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Making the World Safe for Nuclear Energy: The Road to the 2010 NPT Review Conference

Keynote remarks by Louise Fréchette, *Distinguished Fellow, Centre for International Governance Innovation (CIGI); Former UN Deputy Secretary-General*

Dear friends,

Over the next few minutes, I would like to offer a few thoughts on the broad context within which the NPT review conference will take place, particularly the renewed interest in nuclear energy shown by many countries

There are currently 439 nuclear power plants in operation in thirty countries. Nearly half of these reactors are located in just four countries: the United States, France, Japan, and Russia.

Nuclear energy grew at a fast pace from 1960 until the late 1980s. At that point, the construction of new nuclear power plants slowed to a crawl, the result, at least in part, of growing popular opposition in the wake of the accident at the Three Mile Island plant in the United States in 1979 and the Chernobyl disaster in 1986.

This picture is about to change. There are currently thirty-six new plants under construction, mostly in Asia. According to some projections, the number of nuclear power plants could double over the next twenty years. Up to forty new countries could join the nuclear energy club. Most of the newcomers would be from the developing world. Countries like Indonesia, Viet Nam, Jordan, Egypt, to name just a few have signalled their intention to develop a nuclear power programme.

Why this renewed interest in nuclear power?

For some countries, concerns over climate change figure prominently. Nuclear is seen as offering a cleaner alternative to coal or oil, at least as a transitory solution until renewable sources like sun and wind can produce energy in sufficient quantities to satisfy large-scale demand.

But for most countries contemplating new investment in nuclear energy, it is energy security rather than climate change that is the main motivation.

All projections point towards a robust, sustained growth in global energy demand over the next several decades. The current financial crisis will no doubt slow down this growth in demand for a while but in the longer term, the trend is clearly upwards.

Meanwhile, the supply situation looks uncertain, if not downright worrisome.

Traditional sources of inexpensive oil are running thin. The new ones are either much more expensive, more polluting (or both like the Canadian tar sands oil) or are located in unstable regions. Coal is in abundant supply but it remains, for the time being at least, a major producer of green house gases. Natural gas and bio-fuels, hydro and other renewables all have their limitations and drawbacks on the basis of the currently available technologies.

Access to energy sources is also vulnerable to geopolitical tensions. Wars, terrorist attacks, flare ups in bilateral relations: each raise the spectre of major disruption in the flow of energy supplies and feeds a desire to reduce dependency from foreign sources where possible.

In some developing countries, the nuclear option also seems to carry an element of enhanced national prestige, a symbol of economic progress and technological sophistication that holds attraction to countries seeking to consolidate their position vis-à-vis their neighbours as well as with foreign investors.

Most observers consider the high-end projection of 400 to 500 more nuclear power plants twenty years from now highly improbable.

To begin with, there remains considerable reluctance in many countries to go the nuclear route. Safety and security concerns have not totally abated, particularly in western countries and the pesky problem of what to do with nuclear wastes has not been answered satisfactorily, in the view of nuclear energy's many opponents.

Furthermore, new entrants particularly in the developing world would face major challenges. Setting up a nuclear power programme entails a lot more than just procuring the physical installations. Because of the special risks associated with nuclear power production—safety, security, proliferation risks—states must first adopt complex legislation and set up effective regulatory bodies and controls. They must attract and retain a large number of especially trained personnel to manage and operate the plants.

The IAEA's guide to the start up of a new programme contains fifteen pages of various steps and factors for consideration to put in place a proper framework for nuclear energy production in the areas of human resources and training, regulatory infrastructure, funding and economics and safety and security among others.

Even more daunting is the cost factor. The price tag for a single plant is several billions of dollars and countries must be prepared for significant time delays and cost overruns.

Take the example of a recent construction, the Olkiluoto-3 plant being built in Finland. Begun in 2005, the plant is now at least two years behind schedule. Its cost is projected to reach \$6.7 billion from an initial estimate of \$4.5 billion.

So the cost and complexity of running a nuclear power programme may in the end lead many plans to be abandoned along the way. But there is every reason to believe that a significant number of new power plants will indeed be built in the next couple of decades. Many of those will be located in China and in Russia, in the United States, and in Canada, countries that already have a robust programme and the necessary infrastructure and governance frameworks in place. But it is fair to assume that some new entrants will emerge, with nuclear energy programmes of their own in the coming decade or two.

On the eve of a new nuclear era, it is fair to ask ourselves whether we are confident that it can take place without increased risks for our safety and security and without compromising our non-proliferation objectives. How good are our tools of global governance in nuclear matters?

At first blush, the answer to all these questions should be positive. Since Chernobyl, the world has not had to deplore any major nuclear accident and new nuclear designs have proved to be safer than the earlier generations. Nor have there been reports of penetration of nuclear power plants or major theft of nuclear material by would-be terrorists. And while Iraq, Libya, North Korea and Iran have been found to have failed, in one way or the other, to fully live up to their obligations under the Nuclear Non-proliferation Treaty, these cases have been or are being handled vigorously in international fora and through multinational initiatives.

International cooperation in nuclear matters is underpinned by a large number of treaties, conventions and other arrangements supported by international institutions. As part of the research project which I am chairing, the Centre for International Governance Innovation has just published the first ever compendium of all the tools of global governance in the field of nuclear energy and it makes for a very impressive list.

So where is the problem, you might ask? Let us take a closer look, starting with safety and security.

In 2007, the IAEA received 140 reports from its member states on mishaps in nuclear power plants. Many of these incidents were due to human error. In other cases, natural disasters were to blame. This was the case for instance with a plant in Japan that experienced serious problem after a major earthquake in 2007. In my own country, Canada, our regulatory agency ordered a plant to be shut down after repeated requests for security upgrades were ignored by the operator.

When it comes to the security of nuclear material, dozens of cases of lost nuclear material are reported to the IAEA every year, and much of that material is never

recovered, although most of it would not be useful for nuclear weapons purposes. On the other hand, nuclear material that was never reported lost is discovered regularly.

Information about possible dumping of nuclear wastes across national borders is very sketchy. The UN did release a report in February 2005 claiming that countless shipments of “nuclear and hazardous wastes” have been dumped on Somalia’s shores as far back as the 1980s. The 2005 tsunami washed much of it ashore, hence the sudden interest.

This said, the main challenge in addressing nuclear waste is not so much preventing illegal dumping or disposal, but finding a scientifically and politically viable solution for the long-term disposal of it.

A significant increase in the number of nuclear power plants operating around the world and therefore in the amount of nuclear material being produced, transported and stored, could lead to an increase in the number of safety or security-related incidents, not because of neglect or lack of concern on the part of the operators but simply because a 100 percent perfect record is impossible to achieve and because new entrants may not have the necessary experience and infrastructure to manage the complex industrial undertaking that a nuclear power program represents.

Some international mechanisms are already in place to minimize the risks to safety and security. In this regard, the nuclear industry plays a significant role. The World Association of Nuclear Operators (WANO) which regroups all nuclear operators conducts safety reviews of its members’ operations. These reviews are said to be thorough and tough because the industry has every interest in ensuring that nuclear operators adhere to high standards. I say “are said to be” because the results of these reviews, undertaken voluntarily by the members of WANO, are for their own benefit only and are not made public.

The IAEA does extensive work in matters of safety and security as well. The most relevant IAEA conventions in these areas—the 1994 Convention on Nuclear Safety and the 1980 Convention on the Physical Protection of Nuclear Materials - have been signed by well over one hundred countries. But the obligations contained in these conventions are very general in nature.

In regard to nuclear safety, the IAEA has developed more specific standards that have been endorsed by the member states. But application of these standards is strictly voluntary. Reporting on incidents is also done on a voluntary basis.

The IAEA has extensive capacity to offer advice and conduct safety reviews on nuclear sites but it can only act on the specific invitation of a member state.

The international oversight is even looser when it comes to nuclear security, an issue that has received serious attention only since 9/11. There are no internationally agreed standards yet, just mere guidelines issued by the IAEA. As with safety issues, whatever

international guidance and oversight takes place regarding nuclear security is strictly voluntary.

Two international conventions deal with nuclear waste. The first, the 1972 Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (London Convention), deals strictly with dumping into the sea, and includes nuclear waste. The other is the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. The convention focuses on the safety of short-term storage facilities and not potential long-term solutions, such as deep geological disposal.

Like most other aspects of the global safety and security regime, the convention is voluntary in respect of detailed implementation. Monitoring and verification is limited to the review of national reports submitted by contracting states on their implementation efforts.

Tellingly, the IAEA budget devoted to nuclear safety and security comes largely from voluntary contributions (30 percent of the budget for safety-related activities and 90 percent for security-related activities). Absent predictable funding, it is impossible to build a solid oversight programme in these areas. Nuclear safeguards inspectors do not report on either safety or security but only on whether nuclear material has been diverted from peaceful uses to weapons uses.

Issues of nuclear safety and security have been treated so far as matters of national responsibility. Yet, the consequences of a poor performance either because of neglect or because of lack of capacity on the part of a single country can and would have repercussions far beyond that country's borders.

I believe a strong case can be made for reinforced oversight by a competent international body. I am not talking here of putting in place excessively elaborate procedures and a heavy bureaucracy to implement them. But it should be possible to move towards a system of mandatory standards with a minimum capacity to verify their observance.

The issues relating to non-proliferation concerns are altogether of a different nature.

Let me say from the outset that I do not think a decision to acquire a nuclear energy production capacity increases, in and of itself, the risks of nuclear proliferation. Such a decision is perfectly legitimate under the Nuclear Non-proliferation Treaty provided countries are prepared to place their entire programme under IAEA safeguards. Indeed, as you all know, the NPT is designed to encourage the use of nuclear technology for peaceful purposes and the IAEA receives significant sums every year to help developing countries in this area.

The decision to build or acquire nuclear weapons is a deliberate political move which responds to geo-political concerns either of an aggressive or defensive nature. It has little if anything to do with a perceived need to achieve energy independence or a desire to produce cleaner energy. Indeed, countries bent on mastering the technology to make the bomb do not need a civilian programme to do so, although a civilian programme can offer a useful cover for less legitimate activities.

This being said, the so-called nuclear renaissance is not without relevance to non-proliferation concerns

First, more nuclear power plants in more countries mean more nuclear scientists and technicians, more individuals with knowledge and expertise who may, for whatever motive, be willing to apply their skills to a clandestine weapons programme or get involved in illicit nuclear trade.

Second, there could be cause for concern if one or several countries were to decide to develop an indigenous capacity to enrich uranium or reprocess their spent fuel. That decision could be based on genuine fears that nuclear fuel may be withheld from them for political reasons. Or it could be motivated by commercial or nationalist ambitions.

Or it could be motivated by a desire to keep open the option of an eventual nuclear weapons programme, should neighbouring states seek or acquire such weapons or should the international non-proliferation regime collapse and a new nuclear race ensue.

As you all know very well, the Non-Proliferation Treaty is the cornerstone of that regime. For nearly forty years the NPT has helped to limit the number of states in possession of nuclear weapons. For forty years, the vast majority of states on this planet have voluntarily foregone the possession of nuclear weapons. They have agreed to account for the nuclear material in their possession and to permit intrusive inspections of their civilian programme. They have also accepted that a handful of countries are exempted from the nuclear weapons' prohibition in exchange for promising, and I quote here article VI of the Treaty,

...to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.

The non-proliferation regime set up by the NPT was flawed from the beginning by virtue of the fact that three countries—India, Pakistan, and Israel—decided not to sign it. The first two have since openly developed a military weapons program and the third is assumed to have done so as well.

New fault lines have appeared in recent years. North Korea was the first signatory to withdraw from the treaty and carry out nuclear tests. Although some progress has been

made in dismantling North Korea's nuclear weapons program, no one can say for sure at this point whether the operation will be successful in the end.

The integrity of the NPT was further challenged by Iran's undeclared nuclear activities and its refusal to fully comply with all of the IAEA's requests for information and unrestricted access. Iran may not have a secret nuclear weapons program underway but it certainly is acquiring the essential elements of a technological capacity to have one if it so desires.

To these developments must be added the discovery in the early nineteen-nineties of a secret nuclear program in Saddam Hussein's Iraq, and revelations about the aborted Libyan program which had gained access to sensitive technologies thanks to the AQ Khan underground network.

It is hard not to conclude that the NPT is under serious strain and could even unravel if more such cases were to come to light, with more countries tempted to go nuclear in response to neighbors' moves in that direction.

Meanwhile the bilateral agreement negotiated between the United States and India, now endorsed by the Nuclear Suppliers' Group, will allow export of uranium and nuclear technology to India to resume. In exchange, India will place its civilian nuclear facilities under IAEA safeguards. It is not clear yet which facilities will be placed under safeguards since India has agreed to do this over several years.

There may be many good and valid reasons for wishing to normalize nuclear relations with India but the deal also sends the message to would-be nuclear weapon states that sanctions are not eternal and that the international community can be prepared to turn the page and accept the "fait accompli."

Some people argue that an increase in the number of new nuclear weapons states should not alarm us unduly, that the prospect of mutually assured destruction is sufficient to ensure that the weapons will never actually be used.

That may be a credible scenario in a world governed by reason but I have seen enough insanity just in my own lifetime to refuse to bet my future and that of my family on the wisdom of world leaders alone. Most people would agree that the world will be much safer if there is a robust non-proliferation regime in place.

The question that arises then is whether the current case-by-case management of new challenges to the non-proliferation regime is viable in the long-term or whether a more systemic approach is required. Does the Dutch boy have enough fingers to plug all the holes in the dyke or should we think of refurbishing the dyke?

This is what the forthcoming NPT review conference should attempt to do: to chart a path towards a reinforced and sustainable non-proliferation regime.

Control of the nuclear fuel cycle is, in my opinion, at the heart of the proliferation challenge. When the NPT was concluded forty years ago, only a handful of countries could realistically aspire to enrich uranium or reprocess spent fuel to produce plutonium and therefore have the option of developing their own nuclear weapons. Nowadays, this process is within the reach of any number of countries.

The obvious way to reduce the risks of proliferation is to ensure that enrichment and reprocessing activities remain in “safe hands”. Naturally, the nuclear weapon states and the few others which currently supply nuclear fuels to most of the nuclear power plants in the world would like nothing better than to confirm their role in the supply function to the exclusion of all others in exchange for some international guarantee of access to nuclear fuel free from political interference.

This is of course not a viable proposition. Even my own country, Canada, which has long ago renounced nuclear weapons and has not so far sought to get involved in the enrichment business even though it is the largest uranium exporter in the world, is not prepared to relinquish its right to develop its own enrichment industry. Many developing countries feel even more strongly about this.

There is not getting around the fact that the NPT is an unequal treaty with different rights and obligations for different categories of countries. From the beginning, this was seen as a temporary state of affairs which would be remedied over time by the march towards full and complete nuclear disarmament.

Progress on this front has been painfully slow with many reversals and the end goal remains nowhere in sight. The last thing many countries will accept is the institution of a new two-tier system that would see a world divided not only between those who are allowed to have nuclear weapons and those who are not but also between those who are allowed to enrich uranium and reprocess spent fuel and those who are not.

The key to long-term sustainability of the non-proliferation regime is to transform it into a universal regime with equal rights and obligations for all. In my opinion, this means essentially two things.

First, it means re-commitment to the goal of full and complete disarmament by the nuclear power states and concrete steps towards that end.

Second, it means placing all sensitive parts of the nuclear fuel cycle under international authority and supervision, including existing enrichment and reprocessing plants. The internationalisation can take many forms and many ideas have been advanced already but I believe that only those that are based on the principle of equality have the potential to achieve consensus.

On both these fronts, disarmament and internationalisation of part of the fuel cycle, the leadership must come from the nuclear weapon states recognised under the NPT. If

they show the way, it will generate enormous pressure on the three non NPT signatories to follow suit.

It is clear to me that a stronger international consensus around nuclear non-proliferation and disarmament would raise the cost to those who would dare to go against the will of the entire international community.

Is this all possible? Is this utopia, with a capital U?

Well, clearly, this is not going to happen overnight. A very high level of trust will have to exist between Nuclear Weapon States among themselves and between them and the rest of the international community.

Many steps could help to get us to that stage. They are all well known to you and are in fact on the agenda of this seminar: entry into force of the CTBT, negotiation of a Fissile Material Cut-off treaty, lowering the operational status of existing nuclear weapons, bilateral agreements between NWP to reduce their arsenal, universal adherence to the additional protocol, firm “no first use” commitments, to name just a few.

What we need to do is chart a path towards the achievement of complete nuclear disarmament and a more robust, sustainable nuclear safety, security and non-proliferation regime. The prospects of vastly increased nuclear activities around the world give us a strong impetus to move in this direction. Fortunately, the current geopolitical environment is more conducive to serious engagement than it was at the time of the last review conference. For the first time in many decades, there are also signs of renewed popular mobilisation in support of nuclear disarmament which is no longer confined to the usual idealist groups. Serious practitioners of foreign and defence policy in this and other countries have started to speak up.

I do not for one minute underestimate the difficulties involved in reaching our goal. But I am convinced that if we do not move in that direction, we will be living on borrowed time, with or without a nuclear renaissance.