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NUCLEAR FUEL REPROCESSING AND
INTERNATIONAL SECURITY

A Presentation by Gordon Thompson to the
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Introduction

"The dangers of the creation of plutonium in large quantities in conditions of increasing world unrest are genuine and serious. We should not rely for energy supply on a process that produces such a hazardous substance as plutonium unless there is no reasonable alternative."

Royal Commission on Environmental Pollution, 1976¹

"Probably in the seventh and eighth centuries no one in western Europe spoke Greek who was not Irish or taught by an Irishman. No land ever sent out such impassioned teachers of learning, and Charles the Great and his successors set them at the head of the chief schools throughout Europe."

Alice Stopford Green²

In the fifth century, Ireland was a remote place at the outer margins of western civilization. Yet, as the Roman Empire fell and books were burned across Europe, Irish scribes were busy preserving classical learning. Over the subsequent centuries, the Mission of the Irish Monks restored this learning to a Europe that was plagued by ignorance and illiteracy.

Today, Ireland remains a small country at the edge of Europe. The modern world differs vastly from that of the fifth century, but our civilization faces perils that do not always receive due recognition. This presentation challenges Ireland to respond to two, linked perils -- the proliferation of nuclear weapons, and the potential instability of the Russian state.

This presentation has six major parts. First, the risks associated with nuclear fuel reprocessing are summarized. These risks are familiar in Ireland, where citizens and government have long-standing concerns about reprocessing at the UK's Sellafield site.

¹ Sixth Report of the Royal Commission on Environmental Pollution, Nuclear Power and the Environment, HMSO, London, September 1976, p. 204.

² Alice Stopford Green, Irish Nationality, Henry Holt & Company, New York, undated, p. 54.

Second, the presentation reviews Ireland's opportunities to limit reprocessing. Third, the dangers associated with Russia's present political and economic transition are described. Fourth, a new opportunity is described, whereby Ireland would promote and facilitate a Grand Bargain in nuclear affairs. This Grand Bargain would stop reprocessing and initiate a massive program of nuclear cleanup which would help to stabilize the Russian state. Fifth, the presentation describes the potential benefits to Ireland from promoting the Grand Bargain. Sixth, specific actions by Ireland are recommended.

Risks associated with nuclear fuel reprocessing

Reprocessing of spent nuclear fuel is a chemical process that separates plutonium from the fuel. Initially, reprocessing's sole purpose was to produce plutonium for use in nuclear weapons. Later, reprocessing became a commercial activity, separating plutonium that was intended as a fuel for breeder reactors. In the 1980s, breeder reactor programs collapsed and reprocessing no longer had any economic purpose. Nevertheless, reprocessing continued in several countries because of institutional inertia and distorted economic incentives, and is producing many tonnes of separated plutonium that has no economic use.

The UK Royal Society expressed concern, in a 1998 report, about the nuclear weapons proliferation and public health risks posed by the world's growing stock of separated plutonium.³ Yet, these risks were foreseen two decades previously. In 1976 a UK Royal Commission on Environmental Pollution expressed grave concern about the implications of reprocessing for nuclear proliferation, and the same concern led the US government to abandon commercial reprocessing in 1977.

Use of reprocessing by many countries would make plutonium widely accessible, thereby greatly facilitating the proliferation of nuclear weapons. At present, comparatively few countries conduct reprocessing, but their example has an important effect. Several states, including Iran and North Korea, are seeking the technology and materials to make nuclear weapons. These items are available from various sources but are particularly abundant in Russia, and will be increasingly easy to obtain from Russian sources if state authority weakens. To limit the availability of the relevant technology and materials, the world needs a comprehensive, non-discriminatory, international regime of inspection and regulation. An effective regime would have a scope and authority much more extensive than the arrangements which now support the Non-Proliferation Treaty (NPT). Creation of such a regime, a difficult task under any circumstances, will be politically impossible if the UK, France, Japan and Russia claim an unrestricted right to reprocess.

Thus, reprocessing makes the acquisition of nuclear weapons easier, a tendency which will be exacerbated if the Russian state weakens. Moreover, current events in Yugoslavia may be providing states with an additional motive to acquire nuclear

³ The Royal Society, *Management of Separated Plutonium*, London, February 1998.

weapons. NATO has demonstrated that it has a substantial capability for air attack, which it is willing to employ without regard for the UN Charter. Some states may conclude that the acquisition of nuclear weapons, perhaps done clandestinely, would be a prudent response.

Reprocessing is also an ongoing source of radioactive pollution, as illustrated by Sellafield's discharges to the Irish Sea. In addition, the operation of reprocessing plants and the associated transport activities creates the potential for accidents. IRSS has examined the accident potential of the Sellafield site, with particular attention to storage of high level radioactive waste as a liquid.⁴ We concluded that Sellafield's stock of liquid high level waste represents one of the world's most dangerous concentrations of long-lived radioactive material. An accident could release this material as a flow of liquid to the Irish Sea or as an atmospheric plume which could travel across Ireland.

Many studies have determined that reprocessing is uneconomic. It continues because of institutional inertia and distorted economic incentives. Moreover, if there were an economic benefit, this benefit would not accrue to the citizens of Ireland or most other nations, although these citizens must bear the risks associated with reprocessing.

Opportunities for Ireland to limit reprocessing

Despite reprocessing's risks, and its lack of economic benefit, some governments continue to defend it vigorously. Consider the recent experience of Germany. In mid-January, the German government announced its plan to end the reprocessing of Germany's spent nuclear fuel in France and Britain after December 1999. That announcement triggered angry protests and legal threats from the French and British governments and their reprocessing companies COGEMA and British Nuclear Fuels. Two weeks later, in response to these threats and pressure from the German nuclear industry, Chancellor Schroeder modified Germany's position. Germany remains committed to ending reprocessing, but over some longer period.

The reactions of the French and British governments reflect short-term economic considerations and a lack of strategic vision. German reprocessing contracts are said to be worth US\$5.3 billion to COGEMA and US\$2 billion to BNFL. Cancellation of the German contracts would be a major blow to COGEMA and BNFL, and could end their reprocessing operations. An end to reprocessing would yield overall economic benefits, but the realization of those benefits would require the renegotiation of reprocessing contracts. With an appropriate strategic vision, the contracts could be renegotiated so as to yield lucrative, useful work for COGEMA and BNFL. The Grand Bargain proposed here is intended to provide such a vision.

What opportunities are open to Ireland to limit reprocessing? First, recall that Ireland has a proud and continuing record of international diplomacy related to nuclear

⁴ Gordon Thompson, High Level Radioactive Liquid Waste at Sellafield: Risks, Alternative Options and Lessons for Policy, Institute for Resource and Security Studies, June 1998.

disarmament. Frank Aiken launched the NPT process in 1958. David Andrews continued this tradition in 1998 by forming the New Agenda Coalition, a group of like-minded states, to galvanize action on nuclear disarmament. In this context, Ireland might promote negotiated limits on commercial reprocessing, as part of international negotiations on a treaty to ban production of fissile materials. However, it is clear that the basic treaty will be difficult to negotiate, and its extension to cover commercial reprocessing seems unlikely at present.⁵

Ireland has engaged with the UK government and through the OSPAR process to express its concerns about the pollution and safety implications of reprocessing. One result of this effort was a July 1998 commitment by the OSPAR parties to virtual elimination of radioactive discharges into the marine environment by 2020, with implementing plans to be submitted by 2000. Meeting this commitment at Sellafield will involve additional expense, further reducing BNFL's slim profits from reprocessing. An indication of the slimness of BNFL's profits is the company's recent announcement that it will eliminate 500 jobs at Sellafield over the next two years as a cost-cutting measure. Clearly, a continuing effort by Ireland to reduce Sellafield's discharges will have a dual benefit -- reduction of environmental pollution, and further highlighting of the adverse economics of reprocessing.

Two international agreements may offer some longer-term opportunities to highlight Ireland's concerns about the safety of reprocessing. One agreement is the relatively new Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. The other is the Convention on Nuclear Safety, which has its first review conference in Vienna during the period 12-23 April 1999. The Convention on Nuclear Safety currently applies only to land-based civil nuclear power plants, and could be improved in significant ways.⁶

Another opportunity to address the risks of reprocessing is a lawsuit by Irish citizens against BNFL, with support from the Irish government. All told, a variety of opportunities to limit reprocessing are available to the Irish state and its citizens, and several of these opportunities are being pursued. To date, however, Ireland has not pursued any opportunity which offers alternative work for BNFL and COGEMA. The proposed Grand Bargain offers such an opportunity, and its promotion would complement other efforts by Ireland.

Dangers associated with Russia's transition

Russia is experiencing a political and economic transition that has brought hardship and insecurity to most of its citizens. This transition could threaten international security in several ways, of which two deserve special mention. First, budget shortages and social

⁵ Annette Schaper, "The Fissban: Stocks, Scope & Goals", *Disarmament Diplomacy*, February 1999, pp 13-16.

⁶ Gordon Thompson, *Opportunities to Improve the Convention on Nuclear Safety: Accounting for Ireland's Interests*, Institute for Resource and Security Studies, 5 March 1999.

disruption in Russia could lead to diversion of nuclear weapons materials, technology or expertise from the many nuclear facilities that were established during the Cold War. Second, poverty, disorder and national humiliation could feed a reactionary political movement with militaristic tendencies. NATO's current bombing of Yugoslavia, pursued despite Russia's objections and without authority from the UN, is encouraging just such a movement. Yet, rich, industrialized nations have a major interest in preventing nuclear diversion or the growth of reactionary politics in Russia.

The United States, western Europe and Japan have responded to the nuclear diversion problem by sponsoring programs in Russia that dismantle nuclear weapons, redirect weapon scientists to alternative employment, and reduce the risk that nuclear weapons materials or technology will be diverted. These programs, and related programs focussed on chemical and biological weapons, have enjoyed some success. President Clinton recently proposed to increase America's spending in this area, to a total of US\$4.2 billion over the next five years. Yet, many observers believe that a larger effort and a new approach are needed. A particular concern is that the existing programs have done little to establish self-sustaining commercial enterprises in Russia.

In general, economic development in Russia and its CIS neighbors has been disappointing. Russia has a highly educated population with proven capabilities in technology, but has not translated these assets into viable businesses. Investments and expert advice from the West have failed to overcome this problem, which has complex, deep-seated roots. Thus, new approaches are needed. One approach would be to focus investments in Russian locations that are politically stable, have low crime, are sheltered from predatory taxes, and have highly capable workforces. Paradoxically, these conditions might exist in Russia's formerly closed 'nuclear cities', which were established to build the Soviet nuclear arsenal and have no commercial history. Investments targeted to the nuclear cities and other selected locations might establish a nucleus of commerce that could spread to other parts of Russia.

The proposed Grand Bargain

The United States sponsors a small program to promote commercial enterprises in Russia's nuclear cities. This program has long-term promise, but a substantial influx of investment and expertise is needed to prime the pump of commerce. Such an influx could be provided by a vigorous program of nuclear cleanup, implemented through partnerships between Western companies and Russian companies that are spun off from Russia's nuclear sector. Here, the term 'nuclear cleanup' refers to the decommissioning of nuclear facilities, and the consolidation and storage of radioactive wastes that have accumulated over decades, especially from reprocessing. Interestingly, COGEMA and BNFL are among the world's leading companies in nuclear cleanup work.

Thus arises a strategic vision -- a Grand Bargain that would benefit Britain and France, their reprocessing companies, and many other parties around the world. France and Britain would agree to stop reprocessing, to initiate a massive program of nuclear cleanup in Russia and elsewhere, and to involve other nations in the bargain. These

actions would enhance international security and provide lucrative, new business for COGEMA and BNFL.

While reprocessing has been a major part of their business, COGEMA and BNFL have also acquired capabilities in managing radioactive wastes and decommissioning nuclear facilities. These capabilities provide a basis for future business that does not pose a risk to the environment, public health or international security. Indeed, the application of these capabilities in Russia could make a major, positive contribution to international security.

Nuclear cleanup is needed in every country that has used nuclear technology, but especially where reprocessing has been conducted. Thus, it is fitting that a halt to reprocessing should be linked to a new, vigorous program of nuclear cleanup. A large part of this program would occur in Russia, whose nuclear facilities have created high levels of radioactive contamination, but accelerated cleanup would also occur in Britain, France and elsewhere. Wherever the work is done, it should be implemented through partnerships between Western and Russian companies. The benefits that would flow to Russia would be matched by Russian obligations: to cease their own reprocessing; to properly account for their nuclear materials; to be open; and to promote commercial enterprise. At the political level, this arrangement would provide the Russian people with a global role that they could be proud of, enhancing international security and protecting the environment.

Some Western-sponsored work on nuclear cleanup is now being done in Russia. Also, Britain and France have taken some steps to clean up their radioactive contamination. Each year the United States spends about US\$6 billion cleaning up its nuclear weapons complex. The new program of nuclear cleanup that is envisioned here would dramatically increase the scale of cleanup work in Russia, and would accelerate cleanup in Britain and France. How could this program be financed? First, from the cost savings that would occur from an end to reprocessing. Second, from investments by development banks and Western governments who would see the program as a new, secure conduit for promoting economic development in Russia. Third, as a part of other programs that seek to prevent the diversion of nuclear materials, technology and expertise from Russian facilities. Fourth, from public funds and a levy on the nuclear industry, in recognition of this generation's responsibility to reduce the burden of radioactive contamination that is handed on to future generations. Fifth, from redirection of Western funds that would otherwise support the upgrading of nuclear reactors in the East, an effort whose achievements have been questioned.

The proposed Grand Bargain is simple in concept: reprocessing would stop and a new program of nuclear cleanup would begin. Execution of the bargain would require considerable planning and negotiation. The negotiations would proceed more smoothly if the parties agreed to set aside issues which are not essential to the bargain and would delay agreement. Three controversial issues deserve mention: the use of nuclear energy as an electricity source; the burial of radioactive wastes; and the disposition of existing stocks of separated plutonium, whether of military or civilian origin.

Use of nuclear energy for electricity generation is an issue that could be set aside, at least temporarily, because nuclear power plants can operate without reprocessing. Similarly, the parties could agree to temporarily set aside the issue of burying radioactive wastes, because the nuclear cleanup program would initially focus on the consolidation, packaging and storage of radioactive wastes, rather than on their burial. Disposition of existing stocks of separated plutonium would be a thornier issue, because programs are under way to burn this plutonium in reactors as MOX fuel, and this action is controversial. However, the level of controversy might decline if reprocessing stopped everywhere.

Who would participate in the Grand Bargain? The British, French, German and Russian governments would be central participants, but other actors would also have central roles. Several western European countries and Japan have reprocessing contracts with BNFL and COGEMA, and would have to accept an end to reprocessing. Japan also performs reprocessing in its own facilities, and an end to that reprocessing would be a desirable complement to the Grand Bargain. The United States does not reprocess but is a major sponsor of nuclear-related programs in Russia, and would therefore have a central role. Western countries and the international development banks would be the major funders of the proposed nuclear cleanup program. BNFL, COGEMA and other Western nuclear companies would have a major role in executing the cleanup program, as would a variety of organizations and government agencies in Russia. Governments of smaller countries not directly involved in the bargain, including Ireland, could play important roles as facilitators of the bargain. Finally, the international community of environmental organizations could play an essential role, ensuring that the final bargain is sound and enjoys broad-based support from the public.

Germany's recent attempt to end the reprocessing of its nuclear fuel was defeated but was, nevertheless, an appropriate policy initiative. Britain and France may be able to delay a halt to reprocessing for a few years, but the interests of both nations, and of COGEMA and BNFL, would be better served if they enthusiastically participate in the Grand Bargain described here. A united Europe, working with other partners, could make this bargain an important instrument for enhancing international security. Ireland could play a crucial, early role by convening groups of stakeholders to explore and informally negotiate the bargain.

Potential benefits to Ireland from promoting the Grand Bargain

The Grand Bargain would satisfy a long-standing objective of Irish policy -- stopping reprocessing at Sellafield. Also, the bargain would reduce the risk of nuclear weapons proliferation and help in achieving nuclear disarmament, objectives which Ireland has sought for several decades. At the same time, the bargain would help to stabilize the Russian state, thereby avoiding the multiple, potential risks associated with Russian instability. In each of these instances, Ireland would be enhancing its security but also the security of every nation.

There are potential benefits to Ireland of a more direct kind. Promotion and facilitation of the Grand Bargain would be a challenging exercise of entrepreneurship. This experience could boost Ireland's efforts to build an advanced, knowledge-based economy. The experience could build commercial linkages with Russia that would be lucrative if the Russian economy revives. Adoption of the Grand Bargain as a national project might improve domestic political cohesion and might, ultimately, improve relations with the UK.

The benefits of this national project would accrue over a period of years, but work on the project would have to begin without an immediate reward. Investments of time, money and political attention would be required. Irish participants would have to convince themselves that the project is desirable, feasible and without unanticipated, adverse consequences. There has been mention in Ireland of a potential adverse consequence -- the obtaining of new, nuclear cleanup business by COGEMA and BNFL, without a stop to reprocessing. Such a consequence certainly deserves consideration, but is unlikely. Reprocessing, although powerfully entrenched, is a declining business. Part of the funding for nuclear cleanup would come from savings from ending reprocessing, and it is unlikely that a political consensus to provide the necessary cleanup funding would exist if reprocessing continued.

Recommended actions by Ireland

At points in this presentation, it is suggested that Ireland could promote and facilitate a Grand Bargain. The presentation further suggests that Ireland could play a crucial, early role by convening groups of stakeholders to explore and informally negotiate the bargain. What specific actions might be implied by these suggestions?

The Grand Bargain is not yet ripe for formal negotiation by governments. It requires further exploration and analysis, involving people from the nations and major institutions that would be involved in implementing the bargain. When sufficient consensus has been achieved among these groups of stakeholders, the bargain could be a subject for formal negotiation. Thus, the crucial role that Ireland could now play would be to convene groups of stakeholders who would explore options and pursue informal negotiations, but who would not represent governments.

A group that might guide this enterprise would be an international commission composed of members of national parliaments. This commission could have as its first

task the exploration of the Grand Bargain, but could subsequently explore other nuclear policy issues. The commission would not be empowered as a negotiating body, but its members would remain in contact with their respective governments. Exploration of the Grand Bargain could profitably engage parliamentarians from Ireland, the UK, France, Germany, Russia, the USA, Japan and elsewhere.
