, the NRC staff noted that the Safety Strategy concept, as currently proposed, could result in potential inconsistencies with Part 50 and Part 52 regulations in terms of event categorization, mitigation, and safety analyses acceptance criteria. The NRC staff additionally noted that a detailed roadmap explaining how the proposed safety strategy addresses NRC regulations could be valuable as a roadmap could help to identify any potential gaps/differences and areas that would need exemptions from the current NRC regulatory requirements. Furthermore, the NRC staff commented that it could be beneficial to see examples of implementation of various aspects of the Safety Strategy and a summary of how the proposed BWRX-300 Safety Strategy is similar to or different from (i.e., as comparison) the strategies implemented by GEH for the NRC approved Economic Simplified Boiling-Water Reactor design.