International Conference
*On the Streets and in Court: Justice and Faith Against Nuclear Risks*
Arnoldshain, Germany March 9-11, 2016

# Toward Reducing Nuclear Risks

Dr. Mary Lou Harley, Representative for the United Church of Canada[1]

Warm Greetings from Canada
This presentation

- outlines some key positions of the United Church of Canada on nuclear issues
- shares some information on measures against nuclear power and nuclear weapons, and
- reflects on the nuclear risk legacy

Aspects of nuclear technology have a presence across Canada. Provinces and territories have historical radioactive wastes or presently are involved in one or more related activities.[2]

While strong voices from civil and religious groups against nuclear weapons have been united for decades, there has been a diversity of views on nuclear power within the country and within religious communities. Often in presentations to hearings and submissions on nuclear power issues, the United Church, Indigenous groups, and some outstanding individuals were the few voices speaking about respect for Creation and raising the ethical concerns along with other immediate and long-term problems.

Now, a growing number of organizations are calling for an end to the whole nuclear chain that feeds both nuclear armaments and nuclear power. The depth of the movement is very encouraging. Our voices are heard in enduring care for our grandchildren's children and all life, in comprehensive ethical principles underpinning religious communities' policies, in deep humanitarian concern expressed in declarations by civil groups, and in selfless commitment to legal action.

---

[1] A scientist and educator, Dr. Mary Lou Harley has served on United Church of Canada writing groups addressing nuclear issues since 1993. She has been a representative on nuclear issues for the United Church at national hearings, in dialogues and submissions to the Canadian Nuclear Waste Management Organization (NWMO), and at the International Conference on the East Japan Disaster, Sendai, 2014. She was a member of the statement drafting group for the World Council of Churches *Statement towards a Nuclear-free World,* 2014.

[2] These activities include uranium mining, milling, and processing, uranium export, nuclear fuel fabrication, nuclear power plants, isotope production, irradiation facilities, medical isotope use, radioactive waste management facilities, proposed repository for low and intermediate level nuclear wastes, siting process for deep geologic repository for nuclear fuel waste, and nuclear research facilities.

This presentation is based in the Social Policies of the United Church of Canada.[3] Some material is directly from the 2008 United Church education resource on nuclear issues for religious communities, for which I was the principal researcher and writer. That resource has a Leader's guide and three workshops offered free on-line to encourage reflection on the complex ethical considerations and to support public participation in decision-making, particularly decisions about Canada's nuclear fuel wastes.[4]

## Some Key Positions of the United Church

We have before us, in Canada and globally, military and civilian nuclear issues that the United Church of Canada views as inseparable from each other, and as interconnected with many broader issues directly related to how we view the world, and see our place in it.

Earth is a sacred space whether viewed from our religious traditions or from the reality that this planet provides us with our life. United Church policies have increasing reflected a worldview in which we are one part in an interdependent, complex web of precious life and sustaining systems.

It is a sacred responsibility that we are to pass Earth to future generations uninjured in its life-giving capacities. The United Church prayer *A New Creed* includes in our responsibilities:
"*We are called … to live with respect in Creation*."[5]
We acknowledge the devastating impact that decisions committing us to the nuclear path have had on people and the Planet, and the threat to all forms of life implicit in continuing on this path.

Growth of consumerism and militarism with acceptance of sacrifice zones have fuelled the continued production of highly toxic radioactive materials, even though we have no means to effectively mitigate their impact when they are released, or to isolate them from the environment for the indefinitely long period required by their inherent hazard. The nuclear power and military realities involve commodification of fundamental values so that

---

[3] United Church of Canada social policies on nuclear disarmament, nuclear bomb tests, depleted uranium, uranium mining, nuclear power, energy, climate change, ethical principles for environment and development, and other relevant policies on social, political and ecological issues are available at <http://fallback.united-church.ca/beliefs/policies>

[4] *Always Changing, Forever Yours: Nuclear fuel wastes*. Available as two document: *Leader's Guide* and *Three Workshops for Faith Groups* at <http://fallback.united-church.ca/ecology/energy/nuclear>

[5] *A New Creed* available at <http://fallback.united-church.ca/beliefs/creed>

human rights and health of some populations[6] are traded for the electrical and military power of others; and non-human life, the inanimate, and the life-sustaining systems are not valued for their natural functions.

In the 1950s, the United Church expressed grave concerns about the military applications of nuclear power, and hope for the development of beneficial peaceful applications of atomic energy. By 1962, as well as having declared opposition to nuclear weapons and bomb testing, the United Church was rethinking support for peaceful applications of atomic energy because of anxiety about its ties to continued military applications and general concern about environmental issues in the face of technological developments.

An excerpt from a 1996 United Church submission on nuclear fuel wastes puts that early hope 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.*[7]

For over 50 years, the United Church has been building a comprehensive policy base on nuclear issues and taking an active role in education and advocacy.

Since 1980, the United Church has asked the federal government repeatedly without success for a public debate on the future of nuclear power in Canada. In the meantime, the United Church has supported

- a moratorium on the expansion or refurbishment or establishment of new nuclear facilities, and
- a moratorium on the expansion of existing or establishment of new uranium mines.
- a moratorium on the disruption of radioactive deposits and
- a moratorium on the export of nuclear technology and materials.[8]

Also, since the 1980s, the United Church has supported the shift from large-scale fossil fuels and nuclear energy generation projects to a focus on

---

[6] The rights and health of Indigenous communities have been particularly affected.

[7] *A submission to the Public Hearings of the Canadian Environmental Assessment Panel reviewing the Nuclear Fuel Waste Management and Disposal Concept.*

[8] The social policy, *Energy in the One Earth Community* (2000) affirms this continuing position of the United Church on nuclear issues and draws together the policy work on energy and climate change.

conservation, increased energy efficiency, and the development of renewable alternate energy sources, particularly small-scale, decentralized renewable energy sources rather than mega projects.[9]

The United Church rejects nuclear power as an energy option in addressing climate change. In moving away from fossil fuels, the goal is energy options that reduce the environmental, health, and security risks of our energy choices. From uranium mining to nuclear fuel wastes, nuclear power increases all of these risks and has a significant greenhouse gas footprint.

The more recent work of the United Church on all aspects of the nuclear chain and energy issues is underpinned by the twelve ethical principles in the 1992 policy statement *One Earth Community*.[10] This policy framework requires that nuclear issues be viewed in a comprehensive manner:

- within the complex of problems in nuclear fuel production and use, from uranium mining to nuclear wastes
- within the international problem of nuclear wastes, including the context of Canadian export sales
- within the risks of past and present nuclear armaments, and proliferation of military applications for radioactive materials
- within the question of the future of nuclear power.

The United Church has produced educational resources to help people recognize that nuclear issues affect them, to encourage them to bring their concerns into public discussions, and to aid them in preparation for consultations on potential locations for nuclear waste facilities and environmental impact assessment hearings. A relatively small number of members are active on these issues; more will need to be done to put the policy base on nuclear issues into effective actions.

## Measures Against Nuclear Weapons and Nuclear Power

Catastrophic incidents negate the safety claims for nuclear power and highlight the insanity of nuclear war. Proponents of the nuclear path have seriously downplayed or even ignored the vast immediate suffering, subsequent related deaths and health impacts, and long-term damage affecting generations of humans and other life.

---

[9] See *Energy in the One Earth Community: Current challenges and future options for energy use in the Canadian and global contexts.* Statement of the 37th General Council (2000) available at <http://www.unitedchurch.ca/ecology/energy/oneearth>

[10] See Appendix A

The production of radioactive weapons and the production of electricity in nuclear power plants both depend on the uranium nuclear fuel chain which involves extremely hazardous, radioactive and chemically toxic wastes throughout the chain. Therefore, efforts are being made to stop the nuclear fuel chain at its starting material, Uranium.

**Stop uranium mining and milling**

Canada was the world's largest uranium producer for many years and remains a major supplier of uranium. Present production comes mainly from the northern mines in the province of Saskatchewan.

Canada was one of the sources of uranium ore,[11] a principal supplier of refined uranium and a producer of a plutonium source for the Manhattan Project, which built the atomic bombs dropped on Hiroshima and Nagasaki. For two decades thereafter, Canada continued to supply uranium for military purposes, and during that period also supplied irradiated nuclear fuel from which plutonium could be extracted. Despite subsequent restrictions on the export of uranium for use in weapons production, some of Canada's uranium exports have found their way into military applications as depleted uranium, the use of which exposes military personnel, populations in war zones, and the environment to the chemically toxic, radioactive by-product of uranium enrichment.

Canada's recent decision to supply uranium to India, which has not signed the Non-Proliferation Treaty (NPT), stands against the intent of that Treaty.

There are some successes in Canada. A legislated prohibition on uranium exploration and mining has been achieved in two provinces, British Columbia (BC) and my home province, Nova Scotia (NS).[12] Also, there is a temporary moratorium on uranium exploration and mining in Quebec.

Successful research in Canada on cyclotron production of Technetium-99m (Tc-99m), the world's most highly used medical isotope, has advanced support for the uranium ban.[13]

---

[11] With gratitude to a Conference participant who asked about Belgium Congo uranium, I add: A main source of uranium ore was Shinkolobwe in the then Belgium Congo (Zaire) and another significant source was Colorado Plateau, USA. For details, see Quotations from Authoritative Sources available at <http://www.ccnr.org/uranium_in_bombs.html>

[12] In 2008, BC government established a "no registration reserve" under the *Mineral Tenure Act* thereby excluding uranium and thorium from any mineral licenses in the province. In 2009, NS government established the *Uranium Exploration and Mining Prohibition Act*.

[13] Radiological Society of North America www.rsna.org/NEWS.aspx?id=15971

Internationally, the declarations of four world gatherings affirmed the statement that "Uranium and its associated radioactive substances must remain in their natural location."[14] Convinced that all non-military end-uses of uranium, including energy and medical uses, can be met in an alternative manner, a global movement has formed to ban the mining, processing and use of uranium worldwide.[15]

**Phase-out nuclear power plants**

Canada has twenty-two nuclear power plants of which nineteen are operational. What opportunities there are for public pressure to phase out nuclear power have come mainly when proposals are made for new builds or for refurbishment of existing reactors.

There have been successes. In 2012, given documented safety concerns, public pressure to close, and a $1.8 billion early projection for refurbishment, Quebec permanently shut-down its only operating power reactor. Six reactors operating in Ontario are slated for shut-down by 2020, joining the two reactors already permanently shut-down in that province. Recent plans for new reactors have been cancelled.

Job loss and related negative economic impacts are critical issues in the transition away from nuclear power. Intentional programs are necessary to assist in alternative economic developments, in retraining or relocation.

Fears of insufficient energy with the move away from nuclear power as well as fossil fuels, particularly for base load, are being countered by energy efficiencies, energy conservation, more effective electricity storage, growth of renewable power and improving integration into electrical grids, and increasing individual and community self-sufficiency in energy.

Promotion of nuclear power as a clean answer to climate change is a false claim and nuclear power continues to be excluded from the options within the clean development mechanism of the UN Convention on Climate Change.

---

[14] World Uranium Hearing, Salzburg Austria, 1992; Indigenous World Uranium Summit, Window Rock Navajo Nation, 2006; International Physicians for the Prevention of Nuclear War (IPPNW) World Conference, Basel Switzerland, 2010; World Uranium Symposium, Quebec City Canada, 2015

[15] A speaker at this Conference asked what on Earth is the purpose of uranium. I offered this response: Uranium functions in the sustaining systems of Earth as one of the main heat sources in the mantle under Earth's crust, driving many of Earth's geological processes. A primary source of energy in the mantle of present-day Earth is the radioactive decay chain of uranium-238. The purpose of uranium in the life of the planet lies under Earth's crust, not on its surface or in the atmosphere above it.

**Ban nuclear weapons**

In spite of the NPT, 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.

Efforts are increasing

- to bring the rule of law to nuclear disarmament and close the gaps in the NPT, and
- to strengthen the commitment to eliminate nuclear weapons and have an effective treaty to ban the production of fissile material for nuclear weapons or other nuclear explosive devices.

The plutonium from dismantled weapons, separated reactor-grade plutonium, and irradiated nuclear fuel all pose nuclear proliferation risks. Minimizing the security risks and stemming proliferation requires addressing nuclear systems as a whole, military and civilian.[16] However, there is not at this time and may never be a long-term management option that is capable of safely containing the military and civilian wastes that include fissile material or a solution to the problem of their long-term inherent hazards.

## The Nuclear Risks Legacy

We cannot abolish nuclear risks. Planet Earth is contaminated with persistent hazards as a result of our choice to take the nuclear path for military and civilian purposes.

**Burden of ionizing radiation**

Background radiation from naturally-occurring radioactive elements in the Earth's crust and from cosmic sources is about 1.7 mSv in Canada for the general public. Human-made and human-released ionizing radiation bring

---

[16] The U.S. National Academy of Sciences' Committee on International Security and Arms Control expressed their concern about efforts to reduce proliferation in their 1995 report, Management and Disposition of Excess Weapons Plutonium: Reactor Related Options.

> *"... further steps should be taken to reduce the proliferation risks posed by all of the world's plutonium stocks, military and civilian, separated and unseparated; the need for such steps exists already and will increase with time. Option …These options, however, can only realistically be considered in the broader context of the future of nuclear electricity generation, including the minimization of security and safety risks … Studies of that broader context should have as one important focus minimizing the risk of nuclear proliferation, and should consider nuclear systems as a whole, from the mining of uranium through to the disposal of waste; …"*

the total background radiation in Canada to approximately 3 mSv, almost twice the natural background for members of the public.[17]

Additional exposures are often stated in comparison to the total background ionizing radiation to imply an insignificant increase over natural exposure. This trickery ignores the unnaturally-elevated background, the increased risk from additional exposures, the difference for a single exposure verses prolonged exposure, and the significantly different impact of external and internal exposures. Any increase in ionizing radiation exposure is accompanied by an increased risk. [18]

The production of the radioactive materials and use of nuclear technologies involve routine releases with an associated human risk of cancers, genetic damage and other health damage deemed acceptable by the regulators. The public has had no input into defining the risk or setting limits of acceptability. Also, permitted radioactive foods and materials enter the market without the knowledge of consumers.[19]

External ionizing radiation, internal ionizing radiation and toxic chemical health impacts can happen concurrently. Radionuclides can have both a radiotoxic hazard and a chemical toxicity when radioactive material enters the body through a break in the skin, inhalation, or ingestion. Additional exposures have an additive effect. The damage can alter body chemistry, disrupt the body's natural processes, prematurely age the body, kill cells, and cause a host of health impacts including cancers and genetic effects.

---

[17] "Nature of the Hazard Background Document" for *Workshop on the Nature of the Hazard of Used Nuclear Fuel*, Nuclear Waste Management Organization, Canada. January 2005. <http://www.nwmo.ca/uploads_managed/MediaFiles/850_10-7BackgroundDocument.pdf>

[18] Indeed, greater care is needed to minimize additional exposure as the total background ionizing radiation has increased, and exposures for some individuals can be significantly higher than the average.

[19] Protection of international trade and facilitation of food supply and animal feed following an emergency at a nuclear facility was addressed after the Chernobyl disaster by setting guidelines for "acceptable" levels for radioactive contaminants in foods following a nuclear event. These guidelines issued by The Food and Agriculture Organization (FAO) of the United Nations and the World Health Organization (WHO) Codex Alimentarius Commission were expanded in 2006. These levels of radioactive contamination were exceeded already in some food markets by the cumulative impact of exposures to the chronic routine releases and accidental releases from nuclear facilities. These guideline levels of contamination have been misused to imply a reference level of safety.

Deregulation of nuclear wastes presents a growing threat. For example, radioactive metal is being "recycled" and entering the world market after it is melted and diluted with clean metal. The radioactivity is not removed; it is spread throughout the new metal, thereby contaminating the clean metal used to dilute it.

The changes in genes and chromosomes can result in mutations limited to the individual or they may be of a type that is passed to offspring and future generations with associated emotional and psychological trauma for generations of affected families and communities.[20]

**Managing the Wastes**

Limiting the quantity of wastes by stopping further production of them is a necessary first step in managing them.

Decades of optimistic anticipation by governments and industry for an engineered solution to as yet unsolved highly hazardous wastes has allowed these critical problems to spread around the globe in military and civilian applications.

For both military and civilian nuclear risks, the safe containment of their most hazardous wastes cannot be assured for the long-term. All options for the long-term management of high level wastes have significant shortcoming and uncertainties, and none can provide the verifiable containment required by the inherent toxic hazards of the wastes.[21]

Further, we do not have and may never have the ability to rapidly reduce the inherent hazardous nature of these wastes in any way that does not produce its own hazardous wastes, environmental problems, and security risks.

The following quote was initiated by the United Church nuclear issues writing group as a prayer for all people involved in the environmental assessment underway in Canada in the 1990s on the concept of deep geologic disposal of nuclear fuel wastes. It continues to apply to our work:

> *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*

---

[20] The Foreign Minister of the Marshall Islands, Tony de Brum spoke of the immeasurable pain of living with radioactive contamination:

> *How could human beings do this to other humans? …The emotional and psychological trauma to our people, both young and old, cannot be measured in real terms. The pain is real and the uncertainty is overwhelming. As a young lady said to me when showing me pictures of her dead deformed infant child, "God did not create my baby. He cannot be so cruel."*

As reported at http://www.huffingtonpost.com/lia-petridis/marshall-islands-nuclear-lawsuit_b_5401020.html

[21] Nuclear Waste Management Organization report, 2005. *Final Study: Choosing a Way Forward*. Canada p 348 <http://www.nwmo.ca/studyreport >

*by the best of social sciences, natural sciences, and technologies,*
*with the wisdom to acknowledge the uncertainties and the limitations of our best.*[22]

**We *can* work toward a world that does not add further to nuclear contamination**.
We live in gratitude for the richness of Creation, with growing awareness of the complexity of life-sustaining systems and of our ability to do far-reaching damage. Protection of the gene pools of life necessitates

- urgent effective nuclear disarmament,
- exit from uranium mining and nuclear power,
- regulation and enforcement for effective protection, with public input to defining the risk and setting acceptable limits, and
- research to meet the challenge of effective long-term management of the resultant wastes.

We know that the issues are urgent. There is hope in the growing awareness of the international community, and in the determination of ordinary people who increasingly express commitment to work for a just, sustainable energy future and to transform systems that have failed to support peace.

Additionally in Canada, the federal government has committed recently to rightful relationship with the Indigenous peoples of this Land. If this commitment is honoured, it promises new incorporation of Indigenous perspectives of respect and gratitude for the land, water, air, and all life, and decision-making that gives greater consideration to long-term consequences.

Words from Sister Dr. Rosalie Bertell inspire us to be steadfast:

*The continuity of life, the call for making things better for the next and the next generations blots out all hesitation. To act becomes natural, and to not be able to act, a torment. …*
*We are part of a great chain of big-hearted people who care about the Earth, about the life that gives it fruitfulness, and about a world where rights would be respected, children cherished, and where peace would prevail.*[23]

---

[22] *Submission 1: United Church of Canada general comments on nuclear wastes and the work of the Nuclear Waste Management Organization (NWMO)*. Submission in 2004 to NWMO archived at http://www.nwmo.ca

[23] "In What Do I Place My Trust?" essay by Rosalie Bertell in *The Impossible Will Take a Little While: A citizen's guide to hope in a time of fear* edited by Paul Rogat Loeb

Thank you for this opportunity to speak to you.
The World is a sacred place. Now is a sacred time.
It is our time to do our part on issues that require care beyond our lifetime.

## Appendix A One Earth Community

The work of the United Church of Canada on nuclear issues is underpinned by a body of policy including *One Earth Community – Ethical Principle for Environment and Development* adopted in 1992 by the 34th General Council. This policy provides a framework of twelve ethical principles which seek to include 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.*