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CANADA'S NUCLEAR REACTOR EXPORT POLICY:
COMMERCIAL INTERESTS VERSUS POLITICAL/SECURITY CONCERNS

by

Duane Bratt

A Thesis
Submitted to the Faculty of Graduate Studies and Research
through the Department of Political Science
in Partial Fulfilment
of the Requirements for the Degree of
Master of Arts
at the University of Windsor

Windsor, Ontario, Canada

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ABSTRACT

The purpose of this study is to examine in detail the dilemma that faces the Canadian government in its nuclear reactor export policy in that it must attempt to reconcile two important foreign policy goals. The first is to realize the economic advantages that can accrue to Canada through the sale of nuclear equipment. The second goal is to ensure that nuclear export activity does not contribute to the proliferation of nuclear weapons, a development which has been almost universally accepted as destabilizing. The competition between these two objectives is explored by assessing each reactor export that Canada has concluded to determine the respective influence that commercial interests and political/security concerns had on the government in each instance.

Chapter One provides an introduction to the problem and a review of all of the significant literature on the subject. It establishes that this is the first study to examine all Canadian reactor transactions to date and to focus centrally on the dilemma posed by the need to reconcile two contrasting foreign policy objectives. Chapter Two examines the various economic factors that have made the sale of reactors an important Canadian foreign policy goal. Chapter Three sets out the political/security concerns associated with reactor exports, concentrating on the theme of the prevention of nuclear proliferation. Chapter Four looks at the period 1945-74 and shows that at the beginning of this era commercial interests clearly dominated over security concerns, but by the end an equilibrium had been reached between the two forces.

Chapter Five examines the period 1974-76 when, as a result of India's explosion of a nuclear device, a shift in the balance between the two competing objectives took place, resulting in political/security concerns dominating over commercial interests. Chapter Six assesses the final period, 1977-92, when, despite the dire economic necessity of concluding reactor sales, the Canadian government still allowed political/security concerns to dominate over commercial interests. Chapter Seven gives a brief conclusion and then offers some reflections on the future of Canadian nuclear reactor export policy. In sum, the thesis demonstrates the gradual ascendance of Canada's political/security preoccupations, especially in terms of avoiding nuclear proliferation, over its economic interest in concluding lucrative, high-technology exports. However, the study suggests that these competing objectives are now being reconciled because the international nuclear non-proliferation regime is gaining universal acceptance and strength. Under these circumstances and with future CANDU market opportunities looking promising, the Canadian nuclear industry may be heading into its most successful export period to date.

DEDICATION

This thesis is dedicated to my Mother, Mary Bratt, who instilled in me a love of learning at an early age, allowed me room for growth, and gave me all the support that she could.

ACKNOWLEDGEMENTS

I would like to thank my supervisor, Dr. Keenleyside, for all his support during the writing of this thesis. His intimate knowledge of Canadian foreign policy combined with his constructive criticism and helpful suggestions were invaluable. I would also like to thank the other members of my committee, Dr. Briggs and Dr. Pemberton, whose comments and suggestions during the writing stage were an essential aid to the finished work. I am also in debt to my colleagues, Adam Fallenbuchl, Ann Hibbard, Livianna Tossutti, Helen Trochluk, and Joyce Zuk, who were forced to listen to my discussions on nuclear energy in class, at lunch, and anywhere else I happened to be. These discussions during the "research and development" stage of my thesis enabled me to sharpen my debating skills and made the eventual writing that much easier. Finally, I would like to thank the Graduate Awards Committee for awarding me a Summer Research Scholarship which gave me the financial support necessary to finish my thesis in the required time.

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Chapter One

Introduction

Nuclear power is one of the great technological achievements of the twentieth century, ranking in a sense with the invention of fire. However, like fire, nuclear power can be both extremely beneficial to mankind or it can be very destructive. The central dilemma of nuclear power has been how to harness it for peaceful uses without allowing its destructive capability to jeopardize human survival. A complicating factor in this respect is that nuclear power, while possessing both the peaceful and violent characteristics of fire, increases them exponentially. The destructive capability of nuclear power was best exemplified by the atomic bombing of Hiroshima, and thus, sadly, its first application was for violent military purposes.

Canada was on the ground floor of the development of nuclear technology due to its work on the Manhattan Project with the United States during World War II. In recognizing the Janus-like aspect of nuclear power, Canada made a conscious decision to concentrate its efforts on developing the peaceful aspects of nuclear power. This goal was reached with the development of the CANDU power reactor which has become an important energy source. It is apparent that a commitment to pursue the peaceful uses of nuclear power has been accomplished successfully in Canada.

Although Canada has foregone the military uses of nuclear power, the same cannot be said for much of the rest of the world. The "nuclear club" has increased in membership from one in 1945

(U.S.) to six in 1992 (U.S., the former U.S.S.R., Great Britain, France, China, and India) with many near-nuclear-weapons states banging on the club door (Pakistan, Israel, South Africa, Argentina, Brazil, etc). This number could increase even more depending on how the former Soviet Union divides its nuclear weapons arsenal amongst the former republics.

The fact that most countries of the world have not forsworn the military uses of nuclear power has important implications for Canada because for both political and economic reasons Canada must export its nuclear reactors. The principal objective of Canada's nuclear reactor export policy is to allow other countries to benefit from nuclear power while preventing them from utilizing it for military purposes.

Canada's nuclear reactor export policy must, then, reconcile two important foreign policy goals. The first is to realize the economic and political advantages that can accrue to Canada through the sale of nuclear equipment. The second is to ensure that nuclear export activity does not contribute to the proliferation of nuclear weapons, a development which has been almost universally accepted as destabilizing.

The purpose of this study is to examine in detail the dilemma that faces the Canadian government as it tries to reconcile these two conflicting foreign policy goals in the area of nuclear reactor exports. This will be done by assessing each reactor export that Canada has concluded to determine the influence that commercial interests and political/security concerns had on the

government in each instance. Before doing so, however, it is necessary to review the nature of the existing literature on nuclear reactor exports and on Canadian policy in this domain in particular.

There exists a large body of literature on the subject of the international nuclear reactor trade. This literature can be divided into two sections: 1) the large category of works on the international nuclear reactor trade in general; and 2) the smaller body of works specializing on Canadian export policy.

International Literature

In the literature on the international nuclear trade, most writers concentrate on the central dilemma of nuclear power. However, this group can be divided into those who place the emphasis on the commercial aspects of the nuclear trade and those who focus on the problem of nuclear proliferation.

Those who concentrate on the commercial aspects tend to stress the intense competition amongst the many nuclear suppliers. In the immediate post-World War II period, only the U.S. was capable of exporting nuclear reactors. However, by the mid-1970s there were seven countries that were nuclear suppliers (U.S., U.S.S.R., U.K., France, West Germany, Canada, and Japan). In assessing this problem, Walker and Lonroth point out that the major issue was:

how to prevent competitive pressures from degrading the non-proliferation regime, and how to evolve and legitimise a common nuclear trade policy. In industrial

production, hegemony was giving way to pluralism, with all the headaches that entailed for trade management.¹

A secondary approach has been to assess how the nuclear suppliers can work together. There are two schools of thought regarding the cooperation of the nuclear suppliers: 1) those who feel that the United States must play the leading role in establishing cooperation;² and 2) those who feel that international institutions like the Nuclear Suppliers Club are best equipped to meet this purpose.³

Writers who place a greater emphasis on the security dimension can be divided into three sections: 1) those that simply outline the threat of proliferation; 2) those who examine the motivations of states which might contribute to nuclear proliferation; and 3) those who examine the international controls that exist to prevent proliferation.

¹ William Walker and Mans Lonnroth, Nuclear Power Struggles: Industrial Competition and Proliferation Control (London, 1983): 32-33. Also see Joseph A. Camillieri, The State and Nuclear Power: Conflict and Control in the Western World (Seattle, 1984).

² See Abraham A. Ribicoff, "A Market-Sharing Approach to the World Nuclear Sales Problem" Foreign Affairs (summer 1977): 763-787; Paul L. Joskow, "The International Nuclear Industry Today: The end of the American Monopoly" Foreign Affairs (Summer 1977): 788-803; Joseph A. Yager, International Cooperation in Nuclear Energy (Washington, 1981).

³ See Rodney W. Jones, Cesare Merlini, Joseph F. Pilat, and William C. Potter eds, The Nuclear Suppliers and Nonproliferation: International Policy Choices (Lexington, MA, 1985); Benjamin N. Schiff, International Nuclear Technology Transfer: Dilemmas of Dissemination and Control (Totowa, NJ, 1984); Albert Wohlstetter, Victor Gilinsky, Robert Gillette, and Roberta Wohlstetter, Nuclear Policies: Fuel Without the Bomb (Cambridge, MA, 1978).

With regard to the first of these categories, although there was some work on nuclear proliferation prior to 1974, primarily by George Quester⁴, most of the interest in this area occurred after 1974, when India exploded a nuclear device, thus becoming the first country to join the "nuclear club" since China in 1964. The Indian explosion was also important because it was done by a non-industrialized country, which had utilized foreign assistance (primarily Canadian and American) to develop its nuclear device. In addition to the Indian explosion, there was a series of other important developments in the mid-1970s which led people to show a greater concern regarding nuclear proliferation. As William Potter points out, "the 1973 oil embargo and the quadrupling of world oil prices, the subsequent increase in demand by developing states for nuclear energy production capabilities... and the appearance in the 1970s of increasingly sophisticated and worldwide terrorist groups"⁵ all contributed to an increasing threat of nuclear proliferation. Following the Indian explosion, a multitude of studies on the threat of nuclear proliferation appeared.⁶ These studies, which concentrated on the proliferation possibilities of

⁴ George Quester, The Politics of Nuclear Proliferation (Baltimore, 1973).

⁵ William C. Potter, Nuclear Power and Nonproliferation: An Interdisciplinary Perspective (Cambridge, MA, 1982):xiii.

⁶ See Charles K. Ebinger, "International Politics of Nuclear Energy" The Washington Papers Vol. VI, No. 57 (Washington, 1978); William Epstein, The Last Chance: Nuclear Proliferation and Arms Control (New York, 1976); John Maddox, "Prospects for Nuclear Proliferation" Adelphi Papers No. 113 (Spring 1975); T.T. Poulouse, Nuclear Proliferation and the Third World (Atlantic Highlands, NJ, 1982).

the near-nuclear-weapons states like Israel, South Africa, Pakistan, Iraq, Iran, Argentina, Brazil, etc, were updated in the 1980s by people like Leonard Spector and William Potter.⁷

With respect to the second category, a number of studies have attempted to analyze the motivations of states which wish to join the "nuclear club" in order to establish which states constitute the greatest risk to the non-proliferation regime. Jozef Goldblat and Ted Greenwood, in particular, have attempted to gauge accurately state motivations and capabilities.⁸

Finally, in the third category, there are writers who have emphasized the effort to maintain and strengthen the international non-proliferation regime. These authors have concentrated on examining the role that the International Atomic Energy Agency (IAEA) and the Non-proliferation Treaty (NPT) play in preventing nuclear proliferation. In particular, they have assessed the utility of nuclear safeguards procedures of both a technical and political character.⁹

⁷ See Leonard S. Spector, Nuclear Proliferation Today (New York, 1984); Leonard S. Spector, The Undeclared Bomb (Cambridge, MA, 1988); and William C. Potter ed, International Nuclear Trade and Nonproliferation: The Challenge of the Emerging Suppliers (Lexington, MA, 1990).

⁸ See Jozef Goldblat ed, Non-proliferation: The why and the wherefore (Stockholm, 1985); Ted Greenwood, Harold A. Feiveson, and Theodore B. Taylor, Nuclear Proliferation: Motivations, Capabilities, and Strategies for Control (New York, 1977).

⁹ See Joseph F. Pilat, Robert E. Pendley, and Charles K. Ebinger eds, Atoms for Peace: An Analysis After Thirty Years (Boulder, Colorado, 1985); Joseph F. Pilat and Robert W. Pendley eds, Beyond 1995: The Future of the NPT Regime (New York, 1990); Stockholm International Peace Research Institute, Internationalization to Prevent the Spread of Nuclear Weapons

Other authors writing on international nuclear safeguards have taken a more legalistic approach, examining the legal framework which exists for international nuclear exports. These scholars have determined that there exist three possible avenues for safeguards: bilateral safeguards; IAEA safeguards; and NPT safeguards. Again, the Indian explosion represented a dividing line for these authors. Those writing before 1974 developed mainly hypothetical arguments about safeguards arrangements. A good example of these was Stephen Gorove's study on distinguishing "peaceful uses" of nuclear energy from "military uses". Gorove pointed out that "something which has overwhelmingly military connotation today may have many peaceful uses tomorrow" so that definitions of military uses of atomic energy are relative, "and should be reevaluated from time to time in the light of technological developments and innovations."¹⁰ Following the Indian explosion, on the other hand, there were several studies on the subject of whether or not India had violated international law with

(London, 1980); SIPRI, The NPT: The Main Political Barrier to Nuclear Weapon Proliferation (London, 1980); John Simpson and Anthony G. McGrew eds, The International Nuclear Non-Proliferation System: Challenges and Choices (New York, 1984).

¹⁰ Stephen Gorove, "Distinguishing 'Peaceful' From 'Military' Uses of Atomic Energy: Some Facts and Considerations" Ohio State Law Journal Vol. 30 (1969): 500-501.

its explosion,¹¹ and if any legal measures could be taken to prevent nuclear proliferation.¹²

Canadian Literature

In addition to the international studies on nuclear power, there is also a body of literature, albeit smaller, that is specific to Canadian policy. These works can be classified into six categories: 1) normative accounts that oppose nuclear exports; 2) histories; 3) studies that focus on the role of government regulations; 4) analyses of the issue of proliferation; 5) studies focusing on sales to specific countries; and 6) comprehensive analyses of Canadian export policy.

The normative, anti-nuclear studies focus largely on environmental concerns¹³, but there are also some that make a case against exports because of the attendant security risks. Writers like Ian Adams argue that Canada has "sold the CANDU reactor knowing it would be used as a key component in the development of

¹¹ See James R. Walczak, "Legal Implication of Indian Nuclear Development" Denver Journal of International Law and Policy Vol. 4 (1974): 237-256; Gary Milhollin, "Stopping The Indian Bomb" The American Journal of International Law Vol. 81 (1987): 593-609.

¹² See Don F. Dagenais, "Atomic Safeguards and the Strategy of Treaty Deterrence" Cornell International Law Journal Vol. 8 (1975): 211-228; Joseph S. Stanford, "Nuclear Assistance and Cooperation Agreements: Some Problems in the Application of Safeguards" Journal of International Law and Economics Vol. 10 (1975): 437-451; Paul C. Szasz, "The Adequacy of International Nuclear Safeguards" Journal of International Law and Economics Vol. 10 (1975): 423-436.

¹³ The earliest, and most important, of these books was Fred H. Knelman, Nuclear Energy: The Unforgiving Technology (Edmonton, 1976).

a nuclear weapons system."¹⁴ The countries purchasing CANDUs have also come under attack because, as Gordon Edwards points out, Canadians are "deeply disturbed over Canada's role in the global proliferation of nuclear weapons, especially considering the human rights records and the military ambitions of some of our trading partners."¹⁵ These nuclear critics also disparage Canada's attempts to address the proliferation problem, arguing that its approach does "little to halt the spread of atomic weapons," although it has the effect of "curbing criticism from those opposed to the nuclear option."¹⁶

The surveys which are historical in nature are of two types: official histories of the Canadian nuclear industry commissioned by the government;¹⁷ and comprehensive probes of those companies involved in the nuclear industry.¹⁸

The third area of the literature, that dealing with government regulation of the nuclear industry, is a prominent one,

¹⁴ Ian Adams, "The Real McGuffin: Selling the Bomb, Confessions of a Nuclear Salesman" This Magazine 16 (May 1982): 18.

¹⁵ Gordon Edwards, "Canada's Nuclear Dilemma" Journal of Business Administration Vol. 13 No. 1-2 (1982): 222.

¹⁶ Ronald Babin, The Nuclear Power Game (Montreal, 1985). Other normative studies on Canada's nuclear export programme include Bob Carty, "No CANDU for Argentina" New Internationalist 6 (March 1978): 27-28; Ernie Regehr and Simon Rosenblum eds, Canada and the Nuclear Arms Race (Toronto, 1983).

¹⁷ See Wilfrid Eggleston, Canada's Nuclear Story (Toronto, 1965); Gordon H.E. Sims, A History of the Atomic Energy Control Board (Hull, Quebec, 1981).

¹⁸ See Robert Bothwell, Eldorado: Canada's National Uranium Company (Toronto, 1984); Robert Bothwell, Nucleus: The History of Atomic Energy of Canada Limited (Toronto, 1988).

since Canadian reactor exports are controlled by crown corporations (Atomic Energy of Canada Limited), government agencies (Atomic Energy Control Board), and government bureaucracies (External Affairs and Energy, Mines and Resources). As Bruce Doern emphasizes, "it must be recognized at the outset that the Canadian nuclear industry trades in a decidedly political-economic market, more so than most other industries,"¹⁹ and that as a result government intervention has been an inherent characteristic of this field of endeavour.

The studies which concentrate on Canada's role in preventing nuclear proliferation generally agree that Canada should maintain nuclear exports, but with appropriate safeguards. Typical of their rationale is the following assertion by Peter Mueller:

If Canada chooses to deploy domestic nuclear power stations it seems difficult to justify denying them to those foreign nations who want them, albeit with safeguards. If Canada chooses not to export nuclear technology, other suppliers have shown themselves to be more than willing to breach the gap.²⁰

There is also a consensus among these writers that, as John Noble pointed out in 1978, "Canada has probably achieved as much as it is possible to achieve through the unilateral vehicle of

¹⁹ G. Bruce Doern, "The Politics of Canadian Nuclear Energy" in Doern and Robert W. Morrison eds, Canadian Nuclear Policies (Montreal, 1980): 45. See also G. Bruce Doern, Government Intervention in the Canadian Nuclear Industry (Montreal, 1980); P. Roff Johannson and J.C. Thomas, "Nuclear Regulation in Canada: Political Control and Public Confidence" Canadian Public Policy (Summer 1981): 433-443.

²⁰ Peter G. Mueller, On Things Nuclear: The Canadian Debate (Toronto, 1977): 38.

its national safeguards policy."²¹ Now, as James Keeley mentioned in 1980, Canada needs to concentrate its non-proliferation efforts on "the multi-lateral level --- encouraging desirable political, organizational and technological changes in importers and in other suppliers."²²

Although the literature on Canada's role in preventing nuclear proliferation is extensive, the vast majority of it was written in the mid-1970s.²³ There is a clear need for additional work on nuclear proliferation, concentrating on the problems that have emerged since that time and the role Canada can play in the 1990's in preventing proliferation. This study is designed, in part, to fill this gap.

The fifth area of the literature --- descriptions of Canada's bilateral nuclear relationships --- has focused on certain countries which have purchased CANDUs, Pakistan²⁴ and India²⁵ in

²¹ John J. Noble, "Canada's continuing search for acceptable nuclear safeguards" International Perspectives (Jan/Feb 1978): 47.

²² James F. Keeley, "Canadian Nuclear Export Policy and the Problems of Proliferation" Canadian Public Policy 6 (1980): 626.

²³ See William Epstein, "Canada and the problem of nuclear proliferation", Paper presented to the Canadian Peace Research and Educational Association (1976); Albert Legault, "Nuclear policy should be more open and less ambiguous" International Perspectives (Jan/Feb 1976): 8-13; Robert W. Reford, "Problems of Nuclear Proliferation" Behind the Headlines (May 1975).

²⁴ See M. Raziullah Azmi, Pakistan-Canada Relations: 1947-82 (Islamabad, Pakistan, 1982).

²⁵ See Iris Lonergan, "Canada and India: The Negotiations for the Supply of the N.R.X. 1955-56" bout de papier Vol. 8, No. 2 (Spring 1991): 12-15; Barrie Morrison and Donald M. Page, "India's option: the nuclear route to achieve goal as world power" International Perspectives (July/Aug 1974): 23-28.

particular, although there have been some studies on Canada's attempts to sell reactors to industrialized states like Japan²⁶ and Great Britain²⁷ as well.

One writer who has done extensive work on Canadian nuclear relations with India, and to a lesser extent Pakistan, is Ashok Kapur. Kapur has been very critical of Canada's export policy towards the developing world, arguing that it has taken "a high moral position" as a promoter of international safeguards that obscures its "willingness to increase the means of nuclear proliferation (that is, reactors that produce ample plutonium)."²⁸

Thus far, several countries have been ignored in these bilateral studies, in particular Argentina, Romania, Taiwan, and South Korea. The South Korean omission is particularly startling because South Korea has become Canada's most important reactor customer. Again, this study is designed to meet this deficiency in the literature by reviewing all Canadian nuclear reactor transactions.

²⁶ See Frank Langdon, The Politics of Canadian-Japanese Economic Relations 1952-1983 (Vancouver, 1983). Michael W. Donnelly, "Japan's Nuclear Power Strategy" Canada and the Pacific: Agenda for the Eighties No. 25 (Downsview, Ont, 1984).

²⁷ See Don Peacock, "Selling CANDU to Britain: a venture in public diplomacy" International Perspectives (Jan/Feb 1976): 3-8.

²⁸ Ashok Kapur, India's Nuclear Option: Atomic Diplomacy and Decision-Making (New York, 1976): 258-259. Also see Ashok Kapur, "Canadian Images of Indian Nuclear Policy", Paper presented to the Canadian Political Science Association (Quebec City, 1976); Ashok Kapur, "A Nuclearizing Pakistan: Some Hypotheses" Asian Survey (1980): 495-515.

Finally, of the major studies which have attempted to provide a comprehensive analysis of Canadian nuclear export policy, there have been only five, those by: Robert Boardman and James Keeley; George Lermer; Constance Hunt; Ron Finch; and Robert Morrison and Edward Wonder.

Boardman's and Keeley's edited study, Nuclear Exports and World Politics: Policy and Regime, although international in scope, uses Canadian examples throughout, and contains several chapters which deal specifically with Canada. In general, Boardman and Keeley point out the trends which have occurred in the international nuclear industry:

- 1) international competition amongst supplier states [has increased];
- 2) countries such as India, Argentina, Brazil might become significant suppliers of nuclear assistance in the future;
- 3) the reactor trade is vulnerable to political decisions, and thus to shifts of opinion on the acceptability of nuclear power, the assessment of risks, appropriateness of different systems, and related matters;
- 4) efforts to use supply as a means of influence over foreign nuclear programmes have not always met with success.²⁹

Boardman and Keeley assert that "nuclear export policy is firmly connected with other areas of foreign policy."³⁰ They also point out that "as the nature of the problem of proliferation dictates a continuing review of the policies of the nuclear

²⁹ Robert Boardman and James F. Keeley, "Nuclear Export Policies and the Non-proliferation Regime" in Robert Boardman and James F. Keeley eds, Nuclear Exports and World Politics: Policy and Regime (New York, 1983): 8-9.

³⁰ Boardman and Keeley, "Regime-making and the Limits of Consensus" in Nuclear Exports and World Politics: 235.

exporting countries, so the nature of the policy processes in those states compels the analyst to probe more deeply into their workings."³¹

The main difficulty with this study is that it is too theoretical and does not analyze Canada's reactor exports in sufficient detail. Secondly, Boardman and Keeley do not place enough emphasis on the commercial aspect of reactor exports. Most of their analysis deals with the security side of the equation and, therefore, the dilemma of two competing pressures on the government is not examined rigorously enough.

If one of Boardman's and Keeley's main flaws is their lack of emphasis on the commercial side, George Lermer's monograph on AECL is deficient because it is restricted to examining commercial influences on Canadian reactor sales. Lermer attempts to determine whether or not AECL is competitive in the international nuclear industry and examines the future alternatives that exist for AECL: increased federal subsidies for the nuclear industry; privatization; or withdrawal from the nuclear industry altogether by Canada. This is primarily an examination of domestic policy. However, Lermer does note that "foreign sales were not part of the initial plan for CANDU's development," but "became a priority only after 1970." In his view foreign sales always "served a political,

³¹ Boardman and Keeley, "Nuclear Export Policies": 12.

as much as economic, purpose," reflected in the fact that "all sales lost money on a realistic accounting basis."³²

With regard to political/security concerns, Lermer asserts simply that they did not emerge "until after India exploded a nuclear device in 1974," and thus the safeguards question had "no bearing on AECL policies prior to 1974."³³ This study presents a different perspective, arguing that while commercial goals dominated Canadian reactor export policy up to 1974, political/security concerns related to the risks of proliferation steadily increased over the years prior to the Indian explosion.

Constance Hunt's monograph is centred around the following question: "how can we ensure that atomic energy and other agents of mass destruction [are] used for peaceful purposes and that restraints and controls are established against their use for destruction?"³⁴ Although Hunt systematically assesses each reactor sale up to the time of writing, the analysis is restricted to the safeguards agreements that were signed and there is no discussion of sales since 1974. Even Hunt recognizes the flaw in her rather legalistic approach, stating that "in the final analysis, the international community in general and nuclear suppliers in particular cannot rely on technical procedures or legal

³² George Lermer, Atomic Energy of Canada Limited: The Crown Corporation as Strategist in an Entrepreneurial, Global-Scale Industry (Ottawa, 1987): 53.

³³ Lermer: 26.

³⁴ Constance D. Hunt, "Canadian Policy and The Export of Nuclear Energy" University of Toronto Law Journal Vol. 27 (1977): 69-104.

undertakings alone as effective guarantees that a country will not develop a nuclear capability."³⁵

Ron Finch goes beyond legal agreements in Exporting Danger: A History of the Canadian Nuclear Energy Export Program, and assesses other political/security considerations. Finch does acknowledge the dilemma that exists in Canada's reactor exports between commercial interests and security concerns. He is very critical of the Canadian government's policy, stating that "Canadians have attempted to sell reactors and uranium to at least twenty-five countries since 1945. Many of these nations were to be found in parts of the world noted for political instability, and some apparently have had an interest in the production of nuclear arms."³⁶ Finch concludes that "as long as government bureaucrats and private profit-makers" control the destiny of energy in Canada "nuclear power [will] continue to receive a disproportionate amount of state and private support, regardless of the international ramifications."³⁷

Although in most respects this is a comprehensive study, Finch gives inadequate attention to the commercial incentives for exports. Further, the study has a clear ideological bias in that Finch is opposed to the use of nuclear power under any circumstances. Finally, this study was published in 1986 and does

³⁵ Hunt: 100.

³⁶ Ron Finch, Exporting Danger: A History of the Canadian Nuclear Energy Export Program (Montreal, 1986): 13.

³⁷ Finch: 148-49.

not take account of developments since 1984, in particular the reactor sale to South Korea in 1990 which has made the future of the Canadian nuclear industry look much more promising than was the case when this study was written.

The final monograph that needs to be noted is one by Morrison and Wonder. This is probably the best study to date on the evolution of Canada's nuclear export policy. A central tenet of Morrison's and Wonder's work is that the influence that each foreign policy goal has on the government is:

conditioned not only by extraordinary events abroad, such as the Indian explosion of a nuclear device in 1974, but also by the nature of the policy-making process, the visibility of nuclear export issues in the domestic political arena, and by specifically Canadian factors such as the nature of the economy, the federal structure of the country, and Canada's particular foreign policy philosophy.³⁸

Morrison and Wonder believe that "In broad terms, economic forces had a predominant influence in setting nuclear export policy in the early years of Canada's nuclear export drive, but political and strategic considerations have become the overriding factors since the Indian explosion."³⁹ The present study confirms this perspective.

Morrison and Wonder give a very systematic account of Canada's nuclear export policy and at least note at every stage the conflict between commercial interests and security concerns. However, it is out-dated. Published in 1978, it does not explore

³⁸ Robert W. Morrison and Edward F. Wonder, Canada's Nuclear Export Policy (Ottawa, 1978): 3-4.

³⁹ Morrison and Wonder: 3-4.

the reactor sales to either Romania or South Korea that have occurred in the intervening 14 years. In addition, there was an internal nuclear industry review completed by Energy, Mines and Resources in 1982 that this study was unable to take into account.

In sum, while there are several major studies of Canadian nuclear reactor sales on which this current analysis has drawn, all have limitations of one sort or another. In particular, while each study acknowledges the dilemma of the competing forces of commercial interests and political/security concerns on reactor exports, this dilemma has not heretofore constituted the central focus as is the case in this study. In sum, there seems to be a need in 1992 for a new comprehensive study of Canadian nuclear reactor exports from 1945 to the present, providing a balanced view of the interplay of commercial and political/security considerations and providing an assessment of where Canadian policy seems headed for the future.

As indicated at the outset, the purpose of this study is to examine the place of the competing economic and political/security objectives of Canada in its nuclear reactor export sales over the period from 1945 to the present. A total of ten reactor exports to six different countries is examined: sales to India in 1956, 1963, and 1966; to Pakistan in 1965; to Taiwan in 1969; to Argentina in 1973; to South Korea in 1973 and 1990; and to Romania in 1978 and 1981. In each case, an examination is conducted to determine which foreign policy goal played a greater role in the

decision-making process, commercial or political/security considerations.

This study divides Canada's export policy into three time periods: 1) 1945-74, the period preceding the Indian nuclear explosion; 2) 1974-76, the period when Canada's nuclear export policy responded to the Indian explosion; and 3) 1977-92, the period in which the results of Canada's stringent 1976 nuclear export policy took effect.

Methodology

The methodology used in this study is traditional, documentary research. The primary sources utilized include: the safeguards agreements that Canada reached related to each export; internal government reports, in particular the Nuclear Industry Review that Energy, Mines and Resources completed in 1982; government policy statements that have been recorded in Hansard and External Affairs' Statements and Speeches series; and interviews with the appropriate officials from AECL, Energy, Mines and Resources, and External Affairs. In addition, as previously indicated, this study draws on the pertinent secondary literature.

Hypothesis

The hypothesis of this paper is that there has been an evolutionary process regarding the conflict in Canadian reactor export policy between commercial interests and security concerns. Over the period 1945-74, there was a clear, gradual rise in the

importance attached to security concerns. In 1956, when the first export was concluded, commercial interests clearly dominated over security concerns, but by 1974, an equilibrium had been reached between the two forces. However, following the 1974 Indian explosion, which Canada indirectly assisted, security concerns overrode Canada's commercial interests.

Following the Indian explosion, Canada developed a new nuclear non-proliferation policy in November 1974. This policy, which was strengthened again in 1976, reflected Canada's growing concern with security issues. Despite a worldwide nuclear recession which began in 1976, Canada did not weaken its newly toughened non-proliferation policy, even though this action had a detrimental effect on CANDU reactor sales. Today, security concerns remain the dominant influence on Canadian reactor export policy, despite the obvious commercial necessity that exists for exports by the nuclear industry.

The following two chapters of this thesis explore the dilemma in Canadian nuclear reactor export policy. Chapter 2 examines the various economic factors that have made the sales of reactors an important Canadian foreign policy goal. Chapter 3, on the other hand, sets out the political/security concerns associated with reactor exports. Chapters 4 to 6 then analyze Canadian sales over the three periods identified above, and, finally, Chapter 7 offers a brief conclusion, including some reflections on the future of Canadian nuclear reactor export policy.

Chapter Two

The Commercial Aspects of Nuclear Reactor Exports

According to Robert Bothwell, "Nuclear Power in Canada meets the classic definition of 'industrial policy': a sustained effort by government 'to promote growth, productivity and the competitiveness of Canadian industries.'"¹ This element of the international nuclear trade will become clear as the commercial aspects are examined.

In analyzing the commercial aspects of Canadian nuclear reactor exports four dimensions must be explored: 1) the competition that exists amongst the world's reactor suppliers; 2) the markets that exist for reactor exports; 3) the benefits that accrue to Canada from the export of reactors; and 4) the consequences for the nuclear industry of insufficient exports.

Competition

To understand properly the competition that exists in the international nuclear reactor trade, one must distinguish between the different reactor types. Essentially, there are two types of nuclear reactors. The dominant design is the light-water reactor (LWR) invented by the United States. However, many other suppliers, including France and Germany, also utilize this design. The main characteristic of the LWR is that it requires enriched uranium. The main opponent to the LWR is the heavy-water reactor (HWR). The HWR is fuelled by natural uranium, and moderated and cooled by

¹ Bothwell, Nucleus: 422.

heavy water. The principal country which uses the HWR is Canada with its CANDU, although Germany has also developed an HWR. Figure 2.1 shows the essential differences in the Nuclear Fuel Cycle of these two types of reactors.

Figure 2.1

The Nuclear Fuel Cycle

Light-Water Reactor

CANDU Reactor

Uranium Mining and Milling	Uranium Mining Milling and Refining
U ₃ O ₈	UO ₂
Enrichment	Fabrication
Enriched UO ₂	Fresh Elements
Fabrication	Electricity Generation
Fresh Elements	Spent Fuel
Electricity Generation	
Spent Elements	
Reprocessing	
Concentrated Wastes	
Waste Management	

Source: Based in part on Fred H. Knelman, Nuclear Energy: The Unforgiving Technology (Edmonton, 1976): 94.

Since Canada is the only supplier that specializes in the HWR, it possesses certain advantages and disadvantages in the exporting market. Germany can also produce an HWR, and has sold two reactors already (both to Argentina), but the HWR is not its speciality, and this situation allows Canada to price the CANDU at

a lower level than the German HWR. There are a variety of technical advantages that the CANDU has over the LWR:

- 1) lower lifecycle generating costs;
- 2) higher utilization of uranium;
- 3) the ability to use natural uranium --- greater independence of fuel supply;
- 4) high plant availability of CANDU stations;
- 5) design features which enhance inherent safety;
- 6) ease of manufacture --- ease of maintenance;
- 7) ease of handling and storing fuel --- fresh or irradiated;
- 8) secure supply of heavy water from Canada;
- 9) obsolescence-resistant fuel cycle options that can be introduced in the future without major change of reactor design and manufacturing concepts;
- 10) Canadian experience of industrial applications of nuclear heat.²

The CANDU's use of natural uranium is probably its best feature because natural uranium is desirable to those states which do not own enrichment facilities, or do not wish to become dependent on states which do have enrichment facilities (US, USSR, France, etc).³ These technical advantages produce a reactor that has an excellent performance record as the data in Figures 2.2 and 2.3 attest.

However, there are also disadvantages to the HWR design. Because of Canada's reliance on its natural uranium design, it lacks light water, enrichment, or separation technology. Therefore, Canada cannot offer the inducement of technological spinoffs from the purchase of its system as can its competitors, like the United

² Energy, Mines and Resources, Nuclear Policy Review, Background Papers (1981): 273.

³ Mark Alan Bartholomew, "The Effect of International Interdependence on Foreign Policy Making: Canadian and United States Nuclear Technology Export" Ph.D. Dissertation (Miami University, 1980): 116.

Figure 2.2

**Worldwide Lifetime Nuclear Reactor Performance
(As of June 1991)**

<u>Reactor Name</u>	<u>Country</u>	<u>Load Factor %</u>
Pt. Lepreau	Canada	90.6
Emsland	Germany	89.7
Neckar 2	Germany	89.2
Paks 3	Hungary	87.1
Pickering 7	Canada	87.0
Grohnde	Germany	86.9
Bruce 5	Canada	86.9
Loviisa 2	Finland	86.8
Tihnage 3	Belgium	86.5
Beznau 2	Czechoslovakia	85.7

**Lifetime Country Averages for Nuclear Suppliers Group.
(As of June 1991)**

<u>Country</u>	<u># of Reactors</u>	<u>Load Factor %</u>
Canada	19	74.9
Germany	21	72.2
Japan	56	67.6
France	40	62.7
USA	109	60.0
Britain	29	49.5

a) Data for the USSR is unavailable

SOURCE: Compiled from data in Nuclear Engineering International, World Nuclear Industry Handbook 1992 (Surrey, UK, 1991): 18-20.

Figure 2.3

**A Comparison Between Suppliers in Selected Countries
(As of June 1991)**

Argentina

<u>Reactor</u>	<u>Supplier</u>	<u>Load Factor %</u>
Embalse	Canada	72.0
Atucha I	Germany	62.8

South Korea

<u>Reactor</u>	<u>Supplier</u>	<u>Load Factor %</u>
Wolsung I	Canada	81.4
Kori 4	United States	79.1
Kori 2	United States	77.4
Yongkwang 1	United States	74.1
Kori 3	United States	71.7
Yongkwang 2	United States	68.4
Ulchin 1	France	66.6
Ulchin 2	France	65.1
Kori 1	United States	61.9

SOURCE: Compiled from data in Nuclear Engineering International, World Nuclear Industry Handbook 1992 (Surrey, UK, 1991): 20-21.

States, France, and Germany.⁴ A further disadvantage is that initial capital costs are higher for the CANDU than for the LWR, despite the long-term cost effectiveness of the CANDU.⁵

Despite the CANDU's technical advantages, the LWR suppliers maintain "broad institutional and political aspects" that Canada has found difficult to overcome.⁶ The major LWR suppliers share several common advantages:

- most are large multinational companies with established reputations in the energy systems supply field, both nuclear and conventional, with a number of reactor units operating in a variety of different countries. They have credibility as suppliers;
- several of the competitors are high-technology based manufacturers with an abundance of skills and resources. The proprietary rights for LWR technology generally rest with the manufacturing vendor, which emphasizes standardization and cost reduction to boost competitiveness; and uses R & D and engineering primarily to the extent that these contribute to the attainment of competitive goals;
- competitors tend to have broad and diversified product lines; most also provide non-nuclear generating capacity which allows economies of scale and spreading of commercial risks;
- they also tend to have worldwide networks of resident overseas offices permitting maintenance of a constant presence in prospective markets;
- some competitors (particularly France) have the advantage of a continuing strong domestic supply experience upon which to base overseas marketing efforts;
- some suppliers conduct existing utility business with prospective customers and have local manufacturing outlets which support localization objectives of prospective clients;
- most suppliers are capable of mounting broadly based industrial financing and trade packages commensurate with the size and scope of the reactor system proposals;

⁴ Bartholomew: 93.

⁵ Energy, Mines and Resources, Nuclear Industry Review: Problems and Prospects 1981-2000 (1982): 26.

⁶ Nuclear Policy Review, Background Papers, 261.

- major suppliers have excess production capacity and, therefore, foreign sales are eagerly sought;
- LWRs are marketed by several firms, providing customers with the advantage of choosing from a number of suppliers.⁷

Traditionally, the major competitors of Canada have been the United States (Westinghouse, General Electric, and Combustion Engineering), France (Framatome), and Germany (Kraftwerk Union). Figure 2.4 indicates the market-share of each of these supplier countries.

Figure 2.4

Share of Nuclear Reactor Export Market
(as of 1989)

	Units	% of Total GWe
United States	52	38.3
USSR	31	26.6
France	9	7.6
Canada	9	5.2
Germany	7	6.5
Other	4	1.8

SOURCE: Compiled from data in Nuclear Engineering International, World Nuclear Industry Handbook 1990 (Surrey, UK, 1989): 12.

However, the balance of power amongst the nuclear suppliers was transformed drastically on April 13, 1989, when KWU and Framatome signed a merger agreement and formed a new company called Nuclear Power International (NPI). This merger agreement covers "the sale and service of nuclear steam supply systems, nuclear islands and complete plants outside France and the Federal Republic of Germany." Both KWU and Framatome will still service their domestic markets individually. One of the objectives of NPI

⁷ Problems and Prospects: 27.

is to develop a new reactor design which would be "licensable in both countries and could become the European standard". The consequence of this merger for AECL is that the competition for exports will become even more keen.⁸

For a variety of reasons, the other members of the Nuclear Suppliers Group (NSG) are not yet major competitors of Canada. The former USSR, although it was the second largest producer of reactors, relied on its domestic market and other communist states primarily in Eastern Europe. Great Britain, except for two Magnox-type reactor exports in the 1960s, has "been unable to break into the world nuclear reactor market."⁹ Japan, despite being an original member of the NSG, has yet to develop a reactor design, although many people consider that it has the potential to become a major nuclear supplier in the future.¹⁰ The other members of the NSG are also not yet considered competitors to the CANDU, although they do produce some nuclear components, equipment, materials, or fuel.

All nuclear suppliers face the same problem: over capacity. In each supplying country, the individual nuclear industries were created when energy demands were high and when the future growth of nuclear power appeared endless. However, the

⁸ IAEA Yearbook 1990 (Vienna, 1990): C58.

⁹ Joseph Pilat, "The Major Suppliers: A Baseline for Comparison" in William C. Potter ed) International Nuclear Trade and Nonproliferation: The Challenge of the Emerging Suppliers (Lexington, 1990): 54.

¹⁰ Pilat, "The Major Suppliers": 64.

demand for nuclear power has decreased in both the domestic markets of the major suppliers and in the export market. Thus, suppliers are faced with preserving their industries until demand for nuclear power again increases. In this situation of many capable suppliers searching for available markets, the result is intense competition. The stakes are very high with the survivors gaining potential billions, while the losers will disappear from the industry.

As a result of this stiff competition, many "sweeteners" have been utilized to increase sales, including: generous financial arrangements between suppliers and recipients, including in some cases the bribery of officials; assurances of a reliable uranium fuel supply, both natural in the case of Canada and enriched in the case of everybody else; the supplying of additional fuel-cycle facilities; increased technology transfers; and a willingness to relax safeguards designed to limit nuclear proliferation (this aspect is discussed in more detail in Chapter 3).

Markets

A further complicating factor that the Canadian nuclear reactor industry faces in its pursuit of exports is the market that exists for reactors. There are three factors that affect the size of the export market for nuclear reactors: the demand for electricity; the energy alternatives that exist within a particular country; and the technological capability of the state (a fourth factor --- the pursuit of nuclear power primarily for its military applications --- is assessed in Chapter Three). These three factors

have resulted in a market that is a paradox for Canada: the countries with the largest demand for nuclear power and which have the necessary infrastructure to handle reactors are also those countries which possess an indigenous nuclear capability, while the rest either do not require vast amounts of electricity, or do not possess the necessary infrastructure to handle a large-scale nuclear programme.

Although the Western world is best suited for nuclear power, and in fact possesses the majority of the world's reactors (see Figure 2.5 for the worldwide distribution of reactors), Canada is largely shut out in exporting to these states. Early on, AECL presumed, probably rightly so, that the Western industrialized countries would exclude foreign competition to protect their domestic nuclear industries.

Figure 2.5

Nuclear Reactors Worldwide
(as of 1991)

	Operable	Under Construction	Planned
NSG	343 (79.5%)	39 (54.9%)	25 (42.3%)
Europe	30 (6.9%)	21 (29.5%)	26 (44.1%)
Other	58 (13.4%)	11 (15.5%)	8 (13.5%)

SOURCE: Compiled from data in Nuclear Engineering International, World Nuclear Industry Handbook 1992 (Surrey, UK, 1991): 10.

Some commentators have suggested that perhaps Canada could have sold reactors to certain Western industrialized countries, in particular the United States, but for two central reasons failed to exploit this potential market. George Lerner argues that Canada could have competed in the U.S. market because

of the existence of many privately-owned utilities more concerned with price and performance than nationality.¹¹ Lermer contends that AECL did not sell in the United States because: it missed the major period of reactor ordering in the U.S. from 1966-1974¹² and it was so convinced of its inability to sell in the American market that it never put in the necessary effort to obtain a reactor bid.¹³

Looking to the future, the U.S. market appears to have some potential. According to officials at AECL, Canada is in the midst of a substantial marketing attempt to acquire sales in the U.S. The major hurdle, obtaining a license for an HWR from the United States Nuclear Reactor Commission, is close to completion. Apparently, the intent of the regulations has been met by AECL, and only the specifics need to be arranged. Canada also retains an important advantage over other nuclear suppliers facing the American market in that there is a "perception by American utilities that Canada is not a foreign country, as is the case with France and Germany."¹⁴

Whatever the potential for sales to the U.S. in the future, the principal export market for Canada and the other nuclear suppliers has been, and is, the Third World. Given the protectionist nature of the industrialized countries towards

¹¹ Lermer: 59.

¹² Lermer: 33.

¹³ Lermer: 59.

¹⁴ Confidential interview by the author with official from AECL, May 1992.

nuclear reactors, the Third World has become a "dumping ground" for nuclear suppliers to deposit their wares.¹⁵ However, as noted above, most Third World countries do not possess the necessary technological infrastructure to justify their acquiring nuclear power. Therefore, the major market for reactors lies with the newly industrialized countries in the Third World.

Walker and Lonroth have determined that the nuclear export market consists of three categories:

- 1) Markets where local industry is able to supply virtually all nuclear hardware but there is still some dependence on foreign technology and management (1:Italy and Spain; 1.5:Belgium, South Korea, UK);
- 2) Markets where there is heavy reliance on foreign technology and managerial services, but where hardware requirements are met partly from domestic sources (2: Argentina, Brazil, Finland, Taiwan; 2.5: China, Mexico, Pakistan, South Africa);
- 3) Markets where industrial skills are limited, and there is complete reliance on foreign technology, hardware and management services (3: Egypt, Greece, Indonesia, Israel, Portugal, Turkey).¹⁶

Since nuclear exports are essentially restricted to a handful of countries, the result is a buyers market. The consequence is that each sale is critical, and therefore the nuclear suppliers have responded by providing the "sweeteners" noted above. States interested in purchasing nuclear reactors realize the leverage they possess with the suppliers and use it to the hilt. In addition, since these states are at the same time industrializing, there is pressure to lessen their technological dependence on the industrialized countries. Therefore, the

¹⁵ Lermer: 59.

¹⁶ Walker and Lonroth: 92.

purchasing states seek self-reliance in nuclear technology and attempt to obtain it by manipulating the suppliers to provide them with the means that will allow them to develop indigenous industries.¹⁷

This intense desire of the newly industrialized states for nuclear self-reliance will result in a market that is continually shrinking as individual countries develop domestic nuclear industries. Where it was once thought that one reactor sale would produce many additional sales to that country, the situation that is emerging is that one sale will almost preclude further sales. In addition, once these countries develop a domestic industry, they will eventually be forced to export for the very same reasons that the current suppliers need exports. That this is already starting to happen is evident in Argentina's export of research reactors to Peru, Algeria, and Albania, and in India's offer to build nuclear research reactors in Egypt and Syria.¹⁸

In sum, the nature of the nuclear reactor market makes Canada's efforts to export the CANDU very arduous. The limited number of qualified countries makes it difficult for Canada to conclude even one sale, and the desire for self-reliance limits the prospect of additional sales. When these facets of the export market are twinned with the intense competition amongst the

¹⁷ Ashok Kapur, "Nuclear Energy, Nuclear Proliferation and National Security: Views from the South" in Robert Boardman and James Keeley ed, Nuclear Exports and World Politics: Policy and Regime (New York, 1983): 164.

¹⁸ For a further analysis of this process, see Potter, The Challenge of the Emerging Suppliers.

suppliers, the result is few sales opportunities for Canada. However, despite the limited opportunities, Canada must maintain a sufficient level of exports to sustain the domestic industry.

Benefits

Although sales are tough to achieve, Canada does benefit a great deal from nuclear reactor exports. The most obvious one is profits. Reactors are a major industrial good, with each sale bringing in hundreds of millions of dollars to the Canadian economy. For example, the 1990 sale of a nuclear reactor to South Korea is expected to inject \$400 million into the Canadian economy.¹⁹

In addition, when hundreds of millions of dollars of foreign exchange enter Canada, our balance of payments is advanced. In a 1977 study, it was calculated that a positive balance of payments of \$70 million was due to reactor exports.²⁰ Also, since reactors constitute a high-tech manufactured good --- the area in which Canada continually possesses a trade deficit --- this category of trade, which International Trade Minister Michael Wilson calls "high value-added goods and services"²¹, is enhanced by nuclear reactor exports.

¹⁹ Minister of Industry, Science and Technology and Minister for International Trade Michael Wilson. "Address to the Canadian Nuclear Association" Statement 92/04 (Feb 11, 1992): 3.

²⁰ Leonard & Partners Ltd, Economic Impact of Nuclear Industry in Canada (1978): 16.

²¹ Wilson, "Address to the Canadian Nuclear Association": 3.

Associated with balance of payments is the fact that nuclear reactor exports can be used to break into markets. Since reactor exports involve a substantial commitment between two countries, it can be surmised that a sale in this area will lead to increased trade in many additional products. As International Trade Minister Michael Wilson pointed out concerning the 1990 Korean reactor sale:

Canadian business has established a place in the Korean market --- one of the world's fastest growing economies. One of the keys to opening the door to Canadian business has been the CANDU reactor. It has been our "flying wedge" into the market of a trading partner whose importance will grow in the coming years.²²

Employment in Canada is also positively influenced by exports. The Canadian nuclear industry currently employs close to 27,000 people.²³ Exports are necessary to provide a steady workload for the nuclear design teams and manufacturing industry.

Reactor exports also help Canada deal with the problem of economies of scale. It is necessary to export nuclear equipment and technology because Canada's domestic market is not large enough on its own to sustain a nuclear industry. Exports are crucial to Canada's nuclear equipment suppliers because these sales allow them to maintain the necessary infrastructure needed to produce components. The domestic market alone would not provide enough orders to make it economically feasible for companies to maintain

²² Wilson, "Address to the Canadian Nuclear Association": 3.

²³ Energy, Mines and Resources, News Release 90/49 (March 30, 1990): 3.

the necessary manufacturing capability. To ensure that Canadian supplying firms remain in the nuclear industry, Canada must produce a satisfactory level of reactor exports and without these supplying firms, there would be no domestic nuclear industry. Therefore, nuclear exports represent "both a natural extension of, and a support for, the domestic nuclear power program."²⁴

Exports are also necessary because the other nuclear supplier states, in particular the U.S., have much larger domestic markets than Canada. Thus, it is imperative that exports are concluded because they make up for Canada's small domestic market, and allow it to compete with the other supplier states.²⁵

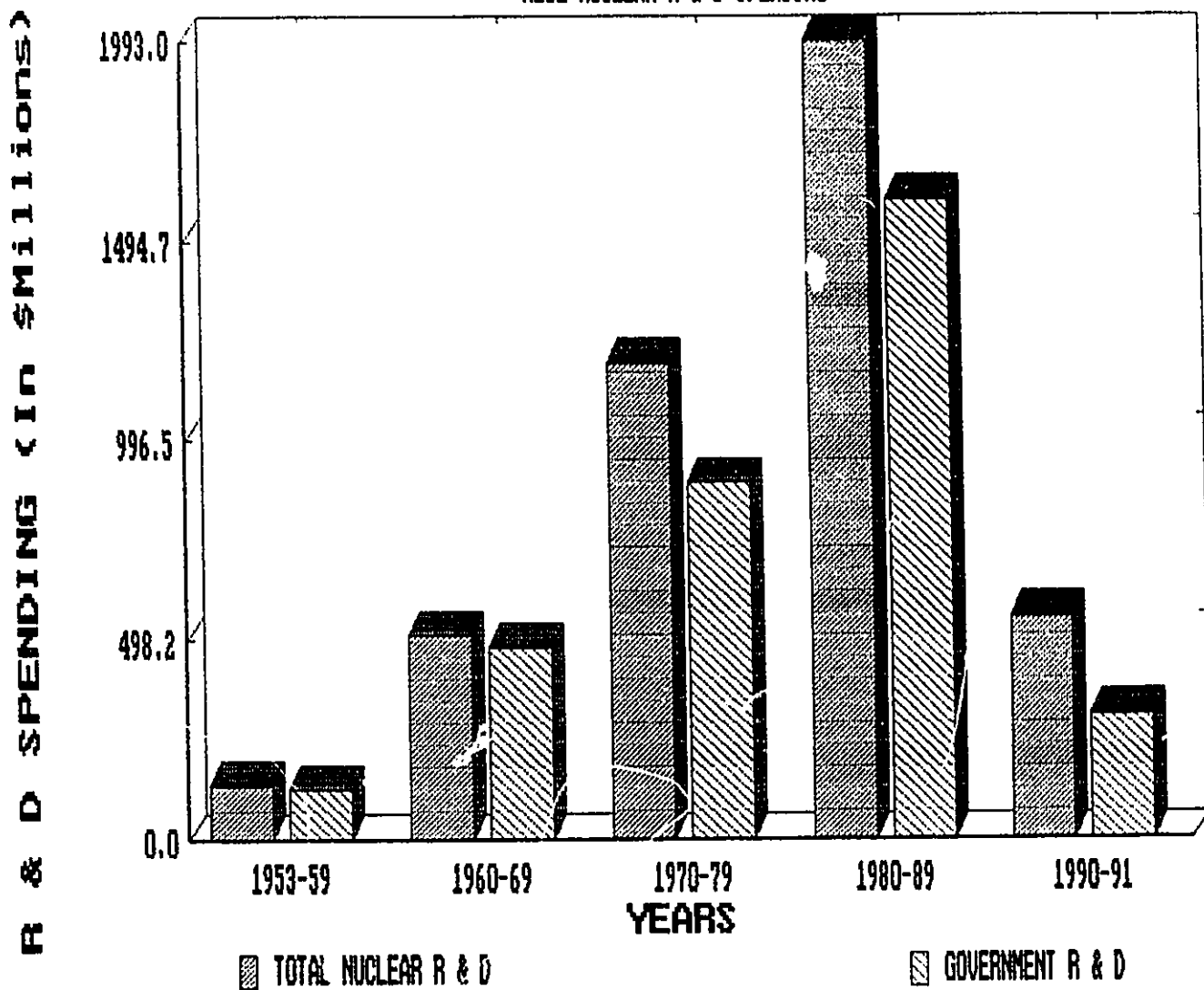
Related to the problem of scale is the question of research and development (R & D). Canada needs exports to spread the substantial costs of R & D over a large market. As of 1991, the Canadian Government had invested close to \$3.5 billion in nuclear R & D and, as the graph in Figure 2.6 shows, the level of governmental expenditure on R & D has increased substantially over the years.

Associated with the issue of R & D are the technological spin-offs due to the nuclear industry. Investment in R & D in the utilization of atomic energy in Canada has not only given rise to the CANDU reactor, but has led to the development of medical and industrial applications of radio isotopes and particle

²⁴ Nuclear Policy Review, Background Papers: 259.

²⁵ Walker and Lonroth, Nuclear Power Struggles: 34.

FIGURE 2.6
AECL NUCLEAR R & D SPENDING



SOURCE: Compiled from data in AECL Annual Reports 1952-53 to 1990-91.

accelerators.²⁶ Other spin-offs that have resulted from nuclear R & D include: cooling systems, which have aided the fighting of oil well fires; flight simulators for pilots;²⁷ and food irradiation, which kills organisms in many foods, thus preventing disease.

Issues related to federalism are also a factor in reactor exports. The principal beneficiary of Canada's nuclear programme, whether measured in terms of employment or number of reactors operating, is Ontario. The federal government thus needs some foreign exports to justify its role in a programme that benefits the richest province in Canada. In effect, exports help "justify the use of federal subsidies to voters and governments outside Ontario." Further, they also "stimulate demand for heavy water from the Maritimes and engineering services domiciled in Quebec."²⁸

The final benefit that extends to Canada as a result of reactor exports is that they demonstrate to sceptical onlookers that Canada is an "industrial country capable of supplying large-scale, high-technology systems" and is not just a purveyor of natural resources.²⁹

²⁶ Leonard & Partners Ltd: 16.

²⁷ Wilson, "Address to the Canadian Nuclear Association": 2.

²⁸ Lermer: 19-20.

²⁹ Nuclear Policy Review, Background Papers: 259.

Consequences of Insufficient Exports

There is no doubt that Canada benefits economically from nuclear reactor exports, but there are also severe consequences that would result from a lack of sufficient exports. One consequence would be that Canada would move back down the nuclear learning curve. In particular, Canada could go from a "manufacturing capability" to a "manufacturing potential." The difference between capability and potential "is essentially between possession of an active and a latent industrial function, and between being competitive and being uncompetitive at a given time in world reactor markets."³⁰

A second consequence would be that some Canadian firms would leave the nuclear industry. "If a sizeable number of main components suppliers were to leave the nuclear market, the vigour with which the CANDU reactor could be promoted in exports, as well as domestic markets, would seriously degenerate."³¹

Eventually, if enough exports were not arranged, the ultimate collapse of the Canadian nuclear industry would occur. The results of such disintegration would be far-reaching. Canada's energy supply, security, and balance would all be affected by the end of a domestic nuclear industry. The result would be higher energy costs, a less self-sufficient energy supply, and a less-reliable energy supply.³²

³⁰ Walker and Lonroth: 51.

³¹ Nuclear Policy Review, Background Papers: 251.

³² Leonard & Partners Ltd: 13-14.

Canada would also suffer a massive "brain-drain" of high-tech personnel skilled in the nuclear field. It is not just the number of employees in the nuclear industry that is important, it is the type of employees. This industry utilizes a very high proportion of scientists and engineers, more so than many other industries, and these workers constitute a scarce resource in Canada. As a result, these jobs take on considerable importance.

Finally, CANDU nuclear technology is, as Bruce Doern has stated, "Canada's last and/or best chance for developing and maintaining a high-technology-based and internationally competitive and respected industry."³³ This image of the CANDU as a matter of prestige cannot be overstated. Since the early 1960s, the example of the "Avro Arrow" has frequently been brought up as a warning to the government to protect the nuclear industry. To fail to support it:

would be the Avro Arrow mistake again, on a vastly greater scale. The Arrow was one of the most competitive fighter aircraft of its time. The Diefenbaker government killed it. All that unique and costly know-how was exported to the U.S. in the heads of Canadians looking for jobs. Canada gained not a nickel. Canada is now preparing to pay billions for aircrafts we could have built ourselves.³⁴

The explicit warning against Canada's giving up on another high-tech industry is a powerful force for the continued maintenance of the nuclear industry.

³³ G. Bruce Doern, "The Politics of Canadian Nuclear Industry" in Doern and Morrison ed, Canadian Nuclear Policies: 47.

³⁴ Toronto Star (Oct 3, 1979): A8.

Conclusion

In sum, the commercial imperatives for exporting nuclear reactors constitute a major influence on the Canadian government. Despite the intense competition from other nuclear suppliers and the relatively small market that exists, Canada needs to produce foreign sales of the CANDU. The benefits of exports combined with the potential adverse consequences of limited exports have meant that commercial influences play a significant role in Canada's nuclear reactor export policy. By themselves, these considerations would justify the Canadian government in making every possible attempt at sales. However, due to the potential military applications of nuclear power, there are also constraints of a political/security nature on Canada's pursuit of nuclear reactor exports.

Chapter Three

Canadian Political/Security Concerns Regarding Nuclear Reactor Exports

Balancing out Canada's commercial interests are its political/security concerns. The major political/security preoccupation of Canada is the preservation of the non-proliferation of nuclear weapons. This has been a consistent foreign policy goal of Canadian governments from 1945 to the present. In addition, there are three political/security concerns which are sub-themes to the major issue of nuclear non-proliferation: 1) the effects of sales on the containment of communism during the years of the Cold War; 2) the political stability of the recipient regimes; and 3) the implication of sales in the context of regional conflicts.

Nuclear Non-Proliferation

The major security concern regarding the export of nuclear reactors is obviously nuclear proliferation. There are two types of proliferation: vertical proliferation, which concerns the addition of new nuclear weapon systems to the arsenals of the nuclear-weapon states; and horizontal proliferation, defined as increasing the nuclear weapons club beyond five states, and, since 1974 and the Indian explosion, six states. Preventing horizontal proliferation has been of greater importance to Canada. The major risk of the latter is that it creates more decision-makers capable of launching a nuclear war and, therefore, an increase in regional

and global instability. The Canadian government has acknowledged that:

while the objectives of Canada's non-proliferation policy are non-commercial, the policy has been and will continue to be one of the myriad of technological, political, and economic factors which influence Canada's reactor export efforts.¹

The major means by which proliferation can be prevented, or at least slowed down, is through the application of stringent nuclear safeguards. William Epstein has defined safeguards as "the regulations and restraints that a nuclear supplier country imposes on its exports of nuclear materials and equipment."²

Canada's non-proliferation and safeguards policies provide the framework within which nuclear reactor exports take place, and its policies are designed:

- 1) to promote the evolution of a more effective and comprehensive international non-proliferation regime;
- 2) to ensure that Canada's nuclear exports do not contribute to nuclear proliferation.³

If a country wants to obtain nuclear weapons there are two paths that it can take. It can: acquire major parts or even a complete actual weapon (by purchase or theft) from a country possessing such weapons; or build nuclear weapons through the development of nuclear technology and capabilities.

In the latter case, there are two elements necessary in the construction of a nuclear weapon: the knowledge or the

¹ Problems and Prospects: 29.

² Epstein, The Last Chance: 147.

³ Problems and Prospects: 29.

necessary technology; and the actual material, consisting of highly enriched uranium or plutonium. There are two ways to produce these necessities: directly by building a facility solely for the purpose of creating weapons-grade fissile materials; or indirectly by using fissile materials created from peaceful nuclear energy facilities.

Building commercial reactors for the purpose of diverting plutonium for weapons production has several disadvantages, but one major advantage. The disadvantages are that plutonium diverted from commercial nuclear reactors is inferior to plutonium produced specifically for weapons production, and that commercial reactors are more expensive to build and operate than facilities designed to produce weapons. However, the major advantage that commercial reactors possess for those states interested in producing nuclear weapons is that they allow a state to camouflage its true intention.⁴ Due to this one great advantage of commercial reactors, most near-nuclear-weapons states will follow this route to weapons capability. It is interesting to note that it is precisely this path that India followed on its way to developing its nuclear explosive. Accordingly, the principal objective of Canadian safeguards has been to prevent the diversion of fissile materials from Canadian-designed commercial reactors.

There are two types of nuclear safeguards. The first is technical safeguards, which centre on controls over the use of

⁴ David C. Gompert, "Introduction: Nuclear Proliferation and the 1980s Project" in Ted Greenwood et al. eds, Nuclear Proliferation: Motivations, Capabilities, and Strategies for Control (New York, 1977): 6-7.

nuclear technology and aim to structure international nuclear cooperation so that it directly restricts the development or military application of sensitive nuclear capabilities. An example of a technical safeguard would be IAEA inspections to guarantee that plutonium is not being diverted from a reactor. The second type is political safeguards, which focus on a state's motivation for producing nuclear weapons. These safeguards emphasize the political ramifications of any military application of nuclear weapons by the near-nuclear-weapons states, such as the imposition of economic sanctions.⁵ Canada has relied on both technical and political safeguards in developing its safeguards policy.

Although Canada does place safeguards on its reactors, opponents of Canada's nuclear export policy charge that the CANDU design is desirable to those states which would like a weapons option. Citing the CANDU's on-line refuelling capability and its higher production of plutonium, some critics argue that the CANDU is more susceptible to diversion for military uses than the LWR. In 1977, an American report, the Ford-Mitre nuclear policy review, agreed with this point of view and stated that the CANDU:

can be operated without undue economic penalty at low fuel irradiation to produce plutonium-240, which is more suitable for reliable weapons.⁶

⁵ Jones, "Islam, the Bomb, and South Asia": 18.

⁶ Gordon Edwards, "Canada's Nuclear Industry and the Myth of the Peaceful Atom" in Ernie Regehr and Simon Rosenblum eds, Canada and the Nuclear Arms Race (Toronto, 1983): 166.

However, there is no consensus that the CANDU is a greater threat to non-proliferation than the LWR. Some experts have defended the CANDU, stating that:

safeguarding this type of fuel management, although more expensive, is probably easier than in the case of bulk refuelling, due to the small number of fuel elements involved in each transfer operation.⁷

In the final analysis, one cannot state definitively that one type of reactor poses a greater risk for proliferation than the other. Since any commercial reactor produces great amounts of plutonium, the fact that a CANDU produces slightly more than an LWR is inconsequential. Further, this problem is offset by the fact that spent fuel from the natural uranium used in the CANDU produces a lower concentration of weapons-grade material than is the case with the enriched uranium used in the LWR.⁸

Of greater concern is the effect that the intense competition among nuclear suppliers can have on the non-proliferation regime. As previously stated in Chapter 2, as a result of this competition amongst the nuclear suppliers, many "sweeteners" are offered to potential purchasers, one of the more insidious of which has been a relaxation of safeguards on the reactor.

Purchasing states, which wish to develop a nuclear programme without foreign interference, place incredible pressure

⁷ SIPRI, Internationalization: 30-31.

⁸ Ted Greenwood, "The Management of the International Nuclear Industry" in Greenwood et al. (eds): 88-89.

on the suppliers to reduce safeguards. Although the near-nuclear states argue that they have the best of intentions, and that safeguards are an infringement on sovereignty, the truth is that many such clients desire nuclear reactors to produce nuclear weapons in addition to their stated purposes of using them as a peaceful energy source. When the goal of purchasing countries to avoid safeguards collides with the fierce competition amongst suppliers, the result is all-too-often a reduction of safeguards.

Evidence of the effects of competition on nuclear non-proliferation was West Germany's export to Argentina in 1979. Although the West German bid was more expensive than the rival bid from Canada, Argentina purchased the West German reactor. Most experts believe that West Germany obtained the contract because of the lower safeguards that were placed on its reactor.

Although there have been attempts by the nuclear suppliers to devise joint supply regulations --- the Zanger Committee, the Nuclear Suppliers Group, the International Nuclear Fuel Cycle Evaluation, and the Conference on Assurances of Supply --- the guidelines that they have established have amounted only to "watered down" safeguards, and often simply of a voluntary character.

In sum, nuclear proliferation is the main political/security concern of Canada. Although a non-proliferation regime has evolved since World War II, and there have been some successes with it --- in particular the Non-proliferation Treaty, Canada's 1974 & 1976 policy announcements, and the United States'

1978 statement of policy --- there are still risks of proliferation as a result of the insecurities and political ambitions of purchasing states and the dictates of competition among suppliers.

Canadian Policy on Nuclear Non-Proliferation

There is, and has been, an underlying philosophy of Canadian foreign policy that nuclear power should be developed for peaceful purposes only. Part and parcel of this philosophy is that all the benefits of nuclear power, except, of course, nuclear weapons, should, in principle, be at the disposal of all states, albeit subject to international inspection and control. This has been a common foreign policy of every Canadian government from Mackenzie King to Brian Mulroney. Canada has pursued this ideal in both its bilateral dealings and through multilateral means. A brief history of Canadian policy on the issue of nuclear non-proliferation follows, focusing on eight statements that are illustrative of Canada's position from 1945 to 1992: 1) Canada's original decision to pursue the peaceful uses of nuclear energy; 2) Canada's response to the "Atoms for Peace" proposal; 3) Canada's work in the development of the International Atomic Energy Agency; 4) Canada's role in the drafting of the Non-proliferation Treaty; 5) Canada's response to the 1974 Indian nuclear explosion; 6) Canada's 1982 nuclear industry review; 7) Canada's position at the 1985 NPT renewal conference; and 8) the current position of the Canadian government on nuclear non-proliferation as enunciated by the Prime Minister in May, 1992.

Canada, through its work on the Manhattan Project during World War II, was a partner in the development of the first atomic bomb. Although a junior partner with the U.K. and U.S., Canada nevertheless did play a significant role in the atom's development. In addition, the uranium necessary for the bomb came from Canada.

Canada thus came out of World War II with the industrial and technical basis to develop a new energy source and with vast unexploited uranium reserves. It also had the world's only working reactor outside the United States. This situation led to Canada's development of a nuclear industry "almost by accident."⁹ However, there was a sort of tacit consensus, with almost no public discussion and without any opposition, not to make or acquire nuclear weapons. As William Epstein has commented, "this policy reflected nation-wide abhorrence of these weapons, the desire to prevent their proliferation, and to see them entirely eliminated, and the hope to benefit from the promising peaceful uses of nuclear energy."¹⁰

There are two important policy statements that reflect Canada's decision to pursue peaceful uses of atomic energy at this time. The first was The Tripartite Declaration on Atomic Energy made by the US, UK, and Canada on November 15, 1945. This declaration's purpose was to discourage the development of nuclear

⁹ Babin: 36.

¹⁰ William Epstein, "Canada" in Jozef Goldblat ed, Non-proliferation: The why and the wherefore (Stockholm, 1985): 171.

weapons and encourage exploration into the possible peaceful uses of atomic energy. In particular, it asked for international action:

- 1) to prevent the use of atomic energy for destructive purposes;
- 2) to promote the use of recent and future advances in scientific knowledge, particularly in the utilization of atomic energy, for peaceful and humanitarian ends.¹¹

The second declaration was by the Minister of Reconstruction and Supply, C.D. Howe, in June 1946 in announcing the incorporation of the Atomic Energy Control Act. He stated that it is "of the first importance to encourage further research and development towards a peaceful and constructive application of atomic energy, under proper safeguards."¹²

The second major decision made by the Canadian government related to nuclear energy occurred after President Eisenhower's famous "Atoms for Peace" speech at the United Nations in 1953, where Eisenhower called for the transfer of nuclear technology from states possessing this capability to those wishing to acquire it for peaceful purposes, and for the formation of an international agency that would regulate nuclear trade. Canada responded favourably to "Atoms for Peace" because it was felt that it would benefit Canada by increasing its uranium development, boosting its then-fledgling nuclear industry, and by providing work for Canadian

¹¹ Treaty Series. Declaration on Atomic Energy made by The President of the United States of America, the Prime Minister of the United Kingdom, and the Prime Minister of Canada 1945 No. 13 (Washington: Nov 15, 1945): Article 2.

¹² Debates, (June 3, 1946): 2106.

manufacturing and construction companies.¹³ Health and Welfare Minister Paul Martin, soon to be Secretary of State for External Affairs, told the United Nations that "Atoms for Peace" was "a proposal which the Canadian Government immediately welcomed most heartily." In addition, Martin stated that:

My Government is prepared to broaden its existing programme of exchanging research institutes and is now in a position to furnish considerable additional information on the structure and operation of research reactors.¹⁴

The agency that Eisenhower asked for came into being in 1957 with the formation of the International Atomic Energy Agency, and support for the IAEA's creation represents the third prominent feature of Canadian nuclear policy. The objective of the IAEA was to foster cooperation among nations in developing atomic energy for peaceful purposes. Canada played a major role in the negotiations that led to the formation of the IAEA. After Canada signed the IAEA treaty, External Affairs Minister Sidney Smith, stated that:

Canada wholeheartedly supports the newly established international atomic energy agency, which is designed to encourage, to complement and to assist the efforts of government, individually or in co-operation on a bilateral or multilateral basis, to develop and apply the peaceful uses of atomic energy.¹⁵

The fourth dimension of Canadian policy was support for the negotiation of a nuclear non-proliferation treaty. If the

¹³ Finch: 76.

¹⁴ Minister of National Health and Welfare Paul Martin, "International Co-operation in Developing the Peaceful Uses of Atomic Energy" Statements and Speeches (Nov 5, 1954): 9.

¹⁵ Finch: 77.

IAEA's purpose was to promote the peaceful uses of nuclear energy, the purpose of the NPT, signed in 1968, was to prevent the proliferation of nuclear weapons states. The essential bargain contained in the NPT was that if the world's non-nuclear-weapons states would renounce nuclear weapons, then the five nuclear-weapon states would make strides to end their nuclear arms race. Contained in the NPT were many safeguards designed to end the proliferation of nuclear weapons. As an incentive for countries to sign the NPT, nuclear supplier states (like Canada) pledged to "co-operate in contributing alone or together with other states or international organizations to the further development of the application of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States Party to the Treaty."¹⁶

Canada, befitting its role in the international nuclear community, played an important role in the negotiating of the NPT, and was an original signatory of the Treaty. External Affairs Minister Mitchell Sharp, in announcing Canada's proposed ratification of the NPT, stated that:

As a leading proponent of the treaty and one of the major "near-nuclear" signatories, Canada has an opportunity to provide leadership by demonstrating our faith in the non-proliferation treaty.¹⁷

However, many near-nuclear-weapons states found the NPT discriminatory because it made a distinction between nuclear-weapons states and non-nuclear-weapons states, and because it held

¹⁶ Treaty on the Non-Proliferation of Nuclear Weapons Article IV.

¹⁷ Debates, (Dec 19, 1969): 4149.

the membership in the "nuclear club" at five. The states which refused to sign the NPT included India, Pakistan, Argentina, South Africa and Israel, the so-called near-nuclear-weapons states, as well as both China and France, which were nuclear-weapons states.

Canada, while acknowledging the discriminatory nature of the NPT, also felt that it was a necessary agreement. General E.L.M. Burns, then Canada's representative on the U.N. Disarmament Committee, commenting on the NPT stated that, "while this is an inherently discriminatory approach to the problem, it is the only rational one."¹⁸

The international nuclear non-proliferation regime suffered a major setback in 1974 when India exploded a nuclear device. Canada felt partially responsible for India's action because the plutonium used in the device came from a Canadian-built reactor. In response Canada suspended, and then terminated, all nuclear assistance with India. In announcing the suspension of Canada's nuclear cooperation, External Affairs Minister Mitchell Sharp stated that India's explosion was a direct violation of Canada's policy of nuclear power for peaceful uses only. Sharp maintained that Canada could not be expected to:

assist and subsidize, directly or indirectly, a nuclear program which, in a key respect, undermines the position which Canada has for a long time been firmly convinced is best for world peace and security.¹⁹

¹⁸ Lieutenant-General E.L.M. Burns, "Canadian Statement on Non-Proliferation" Statements and Speeches (Feb 27, 1967): 1.

¹⁹ Morrison and Page: 24.

Little more than a year later, Prime Minister Trudeau, in a major address to the Canadian Nuclear Association, restated Canada's position on nuclear power. Trudeau felt that Canada had three obligations as a nuclear power. The first was to supply less-developed countries with the advantages of nuclear power. The second concerned the potential harmful uses of nuclear power. Trudeau stated that:

the Canadian Government is obligated to Canadians and to all persons everywhere to assure that nuclear devices, materials or technology from Canadian sources not be used for explosive or illegal purposes. This is done through the application of safeguards.²⁰

Trudeau pointed out that Canada's final obligation, which took several forms, was to itself:

the provision of safe sources of energy, the preservation of the environment, the fostering of a competitive Canadian industry in all its stages --- of exploration, mining, processing, fabrication, design and sales.²¹

In December 1976, Canada announced a new nuclear non-proliferation policy. In the House of Commons, External Affairs Minister Don Jaimeson stated that:

Shipments to non-nuclear weapon states under future contracts will be restricted to those which ratify the Non-Proliferation Treaty or otherwise accept international safeguards on their entire nuclear program. It follows from this policy that Canada will terminate nuclear shipments to any

²⁰ Pierre Elliott Trudeau, "Canada's Obligations as a Nuclear Power" Statements and Speeches (June 17, 1975): 4.

²¹ Ibid: 6.

non-nuclear weapon state(s) which explodes a nuclear device.²²

This new policy, which remains that of Canada today, strengthened its 1974 position which represented Canada's immediate response to the Indian nuclear explosion.

In 1982 the final report of an Energy, Mines and Resources study on the nuclear industry, Nuclear Industry Review: Problems and Prospects 1981-2000, was released. This document affirmed Canada's commitment to the peaceful uses of nuclear power stating that "Safeguards policies are intended to contribute to the achievement of Canada's broad foreign policy goals:

- 1) to promote the evolution of a more effective and comprehensive nonproliferation regime;
- 2) to ensure that Canada's nuclear exports do not contribute to nuclear proliferation.²³

In 1984, there was a change of government with Brian Mulroney and the Progressive Conservatives coming to power. This new government used the 1985 NPT Review Conference to express its position on nuclear power. Canada's representative at the Conference, Ambassador for Disarmament Douglas Roche, stated that:

Canada's nuclear programme is strictly for peaceful purposes and entirely subject to safeguards. With respect to nuclear exports, Canada has a comprehensive nuclear exports policy which is based upon and fully recognizes the central value of the NPT as the cornerstone of the non-proliferation regime.²⁴

²² Debates (Dec 22, 1976): 2255.

²³ Problems and Prospects: 29.

²⁴ Ambassador for Disarmament Douglas Roche. "Statement on the General Debate of the Third Non-Proliferation Treaty Review Conference" Statement 85/48 (Aug 29, 1985):2.

The most recent important policy statement was by Prime Minister Mulroney in 1992. At a commencement address at Johns Hopkins University, Mulroney reiterated Canada's commitment to the peaceful uses of nuclear power, and pledged to renew and help strengthen the NPT. In discussing the NPT, Mulroney said:

It is imperative that the Nuclear Non-Proliferation Treaty be strengthened when it comes up for review in 1995. All countries must sign it. And it must be extended indefinitely. As part of an effective international effort, Canada would be prepared to terminate all of its economic co-operation programs, including aid and tariff preferences, with any country, including the new republics of the former Soviet Union, that undermines the non-proliferation treaty, through action or inaction.²⁵

These government statements on nuclear policy show that since World War II Canada has had a consistent position on nuclear energy. It has aspired to export the benefits of nuclear power, while preventing nuclear energy from being used for military purposes.

While the nuclear non-proliferation theme is the central political/security concern regarding reactor exports, Canada has had three ancillary preoccupations closely related to it which deserve brief mention.

The Containment of Communism

The first of these subordinate political/security concerns of Canada was preventing the spread of communism prior to

²⁵ Office of the Prime Minister. "Notes for an Address by Prime Minister Brian Mulroney" Johns Hopkins University (Baltimore, Maryland, May 21, 1992): 5.

the collapse of the USSR in 1991. The influence of the Cold War resonated throughout Canada's post-World War II foreign policy until 1989 with the demise of Soviet control over the satellite countries in Eastern Europe. From the end of World War II, with the development of a bi-polar world, a Canadian foreign policy priority was preventing the spread of communism, and to the end Canada took such actions as joining Western defence alliances like NATO and NORAD, fighting the Korean War, and generally maintaining limited relations with the Soviet bloc. With regard to the international nuclear reactor trade, Canada did not wish to see countries going to the Soviet Union to supply their nuclear needs for two main reasons: 1) a reactor sale meant a long-term partnership between supplier and recipient, and Canada did not want to see stronger economic relations emerge between the USSR and other states, especially vulnerable Third World countries; and 2) given the potential military application of nuclear power, there was the fear that reactor exports would be the first step in a military alliance between the USSR and the recipient state. As the later analysis of specific cases of Canadian reactor sales shows, in some instances, Canada's Cold War preoccupations acted as a spur to, rather than a restraint on, Canadian nuclear transactions.

Regional Conflict

The second subordinate concern of Canada has been preventing regional conflict. Because nuclear reactors will always possess the capability of enabling a state to develop nuclear

weapons, allowing reactors into geographic areas that are unstable is a concern of the Canadian government. The potential military use of nuclear power means that states which have either been involved in conflict or might be expected to in the near future will consider a nuclear reactor possessed by their adversary to be a threat to their security. For this same reason, some states will want their own reactors for defensive or even offensive purposes. The Canadian government has thus had to be cognizant of the implications for regional stability of the conclusion of any of its reactor sales.

Regime Stability

Finally, there is the question of the security risks attendant upon exporting nuclear reactors unstable and repressive regimes. As some commentators have observed, "The location of nuclear reactors in politically unstable nations adds another dimension. Their control can shift radically as governments change hands. The ability to pinpoint responsibility and impose accountability becomes almost impossible."²⁶ Also, since Canadian safeguards must rely on the word of the recipient state, it is important that this state be trustworthy.

The Canadian government has acknowledged the importance of these last two factors in nuclear reactor exports:

Apart from specific safeguards requirements, Canada makes political and economic assessments of potential

²⁶ Adlai E. Stevenson III, "Nuclear Reactors: America Must Act" Foreign Affairs (Oct 1974): 66.

reactor customers and discourages sales to countries which may be subject to domestic or external instabilities or security threats.²⁷

Conclusion

In sum, there are four interrelated political/security concerns facing the Canadian government which constrain its instinctive commercial interest in exporting nuclear reactors. The overriding preoccupation is to maintain and strengthen the international nuclear non-proliferation regime. However, there are, as indicated, three additional political/security concerns which also act as constraints to, or in some cases facilitators of, reactor exports.

²⁷ Nuclear Policy Review, Background Papers: 275.

Chapter Four

The Need to Establish Markets, 1945-1974

In examining the conflict that exists between commercial interests and political/security concerns in the area of Canadian nuclear reactor exports, the first time period that is explored is the period 1945-1974. These dates were chosen specifically because they mark the beginning of Canada's export of nuclear technology and the date when Canada's export policy suffered its most singular shock. In 1945, the first atomic bomb was dropped on Hiroshima by the United States. The development of this bomb was greatly aided by both Canadian plutonium and Canadian nuclear technology. In 1974, India exploded a nuclear device, making it the sixth member of the "nuclear club". The development of this device was greatly assisted by the use of Canadian plutonium and Canadian nuclear technology. These two events mark the beginning and the end of Canada's early nuclear export policy. Thus, it is ironic that, in a period in which the guiding principle of the Canadian government was the peaceful application of nuclear power, it began and ended with the detonation of a nuclear weapon in which Canada was an integral partner.

In the process of examining Canada's nuclear reactor export policy from 1945-74, each reactor sale is analyzed to determine which foreign policy goal --- promotion of commercial interests or preservation of global security --- was most prevalent. Seven case studies are explored: 1) the Canada-India Research Reactor (CIRUS) in 1956; 2) the Rajasthan Atomic Power

Plant (RAPP I) to India in 1963; 3) a power reactor to Pakistan (KANUPP) in 1965; 4) RAPP II in 1966; 5) the Taiwan Research Reactor (TRR) in 1968; 6) a power reactor to South Korea (Wolsung-I) in 1973; and 7) a power reactor to Argentina (Embalse) in 1973.

Overall, this chapter shows that, while economic considerations were the most powerful influence on Canadian nuclear reactor export policy at the beginning, as the years went on political/security considerations became increasingly important. There was an evolutionary process so that by 1974 there was a balance between the two contradictory forces.

Nuclear Reactor Sales

India CIRUS 1956

Canada's first nuclear reactor export was concluded in 1956, with the export to India of the CIRUS research reactor. CIRUS was part of the Colombo Plan, a developmental aid programme for South Asia that resembled the Marshall Plan. It is important to note that CIRUS was a research reactor, not a power reactor. The purpose of a research reactor is to allow a country's scientific community to examine nuclear technology. A country needs to start with research reactors before moving on to power production.

In analyzing Canada's research reactor export to India, it can be said that CIRUS was heavily influenced by economic considerations, and that security interests did not act as a constraint. There were many economic factors that influenced Canada's decision to proceed with the export of CIRUS. The most

important was that CIRUS would be Canada's first export, and Canada wanted desperately to break into the international nuclear export market.

Concluding this first sale would make Canada's nuclear industry look credible to the international community. Canada had been seen as a junior partner, behind the U.S. and U.K., in the development of nuclear energy; therefore, to be seen as an independent producer, Canada needed another country to show faith in the Canadian system. This was especially so because of the unique nature of Canadian nuclear technology. As indicated earlier, Canada had developed its nuclear technology based on heavy water, while the United States relied on a light-water reactor, and the British on a graphite system.

In addition, the consensus in the 1950s was that nuclear energy would be a substantial growth area. Since, at this stage of the international nuclear trade, buyers were "first-time buyers, and the first sale could lead to a significant amount of repeat business", that first sale was crucial.¹ As Canada's reactor technology was still relatively unproven and developing, India, it was hoped, would become Canada's testing ground leading to eventual worldwide CANDU sales.

The economic importance of that first export was enhanced when India started negotiating with other countries for the reactor, in particular, the U.S., U.K., and the U.S.S.R. Like Canada, these countries were also motivated by the need to

¹ Lermer: 39.

establish the credibility of their domestic nuclear programmes. However, all three countries had a greater reputation for high-tech industrial production than did Canada. This was a substantial handicap and therefore the necessity of making the sale was greater for Canada than for the other suppliers. The fear in Canada that India would choose another supplier was greatly increased with the British-Indian nuclear agreement of December 1955, which called for the export of a "'swimming pool' reactor, enriched fuel, and technical assistance".²

The policy of aiding Canadian market expansion in Asia was an additional economic consideration. One of the major purposes of the Colombo Plan was to allow Canada to make commercial inroads into South Asia. Therefore, it was hoped that Canada could penetrate this market both through future nuclear sales as well as through trade in many other sectors.

A final economic consideration related to using India as a testing site for Canadian nuclear technology. It was felt that Canada's "scientific community would gain experience from having the N.R.X. (Canada's research reactor) function under different climatic and topographic conditions."³

In the atmosphere of 1956, political/security factors were also viewed by Ottawa as supportive of the CIRUS export. The first consideration was that India was a strategically important country in the context of the Cold War. Canada had to ensure that

² Sims: 192.

³ Lonergan: 13.

India did not fall into the Communist bloc. Indeed, one of the purposes of the Colombo Plan, under which this export was arranged, was to prevent the expansion of communism. As the Leader of the Opposition, John Diefenbaker, asserted concerning Canada's financial contribution to the Colombo Plan, "\$50 million a year... would be cheap insurance for Canada... to halt communism in Asia."⁴ If Canada did not help with India's nuclear development, the Soviets would gladly take Canada's place. These concerns about India's possible tilt towards the Communist bloc increased with India's acceptance of aid from the Soviet Union in the form of steel mills.⁵ Therefore, Canadian officials rationalized that it was better if India acquired "nuclear expertise and facilities through cooperation with countries like Canada than as a result of assistance from the Soviet Union."⁶

A second political/security influence favouring the export related to the nature of Canada-India relations at this time. The two countries were collaborating actively in the United Nations in the pursuit of global peace and security and were also at an initial, hopeful stage in their association on the International Control Commission in Indochina. India was also recognized by Canada as the world's most populous democracy and as a leader of the non-aligned countries. Canada and India enjoyed warm, cordial relations reinforced by personal friendship at the

⁴ Finch: 33.

⁵ Morrison and Page: 25.

⁶ Lonergan: 15.

highest level. Some writers have even referred to this era as characterized by an Ottawa-New Delhi entente.⁷ Both Prime Minister St. Laurent and External Affairs Minister Pearson:

attached the highest importance to Canadian-Indian relations, viewing India as a necessary bridge between what would now be called the First World of Western industrial democracies and the Third World of developing and impoverished states.⁸

CIRUS was a perfect tool to accomplish this goal because nuclear energy constituted a high-technology transfer of a product whose objective was to support economic development.

The principal security factor which would normally have acted as a constraint on the Canadian government concerned the general issue of non-proliferation, and the specific matter of the ownership of the nuclear fuel that would be produced by CIRUS. There is no doubt that Canada recognized the possible military applications of CIRUS from the beginning. Canada wanted the irradiated fuel rods returned to Canadian custody, but India refused to negotiate on this issue.

Fearing the possible loss of the deal, the Department of External Affairs did not treat the security issues seriously. The Undersecretary of State for External Affairs, Jules Leger, allowed that while, "There might also be some problems regarding control over the plutonium produced by any reactor which we might supply", he felt that:

⁷ See M.S. Rajan, "The Indo-Canadian Entente" International Journal (Autumn 1962): 358-384; Escott Reid, Envoy to Nehru (Toronto, 1981)

⁸ Bothwell, Eldorado: 404.

this could presumably be surmounted, especially if we assume that a country like India will acquire a reactor from some source (friendly or otherwise) and will be producing this material. It was too bad that no international agreement existed for the export of nuclear technology, and it was unlikely that an international atomic energy agency would be constituted for some time. In the meantime, it was every country for itself.'

Leger's comments suggest that the Canadian government was downplaying the possibility of proliferation difficulties resulting from the export of the nuclear reactor.

The most crucial determinant which explains Canada's ambivalence towards the non-proliferation issue was that Canada trusted the Indian government. Inside Canada, there was, as Bothwell has asserted "considerable trust in the political reliability of the Indian government." In addition, it could be argued that "the domestic constraints of the Indian political system" were the best protection against any military applications of CIRUS.⁹ If Canadian diplomats did exhibit some apprehension about India's intentions, they were shamed into recanting. This is because Dr. Homi Bhabha, the Chairman of the Atomic Energy Commission of India, argued that within the Commonwealth "India's word" should be "a sufficient safeguard" and Canadian reservations "only served to call into question Indian credibility."¹¹

Additional rationales for Canada's downplaying of the proliferation threat were that: 1) Canada would let the IAEA, whose

⁹ Bothwell, Nucleus: 353.

¹⁰ Bothwell, Nucleus: 370.

¹¹ Morrison and Page: 25.

inauguration seemed imminent by 1956, handle the safeguards issue; 2) there were fears that either France or Belgium might supply the reactor to India and they would not place any safeguards on it;¹² and 3) Canada felt that India did not have the capability to build a nuclear military device either immediately or in the foreseeable future.¹³

The twin influences of Canadian commercial interests and India's political importance thus led to the conclusion of CIRUS. Due to the downplaying of the proliferation concern, the safeguards agreement that was reached with India over CIRUS was minimal. The principal safeguard was in Article III: "The Government of India will ensure that the reactor and any products resulting from its use will be employed for peaceful purposes only."¹⁴

That economic considerations dominated over proliferation concerns is reflected in the serious loopholes that existed in the CIRUS Agreement. While the Agreement allowed for "peaceful purposes only", peaceful purposes were never defined. Second, the fuel question was not settled satisfactorily at the time of the Agreement's ratification. Instead two alternatives were suggested: 1) "Arrangements for the provision of the fuel elements" would be "agreed upon by the two Governments before the reactor" was "ready to operate"; or 2) "if an international agency acceptable to both

¹² Hunt: 77.

¹³ Bothwell, Eldorado: 405.

¹⁴ Agreement on the Canada-India Colombo Plan Atomic Reactor Project (New Delhi: April 28, 1956): Article III.

Governments" had come into being or was in prospect, the terms of an Indo-Canadian agreement would "be in keeping with the principles of that agency."¹⁵ In the end, Canada suggested letting the IAEA resolve the fuel question despite "the fact that there was no guarantee, and perhaps no real hope, that India would be more cooperative with the agency than it had been with Canada."¹⁶

In sum, it is clear that the dominant foreign policy goal during the CIRUS negotiations was the pursuit of Canadian economic interests. All of the economic variables were in favour of the export, while the ordinarily constraining force of security concerns was in this instance divided. Some political/security considerations favoured the export, and those that were against were discounted. At no time did the risk of proliferation become a major influence on Canadian policy-makers.

India RAPP I 1963

In 1963, Canada exported its first power reactor, RAPP I, to India. Again commercial interests dominated in the conclusion of this transaction, but not to the extent that was evident in CIRUS. This is manifest in the safeguards agreement that was reached because Canada's safeguards were more stringent this time.

By 1962, given the Indo-Pakistani conflict and India's border war with China that year, Canadian officials had started to "express anxiety" about India's nuclear aspirations, and there were

¹⁵ Canada-India Colombo Plan Atomic Reactor: Article XI.

¹⁶ Lonergan: 15.

concerns that India might eventually "divert to military purposes the plutonium obtained from CIRUS". Although these officials wanted "reassurances" from the Indian government, they did realize that they could not withdraw from the CIRUS programme "so long as India did not violate the letter and spirit of the bilateral agreement".¹⁷

To prevent this possible military application of CIRUS, Canada attempted to use the negotiations on RAPP I "as a lever; we can say we won't go ahead unless the Indians safeguard CIRUS."¹⁸ However, the Indians were adamantly opposed to toughening the safeguards. Also, pressure from commercial interests in Canada prevented renegotiation of the CIRUS deal. According to one RAPP I negotiator:

We knew that reactor was naked. Here was a chance to do something about it. But the commercial people kept saying that if we didn't give the Indians what they wanted, they'd get it elsewhere.¹⁹

These commercial interests resulted in CIRUS remaining without adequate safeguards, but a tougher safeguards agreement was reached over RAPP I. These safeguards included the following: 1) a "peaceful purposes" only clause was inserted in the preamble; 2) the agreement mentioned "fissile materials" by name, emphasizing the fact that the Agreement was concerned with the fuel question

¹⁷ Girilal Jain, "India" in Jozef Goldblat ed, Non-proliferation: The why and the wherefore (Stockholm, 1985): 91.

¹⁸ Morrison and Wonder: 18.

¹⁹ Peter Pringle and James Spigelman, The Nuclear Barons, (New York, 1981): 377.

which had been ignored in the CIRUS deal; 3) the agreement allowed for Canadian inspections of the reactor to ensure that the "peaceful purposes only" guarantee was being met. To make the agreement reciprocal, India was entitled to inspect the Douglas Point Station in Canada; 4) there were to be no third-party transfers without Canadian approval; 5) Canada would be informed of any fuel being removed from the reactor; and 6) a reliable accounting system would be established to ensure proper accountability for all fuel and fissionable materials.²⁰

The RAPP I Agreement illustrates the growing importance of security concerns vis-a-vis commercial interests. However, in the end, commercial interests still carried the day. As indicated, some additional safeguards were contained in RAPP I, but there were several loopholes. The inspections were only bilateral; the IAEA was still not involved. Also, the safeguards applied to first-generation use only, taking account only of Canadian uranium exports. This meant that any indigenous uranium supplied by the Indians would be free from any safeguards. Again, what limited the attention given to security was the fact that the political considerations which in 1956 favoured CIRUS were still relevant in 1963. Therefore in the RAPP I case, as in the CIRUS case, the political/security influences remained divided between factors which favoured the sale and factors which opposed the sale.

²⁰ Canada Treaty Series. Rajasthan Atomic Power Station Agreement between Canada and India (New Delhi: Dec 16, 1963). See in particular, the Preamble and Articles IX, X, XI, XII, and XIII.

RAPP I illustrates the impact that commercial interests still had regarding nuclear reactor exports. As Robert Bothwell has noted, Canadian insistence on rigid safeguards was again:

postponed until a later and presumably better day, when the advantages of the Canadian reactor would be manifest to the Indians, or until the Indians were so far committed to the Canadians and so far behind in negotiations with anyone else, that they would swallow the safeguards without wincing.²¹

Pakistan KANUPP 1965

In 1965, Canadian General Electric sold a 125 MWe CANDU unit to Pakistan. This deal, which was CGE's only reactor export,²² was on a turnkey basis, with minimal transfer of technological capability. In assessing which foreign policy objective was more important in this reactor export, four things must be looked at: 1) the safeguards agreement; 2) the regional conflict dimension; 3) the regime stability dimension; and 4) the financial terms of the agreement.

Before examining the KANUPP safeguards agreement of 1965, it is important to note a 1959 agreement between Canada and Pakistan which called for cooperation in the peaceful uses of atomic energy. This agreement, which was a precursor of any possible nuclear transfer, contained the following safeguards: 1)

²¹ Bothwell, Nucleus: 360-361.

²² Canadian General Electric withdrew from the export market in 1968 after failed bids in Argentina and Finland. With CGE's departure, AECL was left as the sole domestic exporter of nuclear reactors. However, CGE did remain in the nuclear industry as a components supplier.

a clause in the preamble and in the body of the text which stated that all nuclear materials would be "used for peaceful purposes only"; 2) a provision for Canadian inspections to ensure that the above pledge was being met; 3) a proscription on third-party transfers without Canadian approval; 4) a provision that Canada would be informed of any fuel being removed from the reactor; 5) the establishment of a reliable accounting system to ensure proper accountability for all fuel and fissionable material; and 6) a sanctions clause which allowed Canada "if it has determined that identified material is furthering a military purpose" to have "the right to suspend or cancel" any provision of nuclear equipment and material.²³

In examining the safeguards agreement that was reached over the 1965 CANDU reactor export, one can see the influence of Canada's non-proliferation concerns. The Canada-Pakistan agreement contained the following safeguards: 1) "that the provisions of the May 1959 Agreement shall continue to apply"; 2) that all "fissionable material produced in the Station will be used only for peaceful purposes"; and 3) that "as and when the Agency (IAEA) is in a position to provide" safeguards, the agreement will come under IAEA safeguards, not bilateral ones.²⁴

²³ Canada Treaty Series. Agreement between The Government of Canada and The Government of Pakistan for Co-operation in the Peaceful Uses of Atomic Energy 1960 No.14 (Ottawa: May 14, 1959). See in particular, the Preamble and Articles II, III, and IV.

²⁴ Canada Treaty Series. Agreement between The Government of Canada and The Government of Pakistan relating to the Construction of The Karachi Nuclear Power Station 1965 No. 26 (Karachi: Dec 26, 1965). See in particular, the Preamble and Articles III, V, and VI.

The IAEA was ready to apply safeguards in 1969 so that an amended agreement was signed between Canada and Pakistan that year. This revised safeguards agreement called for full IAEA inspections and sanctions for non-compliance.²⁵

In assessing these three safeguards agreements signed between Canada and Pakistan, it can be stated that Canadian non-proliferation concerns appeared to be influential. Canada was able to obtain its safeguards agreements from Pakistan without being forced to "pull teeth" as had occurred in the Indian case, and no Canadian reactor on Pakistani soil was left unprotected (unlike CIRUS in the case of India). However, one cannot take the agreements concluded merely at face value and argue that all political/security concerns were satisfactorily put to rest in this instance. Since a treaty is just a promise between governments, one must look at how trustworthy a country is. In the case of nuclear energy, one must examine the stability of a regime and the nature of its regional relations because unstable situations may result in the military application of nuclear energy by a country despite its commitments on a piece of paper.

The Pakistani-Indian conflict has been a constant source of instability since the partition of the subcontinent in 1947. In 1949, Pakistan invaded the Indian province of Kashmir, the control of which had been in dispute between the two countries since partition. Pakistan's actions resulted in the United Nations being

²⁵ Canada Treaty Series. Agreement between Canada, Pakistan and the International Atomic Energy Agency 1969 No.15 (Vienna: Oct 17, 1969).

called in to police a ceasefire in Kashmir between the two warring countries. The Kashmir issue continued to simmer until, finally, the two countries went to war again in 1965. Although Pakistani-Indian relations were relatively cordial in 1961, when the negotiations for a reactor export began, it would have been naive of Canada to consider that the situation was stable. For Canada to be involved nuclearly with both Pakistan and India required great delicacy, and it must be judged that Canada was quite possibly adding to the instability of the region by providing nuclear technology to both sides.

There were, however, also some political/security factors which favoured a reactor sale to Pakistan: 1) Pakistan was a Commonwealth partner, and it was part of Canadian foreign policy to aid members of the Commonwealth; 2) Canada had exported reactors to India, and it was important to the government that Canada play a balanced role in the region; and 3) Pakistan was a firm member of the western alliance, and played a strategic role in the containment of communism in Asia. These factors were presumably considered strong enough to counter the fear of possibly escalating the capacity of Pakistan and India to wage a destructive war with each other. On the other hand, it is interesting to note that after construction began on KANNUP, the 1965 war did begin. Further, the two countries went to war again in 1971, and this development resulted in KANUPP's construction being delayed because the fighting got so bad that it "forced the evacuation of the Canadian

engineering team as bombs and bullets whizzed by the power lines."²⁶

The reliability of the Pakistani government must also be assessed. In stark contrast to India, Pakistan abandoned democracy soon after gaining independence. Autocratic military regimes have ruled Pakistan for most of its existence, except for a brief period in the 1970s when civilian rule was restored following Pakistan's humiliation in the 1971 war, and again for a short time in the late 1980s. Although during the KANUPP negotiations Pakistan emphasized that it would be responsible, it must have been difficult for Canadian officials to take the government at its word.

Further, there were reasons for Canada to conclude that Pakistan wanted the CANDU for military purposes. On one occasion, President Ali Bhutto stated, "If India builds the bomb, we will eat grass or leaves, even go hungry, but we will get one of our own."²⁷ Second, Pakistan tried to obtain a French nuclear reprocessing plant, but was deflected by U.S. and Canadian pressure. While a reprocessing plant can be used for the fabrication of enriched fuel, it seems very likely that Pakistan wanted it to process plutonium for a nuclear bomb.

By allowing a reactor sale to such an unstable government, which had clear designs on building a nuclear weapon, it is evident that Canadian security concerns were not particularly influential in the decision to export the CANDU to Pakistan.

²⁶ Bothwell, Nucleus: 390-391.

²⁷ Pringle and Spigelman: 388.

Pakistan was ruled by a military dictator who was involved in a regional battle with a larger and more wealthy country. Pakistan's continual losses to India in conventional wars were probably leading its rulers to consider a different approach, the capacity to threaten to use nuclear weapons.

The safeguards negotiated notwithstanding, Ottawa's neglect of the political considerations noted above suggests that commercial influences were clearly dominant in the Pakistani reactor export. Canada needed to sell its reactor to more than one country, and, therefore, the Pakistani sale was critical to the industry. Many of the same arguments that led to the CIRUS export were evident in this case. An additional impetus was the role of CGE. As the only privately-owned nuclear exporter in Canada, CGE wanted to prove its international capability. It can be speculated that the Canadian government wanted to see CGE succeed because this would increase competition in Canada by giving credibility to a second supplier. The resulting sale was, in fact, the "largest export order ever obtained by the Canadian electrical industry."²⁸

Evidence of the commercial necessity of the Pakistani sale can be found in Industry Minister C.M. Drury's reaction to the conclusion of the deal:

... it is safe to say that interest in the Canadian system is keen; so also is competition from other industrialized nations. But I am sure that an aggressive Canadian industry (CGE), employing a very sharp pencil, and encouraged by the AECL,

²⁸ Morrison and Wonder: 17.

should be able to look to markets abroad in the nuclear field in the years immediately ahead.²⁹

The final element of the KANUPP export that needs to be assessed is the financial terms under which the deal was made. Similar to CIRUS, the KANUPP export resembled an aid package rather than an actual sale. KANUPP was valued at \$63 million, and of this amount, the Canadian government financed \$51 million. Half of Canada's financial commitment was aid at between 3% and 4% interest, with a grace period of 10 years and then a 30 year repayment schedule, and the other half was credit at 6% with a grace period of 5 years and then a 10 year repayment schedule.³⁰ (See Figure 4.1 for federal financing of all of the reactor exports during this time period.) These generous terms reflect the urgency which both the government and the Canadian nuclear industry attached to obtaining an export --- any export --- even to a country that could obviously not afford it --- Pakistan.

After examining all of the political/security factors which were apparent in the KANUPP deal, it can be concluded that these factors did not significantly constrain Canada. The Canadian government was satisfied by Pakistan's simple agreement to accept written safeguards agreements; it did not look beyond these agreements and assess the intentions of Pakistan. Pakistan was a country that was ruled by a military dictatorship, that was involved in a seemingly never-ending dispute with India which often

²⁹ Finch: 41.

³⁰ Morrison and Wonder: 17.

Figure 4.1

**Federal Financing of Nuclear Reactor Exports
(In \$Millions)**

	<u>INDIA</u>		<u>PAKISTAN</u>	<u>ARGENTINA</u>	<u>SOUTH KOREA</u>
	<u>CIRUS</u>	<u>RAPP I & II</u>	<u>KANUPP</u>	<u>EMBALSE</u>	<u>WOLSUNG I</u>
Grant	9.5	---	---	---	---
Loan (CIDA/ EDC)	---	33.5	47.2	200	560

SOURCE: The figures for India and Pakistan were compiled from data in Energy, Mines and Resources, Nuclear Policy Review, Background Papers (1981): 314. For Argentina and South Korea, the data are from the Export Development Corporation's Annual Reports 1974-79.

erupted into military conflict, and that had strongly suggested its desire to obtain a nuclear bomb. The fact that Canada basically gave the reactor away illustrates the pressure that the nuclear industry placed on the government to consummate the deal. In sum, it is evident that the export of a nuclear reactor to Pakistan was done for commercial reasons, and political/security considerations only minimally influenced the final decision.

India RAPP II 1966

In 1966, Canada exported a second 200 MWe power reactor, RAPP II, to India. The growing security concerns of Canada are in clearer evidence in this case. To assess fully the role that the two competing foreign policy goals had on RAPP II, an examination of two safeguards agreements must be undertaken. The original safeguards agreement was signed in 1966, but there were two

amendments to this agreement, with the more relevant one being concluded in 1971.

Almost immediately after construction began on RAPP I, India started agitating for a second reactor. However, the chairman of India's Atomic Energy Commission, Dr. Bhabha, was emphatic about the safeguards issue. According to Bhabha, Canadian officials "had beaten him down over RAPP I", but in negotiations over RAPP II he said things would be different. India would only accept safeguards on "the reactor core, uranium fuel, and heavy water" and would not allow restrictions on "items of equipment" that were "normal items of commerce."²¹

Reflecting Canadian commercial interests, Atomic Energy of Canada Limited sympathized with Bhabha, asserting that, "It would be a great pity if Canadian industry were denied the opportunity to participate in this work by reason of the application of a political decision on safeguards of doubtful merit."²² Countering these commercial interests were the security concerns of the Department of External Affairs. External Affairs Minister Paul Martin was "adamant in his view that the price for RAPP II should be Indian acceptance of IAEA safeguards."²³ A typically Canadian compromise was reached: a safeguards agreement identical to RAPP I would be signed for RAPP II, but negotiations would continue on the upgrading of these safeguards.

²¹ Bothwell, Nucleus: 365.

²² Bothwell, Nucleus: 365.

²³ Bothwell, Nucleus: 367.

Canada was able to maintain identical safeguards on RAPP II as on RAPP I, despite Indian opposition, for two reasons: Dr. Bhabha died in a plane crash in January 1966, leaving India without its chief negotiator; and Lorne Gray, President of AECL, convinced "Bhabha's successors" that Canada considered RAPP I and RAPP II to be "two units of the same station", and thus the safeguards that existed on RAPP I also applied to RAPP II. Gray also emphasized that any efforts by India "to escape Canadian safeguards by procuring only the conventional parts of the reactor in Canada while making the rest in India were not acceptable" to Canada.³⁴

Canada continued to negotiate with India over upgrading the safeguards applicable to RAPP I and II. What Canada wanted was a safeguards agreement that met guidelines established by the NPT. The Non-proliferation Treaty had been formulated in 1968, and Canada had signed and ratified it in 1970. India was deeply opposed to the NPT, calling it an imperialistic, discriminatory agreement, and refused to sign the Treaty. Therefore, India was not about to allow its nuclear reactors to be subject to NPT safeguards.

In the course of negotiating with Canada, India threatened to buy any additional reactors from France. India calculated that this would result in the Canadian nuclear industry pressuring the Canadian government to ease up on its safeguards demands in order to preserve its sales to India.³⁵ Canadian commercial interests did have some effect on the government as the

³⁴ Bothwell, Nucleus: 366.

³⁵ Kapur, India's Nuclear Option: 194.

demand for NPT safeguards was replaced by less-stringent IAEA safeguards. However, the security concerns that existed in Canada were powerful enough to withstand the demand that the RAPP agreements did not need to be amended and that bilateral inspections were enough.

In the Agreement that was reached on June 9, 1971, safeguards were toughened on RAPP I and II. IAEA safeguards, which included Agency inspections and Agency sanctions for non-compliance were to apply, and not only were Canadian fissile materials to continue to be safeguarded, but now "all subsequent generations of nuclear material produced" would be under safeguards.³⁶

The fact that Canada was able to get India to agree to IAEA safeguards is indicative of the growing security concerns in Canada. However, commercial interests still played an important role in the negotiations because Canada did not make its initial insistence on NPT safeguards a deal-breaker. Looking at the agreements signed between Canada and India from 1956 to 1971, it must be said that the role that non-proliferation concerns played on the Canadian government steadily increased. In 1956, the only safeguard was a "peaceful purposes only" pledge, but by 1971 IAEA

³⁶ Canada Treaty Series. Agreement between The Government of Canada, The Government of India and International Atomic Energy Agency 1971 No. 36 (Vienna: June 9, 1971). See in particular Articles 6-11 and Article 18.

safeguards had been applied to all Canadian nuclear reactors exported to India except for CIRUS.³⁷

Taiwan TRR 1969

On September 16, 1969 Canada concluded an arrangement to export an N.R.X-type research reactor to Taiwan. The Taiwan Research Reactor constituted an almost perfect export for Canada. The Taiwanese paid \$30 million in cash; construction was completed on time; the reactor went critical by September 1973; and Taiwan concluded a safeguards agreement with the IAEA. However, on October 12, 1970, Canada terminated all nuclear cooperation with Taiwan. The reason for this was that Canada had recognized the People's Republic of China, and therefore severed all diplomatic relations with Taiwan.

In assessing which foreign policy goal was more influential in the exporting of a reactor to Taiwan, one must look at two decisions: 1) the decision to supply the TRR; and 2) the decision to terminate all nuclear co-operation.

The original decision to supply the TRR was taken for commercial reasons, and political/security concerns did not act as a constraint on the government. Taiwan, although ruled by an authoritarian government, was stable. However, the issue was not so much the internal stability of Taiwan as the instability of the

³⁷ The justification for this was that CIRUS was concluded prior to the formation of the IAEA and that it was only a research reactor.

region, for the conflict between mainland China and Taiwan resulted in a very unsettled situation.

Since the Communist revolution on mainland China, which sent Chiang Kai-shek and his followers retreating to Taiwan, both the People's Republic of China and the Republic of China have claimed rightful ownership of both Taiwan and the mainland. As a result, the two "countries" have been in a state of civil war since 1949, with only the Strait of Formosa and the U.S. Navy separating them.

Under these circumstances, supplying Taiwan with a *potential* nuclear capability must be seen as contributing to an already tense situation. Since 1964, China had had the bomb, and this made Taiwan fearful. In addition, China had a population advantage of almost a billion people. As former U.S. Department of Defence Director George Rathjens said in 1976, "If mainland China made a determined effort to take Taiwan, the Taiwan government could only effectively respond with nuclear weapons."³⁸

It can be clearly stated that Taiwan was originally supplied with the TRR for commercial reasons. The fact that Taiwan was able to pay the entire cost for the reactor, rather than having the Canadian government subsidize it, meant that Taiwan was a valuable customer. Also, Taiwan possessed a growing economy and was expected to require additional reactors. Canada could thus become a major nuclear supplier to Taiwan. The potential for conflict with China was not taken into consideration, and this is indicative of

³⁸ Edwards, "Myth of the Peaceful Atom": 136.

the lack of concern with security questions. The possible argument that the export resulted from Cold War considerations can also be discounted. It is true that Taiwan was a staunch anti-Communist Western ally in a region where the domino theory was in clear evidence, but Canada, especially after the 1968 election of Pierre Trudeau, deemphasized military means of containment, as reflected in Ottawa's withdrawal of troops from Europe under NATO in 1969. It also moved to normalize relations with China. Therefore, containing communism was not a factor in Canada's conclusion of this reactor sale.

If the export of TRR was based on commercial interests, the decision to terminate nuclear assistance was clearly done for political reasons. When Canada started the formal negotiations in 1970 that eventually led to full recognition of China, it decided to terminate nuclear assistance to Taiwan. Once Canada had ended official recognition of the Taiwanese government, it would have been "impossible to sell such a sensitive item as a nuclear reactor to a government which no longer had any legitimacy in official Canadian eyes."³⁹

Although the commercial interests in Canada objected, the political arguments dominated. AECL contended that it had assured Taiwan in 1969 that Canada's negotiations with the PRC would not jeopardize the TRR project in any way, but the Canadian government was not moved by AECL's appeals to this effect.⁴⁰ Further proof of

³⁹ Bothwell, Nucleus: 425.

⁴⁰ Finch: 48.

the lack of influence possessed by the commercial interests regarding Taiwan occurred in the mid-1970s when Taipower (Taiwan's nuclear agency) discussed the possible purchase of a CANDU with AECL, but the deal was blocked by the Canadian government for fear of offending Peking.⁴¹ There is some possibility that Ottawa considered that, with the Chinese market much larger, there was a greater chance of selling reactors to the mainland than to Taiwan. Such reasoning must, however, be discounted because China already had an indigenous nuclear industry, and would not have an interest in purchasing CANDUs whereas Taiwan had no such industry and did want CANDUs.

It has been suggested that the termination of nuclear assistance to Taiwan actually contributed to instability in the region. Gordon Edwards has argued that "Supplying Taiwan with the means to make nuclear weapons, and then joining in its international abandonment, might be said to invite the spread of the atomic bomb."⁴² This is debatable considering the influence that the United States had, and has, on Taiwan. Taiwan was, and is, dependent on the U.S. for its protection, and the U.S. would not allow Taiwan to develop nuclear weapons. Despite better Sino-American relations since the official American recognition of China, the U.S. is not yet prepared to abandon Taiwan and continues to exert control over the government's military policy.

⁴¹ Joseph A. Yager, "Taiwan" in Yager ed, Nonproliferation and U.S. Foreign Policy (Washington, 1980): 67.

⁴² Edwards, "Myth of the Peaceful Atom": 136.

Rather than contributing to instability in the region, cutting off nuclear assistance to Taiwan actually helped stabilize the situation. Appeasing China, which was a nuclear power, was a more important political goal than running the slim risk by terminating sales to Taiwan of the latter developing nuclear weapons to defend itself from Chinese aggression.

In sum, the decision to export the TRR was taken for commercial reasons, but the termination of the programme was the result of political concerns. This process corresponds with this paper's thesis, which is that commercial interests were more dominant in the early stages of the time period, but that political/security considerations became more influential in the later stages of the reactor export programme. In this instance, however, the latter concerns pertained more to Canadian political, rather than security, interests.

South Korea Wolsung 1973

In 1973, Canada made its first power reactor sale in almost a decade, when it sold a 600 MWe CANDU to South Korea. Canada had earlier failed to sell to Korea in 1969, but surprisingly, four years later, an export was concluded. This is an unusual case because it was Seoul that approached Ottawa about a sale, not the reverse.

The Canadian government claimed that South Korea had purchased the CANDU without calling for international bids because

it was impressed with the Canadian system.⁴³ However, this seems too simplistic, and thus two other possible theories are presented as to why South Korea approached Canada to sell it a nuclear reactor. The first hypothesis is that Shaul Eisenberg, AECL's sales agent, was responsible for the deal. Eisenberg, an Israeli citizen who called himself an international industrial salesman, came to AECL in 1968 and declared, "I can sell that sleeping beauty of yours. You fellows will never sell it, (as) you don't know the market."⁴⁴ Eisenberg was paid \$18.5 million for his job in selling the CANDU to South Korea.

The second hypothesis, put forward by Ron Finch, suggests that:

the South Koreans may have wanted to decrease their dependence on American supplies of enriched uranium and, in turn, by appearing to take a more independent position, force the Americans to increase their military and economic commitment to the region.⁴⁵

The financial terms of the CANDU deal were consistent with other large-scale industrial projects rather than most past Canadian reactor exports which often typified aid projects. The Export Development Corporation committed \$330 million to finance the Korean sale, and a consortium of Canadian and British banks added another \$60 million (see Figure 4.1 for complete financing information). This was not, then, an aid package as the Indian and Pakistani cases resembled.

⁴³ International Canada (Dec 1973): 323.

⁴⁴ Morrison and Wonder: 20.

⁴⁵ Finch: 58.

Since it was South Korea that initiated the sale, the influence of Canadian commercial interests is not as important in this case⁴⁶ as examining the political/security considerations that might have prevented the sale. A tight safeguards agreement was negotiated so that Canada's security concerns in this respect were met. However, since the negotiations occurred after the Indian nuclear explosion, the safeguards agreement is not assessed here, but in Chapter 5. Instead, questions of regional conflict and regime stability are explored.

South Korea remains technically in a state of war with North Korea. Although there has been a ceasefire since the end of the Korean War in 1953, no formal peace treaty has been signed. Therefore, South Korea maintains a security incentive to acquire nuclear weapons, as they could provide a relatively cheap and effective deterrent to invasion from the north.

However, any possible military action that South Korea might wish to take against the north is constrained by the United States. Since the U.S. has promised to protect South Korea from its threat to the north, and has backed up this promise with American troops stationed in South Korea, the U.S. maintains a strong enough presence to prevent South Korea from producing nuclear weapons. However, it has been suggested that if for any reason the U.S. were to weaken its guarantee, even going so far as to withdraw its forces, then this would result in a substantial motivation for

⁴⁶ The commercial climate in which this sale occurred was the same as for the Argentinean case. See below, pp. 89-90.

South Korea to develop a nuclear weapons capability.⁴⁷ Nevertheless, Ottawa seems to have been satisfied that this risk was minimal and that South Korea would continue to be constrained by the United States.

Outside of any possible regional conflict, the nature of South Korea's regime must also be examined. South Korea was then and is today a military dictatorship, and its internal stability has been maintained by severe repression. However, internal stability is also maintained by South Korea's rapid industrial growth. Therefore, it could be argued that the Canadian government was actually preserving stability in South Korea with the Wolsung export.

In sum, the Wolsung export was not constrained by political/security influences. South Korea's potential involvement in regional conflict and the effect that would have on nuclear proliferation was rationalized away by the American factor. In addition, the fact that South Korea was a dictatorship was discounted because it was seen as a *stable* regime.

Argentina Embalse 1973

In a case very similar to the South Korean sale, Canada sold a CANDU to Argentina in 1973. As with Wolsung, Canada had failed in an earlier sales attempt in 1968 before succeeding in 1973. Since the safeguards agreement for Embalse was also reached following the Indian explosion, this agreement is not discussed

⁴⁷ Morrison and Wonder: 72.

here other than to note in passing that the safeguards were stringent. Instead, other potential political/security concerns are examined. However, first the role that commercial interests played on the sale must be explored.

By 1972, it had become clear that foreign sales of the CANDU were critical to the future of the Canadian nuclear programme. As AECL President Lorne Gray has noted, "we were getting pretty tired of it (the search for exports) and were really concerned about the future of the Canadian nuclear power programme if we did not get something."⁴⁸ Additional export pressure was placed on the government by Canadian opposition parties. The Opposition, in questioning the government's commitment and ability to conclude reactor exports, asked:

Is our Department of Industry, Trade and Commerce not on the job, attempting to sell this country another plant, or do they have some doubts about our capacity to build these plants, keep them up-to-date and equal to atomic energy plants in the rest of the world?⁴⁹

These pressures resulted in AECL's hiring of the aforementioned sales agent, Shaul Eisenberg. AECL justified the hiring of agents, asserting that "We are going to need agents in future to do our business. AECL simply is not equipped to provide the kind of marketing organization that is needed to sell the Candu reactor abroad."⁵⁰ In addition, AECL also entered into a

⁴⁸ Morrison and Wonder: 20.

⁴⁹ Debates, (March 23, 1970): 5374.

⁵⁰ Morrison and Wonder: 21.

partnership with an Italian firm, Italimpianti, in its bid in Argentina. Italimpianti had told AECL:

Look, you fellows are babes in the woods, you will never sell in South America the way you go about selling.... you better let us take the commercial lead. You have a good system, we think it is going to go around the world, but if you want to sell in South America you better let us do it for you.⁵¹

Canada pulled out all the stops to make the Argentine sale, including a very generous financial package. In order to obtain the deal, Canada provided a \$130 million EDC loan at a very low interest rate. However, a ceiling of 25% was placed on the inflation that Argentina would have to take into account when paying AECL, and, therefore, when Argentina suffered hyperinflation of 300%, the resulting loss to Canada was in the tens of millions. In the end, Canada lost over \$130 million on the "sale" of the nuclear reactor to Argentina (See Figure 4.1 for complete financing information).

In addition to these generous financial terms, AECL also sweetened the offer by providing the Argentine Nuclear Energy Commission (CNEA) with a "technology transfer agreement" that would facilitate Argentina's development of an indigenous nuclear industry.⁵²

Embalse was considered a "loss-leader" by the Canadian nuclear industry. AECL felt that the Argentine sale would depict

⁵¹ Morrison and Wonder: 20.

⁵² Daniel Poneman, "Argentina" in Jed C. Snyder and Samuel F. Wells Jr. eds, Limiting Nuclear Proliferation (Cambridge, MA, 1985): 99.

Canada as a "viable reactor exporter" to potential purchasers thus ensuring that there would be opportunities for Canadian component suppliers in the future.⁵³ In looking at these commercial arguments, one cannot help but think back to the CIRUS deal, when the same arguments were made. Had nothing changed in twenty years that Canada still had to use loss-leaders to export its reactors?

In looking at potential political/security concerns, it is obvious that Argentina must at the time have been considered a fairly serious candidate for nuclear proliferation. Argentina was not a party to either the NPT or the Treaty of Tlatelco, which attempted to maintain Latin America as a nuclear free zone.

One reason why Argentina might have been viewed as a potential nuclear weapons candidate was its regional rivalry with Brazil. However, although both countries have battled each other politically and economically for the "supremacy of South America", this rivalry has not yet led to military conflict. Indeed, William Courtney pointed out in 1982 that, "the current level of military rivalry between the two countries is low and... in recent decades Brazil and Argentina have been more preoccupied with perceived internal threats to national security than with external threats."⁵⁴

If the security concern of regional conflict can be largely discounted, regime stability cannot. Argentina has had a history of unstable military dictatorships, and even though free

⁵³ Finch: 53.

⁵⁴ Potter, Nuclear Power and Nonproliferation: 162.

elections were to be held in March 1973, one could not be sure how long the government would last. In the elections that occurred, Argentina elected a Peronist President in Hector Campora, but Juan Peron possessed the real power. However, Peron was in his late seventies and could not last long, and the Argentine military was waiting in the wings. The situation in Argentina during the CANDU negotiations was one where civil war between left and right wing forces was ready to erupt at any moment, with the only thing preventing an outbreak of hostilities being an old man. It is clear that Argentina was very unstable, and this was demonstrated when an undeclared civil war did, indeed, break out in 1974.

In sum, it can be said that political/security considerations did not play a great role in the Argentine export beyond Ottawa's desire to have in place a rigid safeguards agreement. Argentina is known as a potential nuclear proliferator, and its government was and is very unstable. Further, despite the fact that Argentina's regional rivalry with Brazil did not involve military conflict, the potential was there, in particular because both countries were ruled by military regimes. On the other hand, commercial interests were important, and the Argentine bid saw Canada try everything to make a sale.

To some degree, the Argentine case is an aberration in the thesis of this paper, which suggests that political/security concerns had become more important by 1974. The Argentine export was a step backwards for non-proliferation concerns after the evidence of increased attention to political/security concerns in

the transactions with India, Taiwan, and South Korea. The key political factor overlooked by Ottawa was the instability of the Argentine government. On the other hand, Canada did ensure that a rigid safeguards agreement was in place.

Conclusion

During the period 1945-74, there was a clear shift in the influence that the two foreign policy goals analyzed in this study had on Canadian nuclear reactor exports. Political/security concerns, especially in terms of avoiding the risk of nuclear proliferation, evolved during the thirty years to reach almost parity with commercial interests. The result was that by May 1974, commercial and security considerations were more or less accorded equal weight. No reactor would be sold without IAEA safeguards attached, but Canada did not make an issue out of whether a recipient state had signed the NPT. This is different from 1956 when economic considerations fully dominated Canada's export policy.

This shift in Canadian nuclear reactor export policy was not due to a lessening of the commercial interests in concluding sales; in fact the imperatives for reactor exports were increasing. Proof of this is in the Argentine export, where Canadian commercial interests outweighed any concerns over the stability of the Argentine political situation. One could argue that commercial interests were even more important in 1974 than they were in 1956

because of the substantial investment that Canada had already made in the nuclear industry.

It was primarily international influences that led to Canada's upgrading of its safeguards policy. The establishment of the IAEA and the NPT, as well as some marginal attempts at ending vertical proliferation, such as the partial test ban, all occurred during this period. Domestic influences did not much affect Canada's non-proliferation policy because the major nuclear issue in Canada concerned the lack of exports, as opposed to the nature of the recipients.

There were, however, cracks in Canada's nuclear export policy. Full-scope safeguards were not yet required. As well, Canada was not overly concerned about whether countries were internally stable and/or engaged in regional conflicts. The Argentina and Pakistan cases best exhibit this fact. Canada's nuclear reactor export policy would probably have remained intact as it stood at the end of this period for many years to come --- with commercial and political/security considerations pretty much in balance --- if it had not been for the May 18, 1974 Indian nuclear explosion.

Chapter Five

Strengthening Safeguards, 1974-1976

On May 18, 1974, India exploded a nuclear device in the Rajasthan desert. This explosion made India the sixth member of the world's "nuclear club", although the Indian government stressed that its nuclear initiative was for peaceful uses only. India was able to explode this device by utilizing Canadian plutonium, which had been diverted from the CIRUS nuclear research reactor. A consequence of India's action was that both the international non-proliferation regime, and Canada's nuclear export policy were challenged.

The Indian nuclear explosion was a catastrophic jolt to the world's nuclear non-proliferation regime. Not only was India the first new member of the "nuclear club" since China's "admittance" in 1964, but it was also the first developing country to join. There were great fears that the Indian explosion would result in the floodgates opening and many of the near-nuclear-weapons states rushing to develop the bomb. A continuation of the "nuclear domino theory", this time in the Third World, was prophesized. That India was the first country to develop the bomb from a civilian nuclear programme and that it had acquired both the fuel and the technological capability through transfers from the Western nuclear suppliers were additional developments affecting negatively the non-proliferation regime.

Canada's nuclear reactor export policy was also dramatically affected by India's explosion. Of all the countries

which aided India's programme, Canada's assistance was the most essential for India's military aspirations. It had assisted India's nuclear weapons capability in two principal ways. The first was through the production of plutonium by CIRUS. In order to produce a nuclear weapon, a supply of plutonium is needed; India had obtained this necessary ingredient by extracting irradiated fuel from CIRUS. However, John Maddox has argued that India's use of CIRUS's spent fuel was not as pivotal as the second factor; Canada's technical transfers and assistance to India's nuclear programme during the 1950s and 1960s helped to create India's self-sufficiency in reactor technology.¹

As a result of Canada's role in the Indian explosion, the relative equilibrium that had been reached in its nuclear reactor export policy between commercial interests and political/security concerns was disrupted. Following the Indian explosion, political/security concerns dominated Canada's nuclear reactor export policy. From 1974 to 1976, the Canadian government strengthened its non-proliferation policy and took significant steps to enforce its new position.

This chapter covers the important period of 1974-76 when the Canadian nuclear reactor export policy changed from one giving equal weight to the two foreign policy objectives to one which allowed political/security concerns to become more dominant. The specific developments that are studied are: 1) the suspension of nuclear cooperation with India; 2) the safeguards agreements

¹ Maddox: 16.

negotiated with Argentina and South Korea; 3) the termination of nuclear cooperation with India; and 4) the termination of nuclear cooperation with Pakistan.

Canada's 1974 and 1976 Nuclear Reactor Export Policies

Before analyzing the consequences of Canada's new safeguards policies for individual situations, an assessment of the evolution of these policies is necessary. Following the May 1974 Indian explosion, Canada's non-proliferation policy was reviewed, and on December 20, 1974 the Minister of Energy, Mines and Resources, Donald Macdonald, announced a more stringent nuclear safeguards policy that contained the following conditions:

- 1) a binding assurance that Canadian-origin items would be used exclusively for peaceful, non-explosive purposes;
- 2) a binding assurance that Canadian-origin items would be covered by international (IAEA) safeguards for their lifetimes;
- 3) a binding assurance that any nuclear material produced by or with Canadian-supplied items would be subject to conditions (1) and (2);
- 4) a binding recognition of Canada's right of prior consent over the re-transfer beyond the recipient's jurisdiction of any Canadian-origin items or of any nuclear material used with or produced by those items;
- 5) a binding recognition of Canada's right of prior consent over the reprocessing of Canadian-origin nuclear material irradiated in a Canadian-origin facility as well as over the subsequent storage of any plutonium produced;
- 6) a binding recognition of Canada's right of prior consent over the enrichment beyond 20 per cent and the subsequent storage of Canadian-origin uranium;
- 7) a binding recognition of Canada's right to apply fall-back safeguards should IAEA safeguards cease to be applied for any reason;

- 8) a binding commitment that adequate physical protection measures would be applied.²

In order to implement this policy, Macdonald announced that Canada would renegotiate the 1973 reactor sales to both Argentina and South Korea. A time limit of one year was originally placed on these negotiations, but it was later extended to two years.

Canada's non-proliferation policy continued to evolve, and at the NPT Review Conference in May 1975, the government announced that, "future Canadian bilateral official development-assistance commitments for the financing of nuclear projects will be undertaken solely to NPT party states."³ As stated in Chapters 2 & 4, most reactor exports involved a great deal of government financing, and the withholding of such financing arrangements would clearly limit AECL's ability to sell the CANDU. Therefore, the limiting of Export Development Corporation financing and other forms of assistance to NPT states represented a significant toughening of Canada's non-proliferation policy. An additional incremental step was also made in 1975 when the Cabinet decided to prohibit all sales to unstable regions, in particular the Middle East.⁴

² Nuclear Policy Review, Background Papers: 342-343.

³ Allan J. MacEachern, "The Nuclear Non-Proliferation Treaty -- An Essential Shield" Statements and Speeches No.75/13 (May 7, 1975): 3.

⁴ The Globe and Mail (Feb 2, 1982): B9. In 1982 this blanket prohibition on sales to the Middle East was altered to allow for country-by-country consideration.

On December 22, 1976, the Minister of External Affairs, Don Jamieson, announced further changes in Canada's policy. In addition to the requirements of the December 1974 announcement, he stated that:

Shipments to non-nuclear weapons states under future contracts will be restricted to those which ratify the Non-Proliferation Treaty or otherwise accept international safeguards on their entire nuclear program. It follows from this policy that Canada will terminate nuclear shipments to any non-nuclear weapon state which explodes a nuclear device.⁵

In making this announcement, which represented the most stringent non-proliferation policy of any nuclear supplier, Jamieson stated that the Canadian government was "determined to do everything within its power to avoid contributing to nuclear weapons proliferation." Pointing out that Canada was strengthening its non-proliferation policy "unilaterally", Jamieson emphasized that Canada was "prepared to accept the commercial consequences of being clearly ahead of other suppliers." This, he said, was the price Canada had "to pay to curb the threat to mankind of nuclear proliferation."⁶

This 1976 statement which remains the policy of Canada today was the most stringent of any of the nuclear suppliers until the United States matched Canada in 1978. To this day, Canada and the United States remain in the vanguard of the nuclear suppliers in this respect. The 1976 non-proliferation policy clearly indicates the rising influence of political/security concerns

⁵ Debates (Dec 22, 1976): 2255.

⁶ Debates (Dec 22, 1976): 2256.

during this period. In indicating that Canada would accept the "commercial consequences" of its non-proliferation policy, Don Jamieson was recognizing that Canada's commercial interests in exporting nuclear reactors would be subservient to the constraints of political/security concerns.

With any new policy, the implementation stage is the most important. To assess whether the 1974-1976 changes in Canada's non-proliferation policy really brought about a shift in priorities, an analysis of the implementation of the new policy must be undertaken. Some critics have suggested that the only thing that changed after the Indian explosion was the "level of anti-proliferation rhetoric" and that "while there was an increase in the number and type of commitments required of recipients of Canadian-supplied nuclear material and technology, the system was not altered."⁷ However, an examination of the five country-specific developments that occurred during this period reveals that there was a significant shift in Canada's nuclear reactor export policy.

India --- Suspension of Nuclear Assistance

On May 22, 1974, four days after India's nuclear explosion, Canada suspended all nuclear assistance to India, as well as suspending all non-food bilateral aid. Non-nuclear aid was resumed to India within several months, but nuclear assistance remained suspended until its termination in 1976 (see below).

⁷ Finch: 99.

Before assessing the role of the two competing foreign policy goals on the suspension decision, an examination of the implications of the Indian explosion would be useful. In particular, there are two interrelated issues that need to be explored: 1) the difference, if any, between a peaceful nuclear and a military nuclear explosion; and 2) the question of whether or not India broke either the letter or the spirit of any multilateral or bilateral safeguards agreements.

The question of whether India's nuclear explosion was peaceful or military was raised right at the time. In its official announcement of the event, the Indian Atomic Energy Commission described it as:

a peaceful nuclear explosion [PNE] experiment using an impulsion device. As part of the programme of study of peaceful uses of nuclear explosions, the Government of India has undertaken a programme to keep itself abreast of developments in this technology, particularly with reference to its use in the field of mining and earth-moving operations.⁸

However, the Indian government never indicated how it planned to use PNEs for economic development.⁹ The research on this subject suggests two possibilities: earth-moving for building canals and harbours; and underground blasts to make it easier to extract natural gases, oil, and minerals.¹⁰ Yet, these possible uses have

⁸ SIPRI, Yearbook 1975 (Stockholm, 1975): 16.

⁹ Reford: 15.

¹⁰ Reford: 12-13.

been ruled out by most because they are either uneconomical or impractical.

For its part, Canada has made it clear that it sees no distinction between the development of nuclear explosions for "so-called peaceful purposes" and explosions for military purposes. As External Affairs Minister Mitchell Sharp pointed out in 1974, "there can be no distinction between peaceful and potential military applications. For all intents and purposes... India now has developed the capability of producing a nuclear weapon."¹¹

International opinion has also reached the conclusion that no difference exists in essence between a "peaceful" and a "military" explosion. This view was affirmed in the 1970 Non-Proliferation Treaty which specifically emphasizes the inseparable link between the two. Article II of the NPT states:

Each non-nuclear-weapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of *nuclear weapons or other nuclear explosive devices* or of control over such weapons or explosive devices directly, or indirectly; not to manufacture or otherwise acquire *nuclear weapons or other nuclear explosive devices*; and not to seek or receive any assistance in the manufacture of *nuclear weapons or other nuclear explosive devices*.¹²

In addition, in 1974, the UN General Assembly stated that it had not yet been proven possible to differentiate between the technology of nuclear weapons and that of nuclear explosive devices

¹¹ Morrison and Page: 24.

¹² Treaty on the Non-Proliferation of Nuclear Weapons: Article II.

for peaceful purposes.¹³ It is clear, then, that there is an international consensus that up to this time, PNEs are equal to military nuclear explosions.

The most important aspect of the Indian nuclear explosion from a Canadian standpoint was whether or not India broke any multilateral or bilateral agreements in the process of conducting its explosion and, accordingly, whether or not Canada's suspension of nuclear cooperation with India was justified legally.

It was important to Canada to find legal justification for its decision to suspend nuclear cooperation with India; otherwise, its reputation as a reliable nuclear supplier might have been damaged. In fact, Ashok Kapur has suggested that perhaps it was Canada which "broke its nuclear supply contracts with India... when it first suspended supplies in May 1974 and then terminated the agreement in May 1976."¹⁴ Canada then needed to find a legal justification for its actions so that its commercial and political dealings with other countries, and not just in the realm of nuclear materials, would be protected.

It is clear that India's action violated the two most crucial elements of the NPT: the prohibition against non-nuclear weapons states developing a nuclear explosive device and the application of international safeguards on civilian nuclear programmes. However, since the NPT has never been signed or

¹³ SIPRI, Yearbook 1975: 493.

¹⁴ Ashok Kapur, "The Canada-India nuclear negotiations: some hypotheses and lessons" The World Today (Aug 1978): 313 (n2).

ratified by India, the question of India's legal obligations vis-a-vis the NPT rests on whether or not the NPT "represents customary international law to such an extent that its provisions are binding even upon states that are not a party to the treaty." For a treaty to create a new legal principle, there must be a "high level of adherence" before that treaty can be considered representative of customary international law.¹⁵

During and after the negotiations that led to the formulation of the NPT, India publicly denounced the Treaty as "discriminatory and unfair" and "declared that it reserved the right to conduct its own nuclear explosions for peaceful purposes."¹⁶ Therefore, under the state practices component of customary international law, the NPT is not binding on India.

Despite India's position on the NPT, she could, however, still be considered bound by its provisions if there were widespread adherence to it by strategically important states. By 1974, over 82 states had either signed or ratified the Treaty, suggesting that it met with worldwide support. However, many of the non-adherents to the NPT were the so-called near-nuclear-weapons states. In addition to India, countries like Argentina, Brazil, South Africa, Pakistan, and Israel had all refused to sign. The position of these near-nuclear states is crucial because the NPT is dependent upon near-unanimity among nuclear-capable countries to be

¹⁵ Walczak: 238-239.

¹⁶ Epstein, Canada and the problem of nuclear proliferation: 17.

viewed as part of customary international law.¹⁷ This point, taken with India's refusal to sign the Treaty, means that India did not breach a binding international argument.

If India did not break an obligation under the NPT, did it break any bilateral agreement that had been made with Canada? More specifically, did it violate either the letter or the spirit of the 1956 CIRUS agreement? The first facet that needs to be investigated is whether the CIRUS agreement explicitly banned PNEs. As has been stated earlier, the principal safeguards measure was Article III which stated that "the reactor and any products resulting from its use will be employed for peaceful purposes only." Since the term "peaceful purposes" was never defined, the Indians could argue that their PNE did not break Article III. India could also argue that since the uranium used to produce the plutonium for the device was Indian uranium, --- albeit derived from CIRUS --- and not Canadian uranium, it was not technically in violation of the agreement.¹⁸ It can be concluded, then, that India did not break the letter of any agreement with Canada.

The question of whether India violated the spirit of any agreements with Canada rests on whether Canada sufficiently articulated its position on PNEs. It is indisputable that India was aware of Canada's position that there is no difference between a nuclear explosive device and a nuclear weapon. Canada's position

¹⁷ Walczak: 243-244.

¹⁸ Ebinger, "International Politics of Nuclear Energy": 44.

was made perfectly clear in a letter from Prime Minister Pierre Trudeau to Prime Minister Indira Gandhi in 1971:

The use of Canadian supplied material, equipment and facilities in India, that is, at CIRUS, RAPP I or RAPP II, or fissile material from these reactors, for the development of a nuclear explosive device would inevitably call on our part for a reassessment of our nuclear cooperation arrangements with India, a position we would take with any other non-nuclear weapons state with which we have cooperation arrangements in the nuclear field.¹⁹

Prime Minister Gandhi's reply did not dispute Canada's position on PNEs:

You have referred to the question of peaceful nuclear explosions. I entirely agree that the basis of the dedication of our two Governments in concluding nuclear cooperation agreements has been the development and application of nuclear energy for peaceful purposes. Nuclear cooperation agreements between India and Canada emphasize the mutual advantage of development and application of nuclear energy for peaceful purposes and it is my sincere hope that our nuclear cooperation would not only continue but increase with the passing of time.

My Government reiterates its commitment to the provisions contained in the nuclear cooperation agreements between India and Canada to which your Government is also committed. Our two Governments have acted in conformity with these agreements for the past several years. The obligations undertaken by our two Governments are mutual and they cannot be unilaterally varied. In these circumstances, it should not be necessary... to interpret these agreements in a particular way based on the development of a hypothetical contingency.²⁰

On the basis of this exchange, it can be concluded that India *did* violate the spirit of its bilateral agreement with Canada. Therefore, when External Affairs Minister Sharp announced

¹⁹ Kapur, Canadian Images: Appendix II.

²⁰ Kapur, Canadian Images: Appendix II.

the suspension of nuclear cooperation, he was correct in stating that:

We have made it clear in international discussions and in bilateral exchanges with India that the creation of a nuclear explosion for so-called peaceful purposes could not be considered as a peaceful purpose within the meaning of our cooperative arrangements.²¹

India's violation of the spirit of a bilateral agreement thus provided the justification the Canadian government required for the suspension of nuclear cooperation.

It is obvious that it was Canada's political/security concerns that led to this suspension of nuclear cooperation with India, but commercial considerations still did have some influence on Canadian government policy at this time. If the Canadian government had been preoccupied exclusively with the security risk of nuclear proliferation, logically it would have terminated rather than suspended cooperation with India in 1974. However, commercial interests apparently ruled out an outright cessation of cooperation at this time. The government hoped that it could negotiate with India and that a new safeguards agreement could be reached. This new agreement would have India renounce its nuclear explosion, place CIRUS under the RAPP safeguards agreement, and have India sign the NPT. This was, however, a vain hope in that Canada had been trying for twenty years to accomplish these objectives, and it was very unlikely that India would now capitulate to Canada's demands.

²¹ Morrison and Page: 24.

How would Canada's commercial interests have been affected by a termination of nuclear assistance with India in 1974? First, there were the immediate economic losses: \$12 million worth of heavy water sales; a \$6 million turbo generator export; and \$1 million in spare parts for the RAPP programme.

Second, there were future economic benefits that would accrue to Canada from the Indian nuclear programme: additional supplies of heavy water and spare parts for the RAPP project; and the possibility of supplying heavy water and spare parts for India's first indigenous reactor, the Madras, whose design was based on the CANDU.

Finally, there was a concern about the effects that ending nuclear assistance to India would have on Canada's ability to export reactors. As Morrison and Wonder have suggested, "the cut-off of shipments probably did more immediate harm to the Canadian nuclear industry than to India's nuclear programme." This was primarily because the cessation may have led "potential third world customers to question Canada's reliability as a supplier."²²

This point cannot be overstated because, while supplier reliability is an important component in any major industrial project, it is critical in the nuclear industry. As the Canadian government has noted:

The long lead times needed to cultivate the market, prepare bids, negotiate contracts, obtain regulatory approval, and build and commission plants require long-term, economic and political commitments to nuclear co-operation. Even after they are in service,

²² Morrison and Wonder: 62.

the reactors will involve the two countries in a continuing relationship to ensure safe and efficient operation. Perceptions of the strength and stability of the vendor government's commitment to the project are essential components of the decision to purchase a nuclear reactor.²³

In sum, while political/security influences clearly were the underlying reason why nuclear cooperation was suspended with India, Canada's commercial interests did act as a constraint on Canada's pursuing stronger action, ie. outright termination of assistance. Canada's commercial interests resulted in only a suspension of cooperation in 1974, with the hope that cooperation could eventually be resumed. Due to this commercial factor, Canada and India negotiated for two years in an effort to come up with a solution.

South Korea's Safeguards Agreement

When Donald Macdonald announced Canada's 1974 non-proliferation policy, he stated, as previously indicated, that Canada would renegotiate its safeguards agreement with South Korea. Although a sales agreement had been signed for the CANDU export, a safeguards agreement had not yet been signed. It was assumed at the time the sale was concluded that the only applicable safeguards on the Wolsung project would be those of the IAEA. However, the Indian explosion led Canada to seek more substantial safeguards.

Canada presented the South Koreans with two major demands: that they ratify the NPT and forego nuclear reprocessing.

²³ Nuclear Policy Review, Background Papers: 269.

Although South Korea had signed the NPT in 1968, it had never ratified it, and Canada made NPT ratification a condition of continuing with the CANDU export. Finally, in March 1975, due to Canadian as well as American pressure, South Korea ratified the NPT. Thus, the first Canadian condition was met, but the second regarding nuclear reprocessing proved more difficult for Canadian negotiators to achieve.

In 1974, Canada became aware of South Korean plans to purchase a French nuclear reprocessing plant. There were grave fears in both Ottawa and Washington that the Koreans wanted this plant for military purposes. Both countries felt that there was no economic justification for the plant and therefore they placed strong pressure on Korea to cancel the deal. In particular, Canada told the Koreans there would be no CANDU if they acquired the reprocessing plant.

The belief that South Korea was attempting to develop a nuclear military capability through the purchase of a reprocessing plant was given additional credibility by Korean actions during 1974-75. According to American intelligence sources, "in 1975 the Koreans were running all over the world picking up material and equipment for a nuclear-weapons program. The reprocessing plant was practically the last thing on the list of things they needed."²⁴ Furthermore, on a trip to Washington in June 1975, South Korean President Chung Hee Park told reporters that his country was

²⁴ Gary Clyde Hufbauer and Jeffrey J. Schott, Economic Sanctions Reconsidered: History and Current Policy (Washington, 1985): 505-506.

capable of building nuclear weapons. Park pointed out that while Korea was honouring the NPT, it did have a nuclear weapons potential. Park later added that "if the U.S. nuclear umbrella were to be removed, we would have to start developing our nuclear capability to save ourselves."²⁵

Finally, after several months of diplomatic pressure and threats, South Korea cancelled plans to obtain the reprocessing plant, and Canada gave the go-ahead to sign the safeguards agreement. The agreement for the Wolsung reactor was signed on January 26, 1976, and was the most stringent of all safeguards agreements to that time. It contained the following conditions: 1) affirmation that nuclear cooperation was for peaceful purposes only; 2) a prohibition on all nuclear explosive devices; 3) a requirement of prior consent from Canada for retransfers of all nuclear equipment, material, facilities, fuel, or technology; and for reprocessing of all generations of fuel (this point was highlighted in an appended note to the agreement in which South Korea was informed that the "Government of Canada would not be prepared, at this time" to agree to reprocessing); 4) provision for NPT and IAEA-administered safeguards; and 5) a provision that in the event of non-compliance nuclear cooperation would cease and all nuclear items provided by Canada would be returned.²⁶

²⁵ International Canada (June 1975): 170.

²⁶ Canada Treaty Series. Agreement between Canada and the Republic of Korea 1976 No. 11 (Seoul: Jan 26, 1976): Article I, Article III, Article V, Note I.

In sum, Canada's political/security concerns were the dominant influence throughout the safeguards negotiations with South Korea. Despite the economic necessity of making the Wolsung sale, Ottawa was prepared to break the deal over the issue of the French reprocessing plant. Fortunately, under strenuous pressure from both Canada and the United States, South Korea decided to cancel its deal with France as well as to ratify the NPT. Comparing the influence of Canada's political/security concerns regarding nuclear reactor exports to South Korea between the sales agreement in 1973 and the safeguards agreement in 1976, one can easily see the rise in importance of these considerations as a result of the Indian nuclear explosion.

Argentina's Safeguards Agreement

In addition to the renegotiations with South Korea, Canada also reopened negotiations with Argentina regarding nuclear safeguards on the Embalse nuclear reactor project. The original contract to sell a CANDU to Argentina had been signed in December, 1973 with the only safeguard being an understanding that Argentina would sign an acceptable agreement with the IAEA. However, immediately following India's nuclear explosion, the Canadian government began to demand that the safeguards be strengthened. Canada wanted a safeguards package that would extend beyond the IAEA's normal attention to nuclear equipment and fissile material and that would apply to Canadian technology as well.²⁷

²⁷ Morrison and Wonder: 72.

The first Canada-Argentina accord concerning new and improved nuclear safeguards for Embalse was completed with an exchange of notes dated September 10 and 12, 1974. The first Canadian demand was met in this accord when Argentina guaranteed that it would not use Canadian technology, material, or expertise to produce any nuclear explosive devices, peaceful or otherwise.²⁸

Reaching the second accord took much longer, and the negotiations were more difficult, primarily due to Canada's intention to upgrade its non-proliferation policy as expressed in the December 1976 announcement referred to earlier. Ottawa's principal demand was for a veto over any fuel reprocessing in Embalse whether the fuel was of Canadian origin or not. The reprocessing issue was a major point of contention between Canada and Argentina, but finally on January 30, 1976 a strengthened safeguards package was signed.²⁹

This agreement was important because it placed essentially NPT safeguards on a non-NPT signatory. The safeguards that were contained in this agreement included the following provisions: 1) nuclear cooperation was to be for peaceful purposes only; 2) no nuclear explosive devices were to be derived from Canadian-supplied items; 3) mutual consent was required for retransfers of all nuclear equipment, material, facilities, fuel, or technology; 4) mutual consent was necessary for reprocessing of all generations of fuel; 5) IAEA-administered safeguards were to

²⁸ Morrison and Wonder: 72.

²⁹ Morrison and Wonder: 72.

apply; and 6) in the event of non-compliance, nuclear cooperation would cease.³⁰

This safeguards agreement was similar to the one reached with South Korea except that: 1) Argentina still had not signed the NPT; 2) the "no nuclear explosive devices" clause was restricted to items of Canadian origin only; and 3) non-compliance did not require that all Canadian supplied items be returned.

It is clear, in examining the Embalse safeguards agreement, that Canada's political/security concerns had a major impact on the negotiating process. However, commercial interests were still a factor in the conclusion of the deal. In many respects, it is remarkable that the Argentina sale went ahead at all, for there was substantial pressure on the government to announce a moratorium on all nuclear reactor exports (in the wake of the Indian explosion) and in Argentina's case in particular. Critics of the government's nuclear policy wanted to cancel the Embalse sale for three reasons. Two of these were commercial and were discussed in Chapter 4: the AECL agent's scandal that erupted in 1975, and the financial cost to Canada of the Embalse project. The third was of a political/security nature and related to Argentina's internal crisis compounded by the undeclared civil war which hit its peak in 1974-1976. Canada had concerns about Argentina's internal stability even before the Embalse contract was signed in 1973, and these fears were eventually realized when the

³⁰ Canada Treaty Series. Agreement between Canada and Argentina 1976 No. 12 (Buenos Aires: January 30, 1976): Article I, Article III and Article V.

fighting started in earnest in early 1974. Although the state of terror in Argentina reached its climax following the March 24, 1976 military coup --- several months after the Embalse safeguards agreement was signed --- there were many extrajudicial killings during 1974 and 1975.

Despite the calls for a cancellation of the Embalse sale due to the political situation in particular, it did go through, largely due to Canada's commercial interests in concluding the transaction. The economic necessity that originally justified the export of the CANDU in 1973 was still present during the safeguards negotiations. As the president of AECL, Lorne Gray, maintained, "we did not like Argentina, but it happened to be the only game in town."²¹

In sum, there was a significant increase in the influence of Canada's political/security concerns from the time of the Embalse sales agreement in 1973 to the safeguards agreement of 1976. The safeguards agreement was as a result significantly toughened, with the only major weakness being Argentina's continued reluctance to sign the NPT. Nonetheless, from Canada's point of view this shortcoming could be overlooked because the safeguards agreement that was obtained was equivalent to NPT safeguards. Nevertheless, Canada's commercial interests were not completely neglected; they constrained the government from cancelling the Embalse project entirely. This in and of itself shows the shift that had taken place in Canada's nuclear reactor export policy

²¹ Morrison and Wonder: 20.

because prior to the Indian explosion Canada's political/security concerns acted as a constraint on Canada's commercial interests whereas now the situation was reversed.

India --- Termination of Nuclear Cooperation

On May 18, 1976, two years to the day after the Indian nuclear explosion, External Affairs Minister Allan MacEachen stood up in the House of Commons and announced that the government had terminated all nuclear cooperation with India. There were four political/security arguments in favour of this action: 1) the safeguards issue could not be satisfactorily resolved; 2) Canadian parliamentary and public opinion was against any resumption of cooperation; 3) Canadian officials believed that the Indian government was no longer trustworthy; and 4) termination might help deter other near-nuclear weapons states from going nuclear.

Starting in 1975, there were intense Canadian-Indian negotiations over the possible resumption of nuclear assistance in order to finish construction on the RAPP reactors. New Delhi threatened Ottawa that if Canada terminated nuclear assistance, it would result in a cancellation of safeguards on the RAPP reactors. While obviously concerned about India's threats, Canada's objectives in negotiating were to place strengthened safeguards on India's entire nuclear programme, including CIRUS and the indigenous CANDU-designed Madras reactors and to obtain a pledge by India to refrain from further PNEs.

In response to Canada's demands, India refused to place additional safeguards on CIRUS and its other reactors, and only guaranteed that it would not set off another PNE while work continued on RAPP II (over the next 18 months) and that it would not develop a PNE using plutonium from the RAPP reactors.³²

It seemed apparent that the Canadian and Indian positions were miles apart, and an acceptable safeguards agreement could not be reached. Nevertheless, surprisingly, in March 1976 an agreement was reached between the negotiators, led on the Canadian side by Prime Minister Trudeau's special foreign policy advisor Ivan Head. An initialled, draft agreement was submitted to the Canadian cabinet. However, despite this hopeful development, on May 18, 1976 Canada announced the termination of assistance to India. What happened between March and May to explain this reversal? Ashok Kapur has suggested several possible hypotheses, two of which seem credible. The Head delegation may have overstepped its authority in initialling an agreement in which Canada's major demands had not been met, or the government may have feared a massive outcry, both by the opposition and the public, if nuclear assistance were resumed.³³

Regarding the latter argument, the Head agreement certainly did generate a reaction within Canada. The opposition Progressive Conservatives attacked the Government in Parliament

³² Morrison and Wonder: 78.

³³ Kapur, "Canada-India Nuclear Negotiations": 317-318.

during a memorable House debate on March 23, 1976. Allan Lawrence, P.C. critic for External Affairs, put forward the following motion:

That this House condemns the government for increasing the threat posed to mankind by the proliferation of nuclear weapons, and in particular by its present negotiations to resume nuclear assistance to India.³⁴

In opening the debate on the resumption of nuclear assistance, Lawrence attempted:

to drag out of the minister, if we can, for the first time some rational explanation, if one exists, for the intended resumption of nuclear assistance to India; and finally if, as I suspect, there is no rational explanation, to embarrass those government members who are either unthinking enough or partisan and disciplined enough to vote willy-nilly for the government's resumption of nuclear aid to India, the timing of which, the circumstances of which and the merits of which are simply incomprehensible to the people of Canada and to the nations of the western world.³⁵

In addition to the vehement opposition inside of Parliament, the government also had to consider public opinion. There had been widespread anger in Canada at India's 1974 explosion and that had been one of the reasons why Canada originally suspended nuclear cooperation with that country. To have recommended further nuclear cooperation without at least achieving all of its goals for safeguards would undoubtedly have set off a strong public reaction and that doubtless contributed to the government's decision to back away from the initialled agreement and terminate cooperation.

³⁴ Debates, (March 23, 1976): 12057.

³⁵ Debates, (March 23, 1976): 12057.

A further factor in the cessation of cooperation was the evaporation of trust in India among Canadian officials. There were many elements inside the government who went by the axiom "once bitten, twice shy". Some of the top government officials in the 1974-76 period --- including External Affairs Minister Mitchell Sharp and Under-Secretary of State Ed Ritchie --- had been involved in the Indian reactor sales of the 1950s and 1960s and there was amongst them a sense of having being betrayed.³⁶ Further, there was considerable anxiety over the "violation of civil liberties under Mrs. Gandhi."³⁷

The final political/security rationale for terminating nuclear cooperation with India was that it might serve as a deterrent to other near-nuclear weapons states exploding their own nuclear devices. Canada's concern about the impact that India's test would have on other states was a key component of its decision to suspend its nuclear cooperation immediately. In the suspension announcement, External Affairs Minister Mitchell Sharp stated:

Canada was concerned as to the effect that India's action --- whatever its motivation --- would have on international efforts to limit and control the proliferation of nuclear exploration technology, for which there can be no distinction between peaceful and potential military applications. For all intents and purposes... India now has developed the capability of producing a nuclear weapon... The development of nuclear technology by India is bound to have serious

³⁶ Ashok Kapur, "Nuclear Energy, Nuclear Proliferation and National Security: Views from the South" in Robert Boardman and James F. Keeley eds, Nuclear Exports and World Politics: Policy and Regime (New York, 1983): 173.

³⁷ Morrison and Wonder: 79.

and widespread repercussions throughout Asia and the world."²⁸

After taking such a strong stand in 1974, how could Canada reverse its position in 1976? If Canada had resumed nuclear assistance to India, then other near-nuclear states could have pointed "to the resumption of Canadian aid as Canadian condonation of India's explosion."²⁹

Although the arguments in favour of terminating nuclear assistance to India were persuasive, there were some plausible political/security concerns which pointed to the desirability of a resumption of nuclear assistance. In the March 23, 1976 debate in the House of Commons, External Affairs Minister Allan MacEachen outlined these arguments. The first issue was the RAPP II reactor which was still under construction. As MacEachen explained, "Under the agreement with India that we entered into, we have an obligation to complete the shipment to the reactor, both of material and fuel." Second, there was some concern that if Canada cancelled the construction of RAPP II, India might allow "the safeguard system at that reactor to disappear entirely." Finally, there was the related argument that continuing cooperation might act as a restraint on further Indian nuclear explosions. MacEachen raised this possibility in a rhetorical question in the House:

Would the completion of our particular project with India be an inhibiting or delaying factor regarding a further explosion in India? Would we have any effect

²⁸ Morrison and Page, 24.

²⁹ Epstein, Canada and the problem of nuclear proliferation: 20.

or, indeed, would a second explosion be delayed or be out of bounds in India?⁴⁰

In the end, these arguments were discounted. First, Ottawa contended that its nuclear agreements with India had already been violated by the Indians when they exploded their nuclear device, and therefore Canada was not bound by the RAPP agreements. Second, the government took the view that India's threats to forswear IAEA safeguards on the RAPP reactors were a bluff. Finally, Ottawa was sure that both the United States and the Soviet Union, which were also involved in India's nuclear programme,⁴¹ would deter India from both renouncing its nuclear safeguards and exploding additional PNEs. It was believed that India's nuclear programme was not yet self-sufficient enough that it "could act with complete impunity."⁴²

In sum, one can see the influence that Canada's political/security concerns had on the decision to terminate its nuclear cooperation with India. The Indian situation fits the thesis of this study that there was a gradual escalation in political/security concerns on Canada's part. In 1974, the government was still partially constrained by Canada's commercial

⁴⁰ Debates, (March 23, 1976): 12066. It is interesting to note that fifteen years later the debate still rages over whether Canada contributes to, or hinders, nuclear non-proliferation when it terminates nuclear assistance. This feeling was indicated to the author in interviews with both AECL and EMR officials.

⁴¹ The United States had supplied several light-water reactors to India, while the Soviet Union supplied India's heavy water after Canada terminated its supply.

⁴² Morrison and Wonder: 79.

interests, and this is why Canadian cooperation with India was only suspended following the Indian nuclear explosion. However, by 1976, Canada's commercial interests were not influential enough to prevent Ottawa from terminating the Indian relationship altogether.

Pakistan

India was not the only country with which Canada terminated its nuclear cooperation as part of its efforts to strengthen its nuclear non-proliferation policy; Canada also terminated cooperation with Pakistan. In announcing Canada's new non-proliferation policy on December 22, 1976, External Affairs Minister Don Jamieson stated that "for all practical purposes the nuclear co-operation between Canada and Pakistan is effectively at an end."⁴³ This announcement signalled the termination of two years of unsuccessful safeguards negotiations with Pakistan which had begun soon after the Indian nuclear explosion.

In examining Canada's decision to terminate its nuclear cooperation with Pakistan, one can clearly see the dominance of Canada's political/security concerns over its commercial interests. The Pakistan situation thus follows the pattern of the 1974-76 period; Canada's increased political/security preoccupations required renegotiation of all previous nuclear arrangements, and if strengthened nuclear safeguards were not achieved on Canadian-supplied items, then assistance was terminated. In fact, of all the

⁴³ Debates, (Dec 22, 1976): 2258.

developments examined in this chapter, commercial interests played the smallest role in the case of Pakistan.

Following India's nuclear explosion, there were concerns in Ottawa that the safeguards agreement that had been signed with Pakistan over the KANUPP reactor would not prevent Pakistan from following India's lead and exploding its own nuclear device. Part of the reason for Ottawa's concern was the public statements by Pakistani leaders in the aftermath of the Indian explosion. On May 19, 1974, Pakistan Prime Minister Ali Bhutto called the Indian explosion a "fateful development", a "threat" to Pakistan's security and said that "a more grave and serious event... has not taken place in the history of Pakistan. The explosion has introduced a qualitative change in the situation" between Pakistan and India. Bhutto also stated that Pakistan would not succumb to "nuclear blackmail", and that it would not accept Indian domination of the subcontinent or of the Kashmir situation. In closing, Bhutto asserted that Pakistan could never sign a non-war pact with India because of its recent nuclear explosion. Such a pact would mean capitulation on the part of Pakistan.⁴⁴ These inflammatory statements combined with the tragic history of Pakistani-Indian relations gave pause to the Canadian government.

In 1973, Canada had reached an agreement with Pakistan for the purchase of a fuel fabrication plant. A \$1.7 million interest-free loan for the \$3.5 million plant was to be supplied,

⁴⁴ Zalmay Khalilzad, "Pakistan: The Making of a Nuclear Power" Asian Survey (1976): 589.

but the Indian explosion of May 18, 1974 changed the situation.⁴⁵ In November of that year, Canada informed Pakistan that it would not negotiate a new fuel contract for the KANUPP reactor until a strengthened safeguards agreement which precluded PNEs was arranged. When Pakistan refused, Canada suspended shipments of spare parts for KANUPP and also the export of the fuel fabrication plant.⁴⁶

Negotiations between Canada and Pakistan continued throughout 1975, but a new and more serious issue then emerged: Pakistan's intention to purchase a French reprocessing plant. As in the South Korean case, Ottawa felt that a reprocessing plant was uneconomical for Pakistan, and that its real interest in acquiring the plant lay in its military applications. If the Canadian government was not already uneasy about Pakistan, the reprocessing deal with France certainly made it so.

In the negotiations, Ottawa's position was that: 1) it would have to retain not only its veto over KANUPP's spent fuel being reprocessed, but that veto would have to be extended to Pakistan's entire nuclear programme; 2) Pakistan would have to renounce the option of termination written into the original 1959 Nuclear Cooperation Agreement, and instead would have to accept whatever new safeguards were agreed upon throughout KANUPP's lifetime; and 3) yearly reviews, with IAEA participation, of the

⁴⁵ Hufbauer and Schott: 503.

⁴⁶ Hufbauer and Schott: 501.

nuclear safeguards arrangements between Pakistan and Canada would be required.⁴⁷

Pakistan agreed with the Canadian proposal for mandatory reviews of nuclear safeguards, since these would make the Agreement renegotiable and allow for new conditions each year. However, it was not prepared to renounce its option to terminate the 1959 agreement without an accompanying removal of Canada's veto over KANUPP fuel reprocessing. Further, Pakistan wanted assurances of continued supply of spare parts and fuel for KANUPP and of delivery of the fuel fabrication plant from Canada.⁴⁸

It appeared that Pakistan and Canada were at a deadlock in their safeguards negotiations, but there was hope that during Prime Minister Bhutto's visit to Canada in February 1976 an agreement could be reached. During his visit, Bhutto indicated that Pakistan would allow stronger safeguards on KANUPP, and conceded that Canada would have the right to terminate all bilateral assistance, even foreign aid, if Pakistan ever exploded a nuclear device.⁴⁹ However, he rejected all attempts to place safeguards on non-Canadian items. In particular, Pakistan would not allow Canadian safeguards on its proposed French reprocessing plant, nor on its proposed second reactor, the CHASMA.⁵⁰

⁴⁷ Azmi: 102.

⁴⁸ Azmi: 102.

⁴⁹ Azmi: 104.

⁵⁰ Hufbauer and Schott: 502.

On December 4, 1976 Canada presented Pakistan with an ultimatum in the form of three options:

- 1) Canada would provide fuel and other support services for the Canadian-made CANDU reactor at KANUPP for ten years and supply the fuel fabrication plant under two conditions --- Pakistan must not acquire the reprocessing plant from France and also improve the existing safeguards to ensure that material provided by Canada would be used only for peaceful purposes;
- 2) Canada would provide fuel for KANUPP for a period of five years if Pakistan insisted on acquiring the reprocessing plant but agreed to enhance existing safeguards. Canada would, in this case, reserve the right to prevent KANUPP's spent fuel from being reprocessed. (Under this option the fuel fabrication facility would not be shipped);
- 3) Canada would provide fuel for KANUPP for only two years if Pakistan acquired the reprocessing plant and also refused to grant Canada the desired veto over the reprocessing of Canadian-origin spent fuel, but agreed to more stringent safeguards. (Again, under this option the fuel fabrication facility would not be shipped)⁵¹

Pakistan was given only a week to decide, and on December 13, 1976, it informed Canada that it would: 1) give an "explicit assurance" that Pakistan would refrain from all nuclear explosions; 2) allow strengthened Canadian safeguards on all nuclear items of Canadian origin; and 3) allow all spent fuel from KANUPP, after reprocessing, to be under Canadian safeguards. However, Islamabad rejected Ottawa's demands for Canadian safeguards over Pakistan's entire nuclear programme, and that those safeguards remain in force throughout KANUPP's lifetime, even if Canada terminated its nuclear cooperation.⁵² Given Canada's strengthened position on nuclear non-

⁵¹ Azmi: 106.

⁵² Azmi: 111.

proliferation, it could not agree to Pakistan's proposals and on December 22, 1976 nuclear cooperation was terminated.

It was probably inevitable that Canada would terminate its nuclear cooperation with Pakistan following India's detonation of a nuclear device in May 1974. Given the rising importance of political/security concerns to Canada, it was unlikely that it would allow cooperation to continue with Pakistan without additional and stronger nuclear safeguards. It was also just as unlikely that Pakistan would allow new safeguards to be applied to its nuclear programme. As Morrison and Wonder point out, "it was inconceivable that Pakistan would bind itself with all-encompassing safeguards while India remained free to proceed along the nuclear weapons path."⁵³

Of all the cases that have been studied in this chapter, Canada's commercial interests played the least role in the Pakistan termination. It might be possible to argue that, as in the Indian situation, it was commercial interests that persuaded the Canadian government at least to negotiate with Pakistan for two years rather than terminate all cooperation in 1974. However, while there were economic benefits that could accrue from continued nuclear cooperation with Pakistan --- supplies of fuel and spare parts, the fuel fabrication facility, and the possibility of being the supplier for CHASMA --- these were not the main reason why Ottawa was prepared to go through the laborious process of attempting to negotiate new safeguards. The principal one, besides a possibly

⁵³ Morrison and Wonder: 79.

naive belief that Canada could convince Pakistan to accept strengthened nuclear safeguards, was that Pakistan had not broken any agreement, bilateral or otherwise, as was the case with India. Thus, Ottawa lacked clear grounds for terminating the Pakistani-Canadian nuclear cooperation agreements.

Indeed, Pakistan argued passionately that Canada's actions were not justified. Following Canada's decision to terminate nuclear cooperation, the Minister of State for Defence and Foreign Affairs, Aziz Ahmed, stated that the Canadian decision was "arbitrary" and constituted the "violation of its three bilateral agreement(s) for cooperation with Pakistan in peaceful uses of atomic energy." Ahmed also said that these agreements "envisaged termination of cooperation by Canada only if Pakistan were to violate its undertaking not to use Canadian supplies and assistance to further a military purpose." Finally, Ahmed pointed out that Pakistan had "scrupulously honoured" all of its nuclear arrangements with Canada, and that Canada's actions were "totally unwarranted".⁵⁴

Pakistan argued that it was being punished for India's crime. As the Pakistan Times editorialized, "Canada, betrayed by India and publicly acknowledging its inability to influence her... unaccountably sought to bill all that to Pakistan with interest."⁵⁵ Even, the Canadian government itself seemed to acknowledge that perhaps it was not entirely justified in terminating its nuclear

⁵⁴ Azmi: Appendix VII.

⁵⁵ Azmi: 97-98.

cooperation with Pakistan. External Affairs Minister Jamieson, in his December 22, 1976 announcement regarding safeguards policy stated:

With regard to retroactivity, the question becomes one of legality in terms of the contracts which are already in place and the like. It was not deemed by the Government of Canada to be in the best interests of the country to abrogate or in any way change contracts which in some instances had been entered into a long time ago with, of course, the exception of the Pakistan one.⁵⁶

In fact, despite this assertion by Jamieson, under its agreement with Pakistan, Canada did have the right to terminate its cooperation by giving Pakistan six months notice.⁵⁷ It thus appears to have been this need to give notice that led to Canada's attempts at bilateral negotiations.

However, to focus on whether or not the termination was legal would be to miss the central point. Canada's rationale for cancelling the agreement was its fear that Pakistan would develop a nuclear bomb in response to India's nuclear explosion and this illustrates the increasing impact of political/security concerns on Canada's nuclear reactor export policy. In effect, Canada terminated what had previously been a mutually beneficial arrangement because of fears of what Pakistan *might* do, not what it had done.

⁵⁶ Debates, (Dec 22, 1976): 2258.

⁵⁷ Canada Treaty Series. Agreement between Canada and Pakistan 1960 No. 14 (Ottawa: May 14, 1959): Article IV and VII.

Conclusion

The period 1974-76 saw a significant shift in Canada's nuclear reactor export policy. Prior to the May 1974 Indian nuclear explosion, there was a virtual equilibrium between Canada's commercial interests and its political/security concerns, but by December 1976, political/security preoccupations were clearly dominant. This shift did not happen immediately; rather there was an increasing focus on security issues over this period.

This shift in emphasis was apparent in the evolution of Canada's non-proliferation policy between December 1974 and December 1976. Moreover, not only did Canada strengthen its policy, it also made retroactive changes in its safeguards arrangements with countries where CANDU exports had already been concluded. Canada pressured both Argentina and South Korea into accepting more stringent nuclear safeguards on reactors that had been sold only months before the Indian explosion. Canada also attempted to strengthen nuclear safeguards on reactors it had previously sold to India and Pakistan, and when these countries refused, Canada terminated all of its nuclear cooperation. By taking these concrete steps to enforce its new non-proliferation policy, the Canadian government showed the increased importance attached to security concerns in its nuclear reactor export policy.

Canada's heightened concern with non-proliferation issues meant that its commercial interests were subservient during this period. By taking such a strong stand, Canada risked future reactor exports during a time when the domestic nuclear industry

desperately needed additional sales. Not only did Canada terminate cooperation with countries with which it had already established itself as a supplier, but due to its stringent safeguards policy, potential customers, like Iran, chose to look elsewhere. Moreover, Canada discouraged some countries, like Egypt (which up to then had not eliminated Canada as a potential nuclear supplier), from considering acquisition of the CANDU.⁵⁸ The Canadian government must have realized the negative economic consequences that its actions during the 1974-76 period would have on sales, but that did not deter it, for by December 1976, Ottawa had made a firm decision that commercial interests would be subordinate to political/security concerns when it came to nuclear reactor exports. The effects of this new Canadian policy were inevitably felt over the years 1977-1992.

⁵⁸ Morrison and Wonder: 75.

Chapter Six

Reconciling CANDU Exports with Stringent Nuclear Non-Proliferation Policies, 1977-1992

By the end of 1976, it was evident that Canada's security concerns over the threat of nuclear proliferation constituted its dominant foreign policy goal related to CANDU exports, overriding any commercial interests. The measures that Canada took in the 1974-76 period to strengthen its nuclear non-proliferation policy thus had a major impact in the 1977-92 period, obliging Canada to face the economic consequences of its unilateral actions during the preceding three years. Throughout this period, Canada had to confront the question of whether or not CANDU exports were compatible with a stringent nuclear non-proliferation policy.

From an exporter's point of view, Canada's 1976 non-proliferation policy was implemented at probably the worst possible time because, starting in the late 1970s and continuing throughout the 1980s, a worldwide recession occurred in reactor exports. This recession, which only started to recede at the beginning of the 1990s, was the result of the twin influences of supplier over-capacity and lower-than-expected electricity demand. The combination of the nuclear recession with Canada's nuclear non-proliferation policy resulted in few sales opportunities and even fewer actual sales.

The consequences of the lack of CANDU exports that Canada experienced in the 1977-92 period meant that the Canadian nuclear industry was on "life support systems" throughout these years. At several stages, the Canadian government had to make a conscious

decision whether to continue with a domestic nuclear industry.¹ It would not be overstating the case to declare that had exports not picked up at the end of this period, Ottawa would probably have pulled the plug on the Canadian nuclear industry.

However, while Canada did, indeed, pay a high economic price for its leadership on the issue of nuclear proliferation, by the 1990s success was at hand. Not only was the threat of nuclear proliferation at its lowest point ever, but CANDU sales were being concluded and additional export opportunities were emerging. Thus, the 1977-92 period can be seen as a time when Ottawa witnessed the Canadian nuclear industry suffering set-back after set-back, but in the end could feel, if not triumphant, at least satisfaction that its policies had been correct.

This chapter covers the resolution stage in the evolution of Canada's nuclear reactor export policy. It is the stage when it was accepted that commercial interests, no matter how consequential, would always be secondary to political/security concerns in the area of Canada's nuclear reactor export policy. The cases that are studied are: 1) the sale of five CANDUs to Romania in 1978-82 (Cernavoda 1-5); 2) the failure to sell a CANDU to Argentina in 1979 (Atucha II); 3) the inability to sell CANDUs to Japan, selected Arab countries, Mexico, Turkey, and Israel in the 1980s; 4) the sale of a CANDU to South Korea in 1990 (Wolsung II);

¹ The consequences of an insufficient number of CANDU exports was explained in Chapter 2, pp. 38-40.

and 5) Ottawa's decision to increase its nuclear commitment to Romania in 1991.

Attempting to Strengthen International Safeguards

Before examining the attempts at CANDU exports that occurred in this period, an assessment of the efforts made by the Canadian government to obtain an international consensus on a stringent nuclear non-proliferation policy must be undertaken. When Ottawa decided in December 1976 that it would unilaterally implement its nuclear non-proliferation policy regardless of any negative economic consequences, it also committed itself to raising the international standards of non-proliferation. Ottawa worked on a variety of multilateral fronts to try to get an international consensus on nuclear non-proliferation.

Canada's motivations for pursuing a uniform nuclear non-proliferation policy were twofold. The first was an honest belief that to fight the threat of nuclear proliferation a uniform standard of stringent nuclear safeguards was required. Second, the Canadian government wanted AECL to be able to compete on a "level playing field" with the other suppliers. Since Ottawa would not lessen its own safeguards requirements, it wanted to see the other suppliers increase theirs so that no supplier country could use watered-down nuclear safeguards as a selling point for its reactors. Canada campaigned for strengthened nuclear safeguards in three main international governmental organizations: the Nuclear Suppliers Group (NSG); the International Nuclear Fuel Cycle

Evaluation (INFCE); and the Committee on Assurances of Supplies (CAS).

The Nuclear Suppliers Group was formed in London in 1975 by the seven major nuclear supplier countries: Canada, the United States, Great Britain, Germany, France, the Soviet Union, and Japan.² In January 1978, after almost three years of negotiations, the NSG reached an agreement on guidelines to cover the members nuclear exports. The NSG Guidelines for Nuclear Transfers stated, inter alia, that:

- 1) "trigger list" items (all nuclear materials, certain other special materials such as heavy water and reactor-grade graphite, and equipment which is considered to be of particular importance in the nuclear fuel cycle from a non-proliferation perspective) should be exported only upon formal assurances from recipients which explicitly excluded uses which would result in any nuclear explosion;
- 2) "trigger list" items should be placed under effective physical protection;
- 3) "trigger list" items should only be exported when covered by IAEA safeguards;
- 4) the export of reprocessing, enrichment, or heavy water facilities or technology should require IAEA safeguards;
- 5) restraint should be exercised in the export of sensitive facilities and technology (reprocessing and enrichment) as well as for weapons-usable materials;
- 6) suppliers should receive assurances by the recipients over the possible future re-transfer of "trigger list" items.³

These guidelines, which augmented both the IAEA and the Non-Proliferation Treaty, were considered by Ottawa to be the

² The NSG was later expanded to include the Netherlands, Sweden, Switzerland, East Germany, Poland, Czechoslovakia, Italy, and Belgium. Australia, Luxembourg, Denmark, Greece, Ireland, Finland, Hungary, Bulgaria, and South Africa have also notified the IAEA that they would adhere to the Guidelines.

³ Nuclear Suppliers' Group Guidelines for Nuclear Transfers (September 21, 1977).

"high-point to date in international co-operation on the non-proliferation safeguards to be applied to nuclear exports by the major supplier nations."⁴ However, the NSG guidelines did contain two crucial weaknesses: 1) they did not require NPT or NPT-equivalent safeguards as a condition for exports as was required by the 1976 Canadian non-proliferation policy; and 2) the guidelines constituted only voluntary undertakings by the suppliers. In addition, as Joseph Pilat has noted, "there are differences in the manner in which the traditional supplier states implement their nuclear supply undertakings; these differences are deeply rooted and have resulted in divergent behaviour."⁵

The second multilateral organization that Canada worked with was the International Nuclear Fuel Cycle Evaluation. The INFCE was formed at the behest of US President Carter, and was mandated to devise methods of developing fuel cycles which would be resistant to weapons proliferation without restricting the use of nuclear energy. The INFCE was carried out between October 1977 and February 1980 with the participation of 46 countries and five international organizations. However, it failed to fulfil its primary objective because in its final report the INFCE recognized that "technical measures have a powerful influence on reducing the risk of theft, but only a limited influence on reducing the risk of

⁴ Nuclear Policy Review, Background Papers: 342.

⁵ Pilat, "The Major Suppliers": 41.

proliferation."⁶ In other words, nuclear proliferation was not a problem which could be solved by technical measures alone because a proliferation-free reactor was impossible to develop. Thus, any state which was politically motivated to acquire a nuclear weapons capability could do so if it either developed, or was furnished with, the appropriate nuclear technology.

The third multilateral organization was the Committee on Assurances of Supply which was formed by the IAEA following the conclusion of the INFCE. Operating from 1980 to 1987, the CAS was mandated to consider the ways and means by which supplies of nuclear materials, equipment, technology, and fuel could be assured on a more predictable and long-term basis. The goal was to reach a consensus between the importing and exporting countries on the conditions for nuclear co-operation. The CAS was an institutional response by Third World countries in particular to the formation of the NSG. The recipients of nuclear technology transfers were tired of the unpredictable nature of exports from the nuclear suppliers, especially Canada, and attempted to use the CAS to make nuclear co-operation more consistent. In the end, the CAS was unable to reconcile the differing viewpoints between suppliers and recipients on the issue of nuclear transactions. In its last report before what turned out to be a permanent suspension of talks in May 1987,

⁶ Organisation for Economic Co-operation and Development. Nuclear Energy Agency. Nuclear Legislation Series. The Regulation of Nuclear Trade: Non-Proliferation --- Supply --- Safety Volume I "International Aspects" (1988): 18.

the CAS "noted the impossibility of reaching agreement on the principles of international co-operation in the nuclear field."⁷

In sum, Canada made three serious attempts at strengthening international nuclear safeguards, and in all three cases fell short of its objectives. With the failure to create a uniform standard for reactor exports, with the exception of the NSG Guidelines, safeguards would only be strengthened on a supplier-by-supplier basis. However, for the majority of this period, only the United States, with its 1978 Nuclear Non-Proliferation Act, adopted safeguards which were as stringent as Ottawa desired. Thus, AECL had to compete for exports knowing that some suppliers would weaken their safeguards, if need be, to make a sale.

Canadian Studies and Decisions Regarding the Future of the Nuclear Industry

In addition to efforts taken on the multilateral front, there were several introspective examinations of the domestic Canadian nuclear industry, most of them undertaken by the Canadian government. Each resulted in Ottawa being faced with the option of assisting the industry by either lessening its safeguards requirements or increasing its subsidies, or allowing the industry to deteriorate to a level where it would no longer be able to compete. The studies and related government spending decisions included: 1) a report commissioned by the Canadian Nuclear Association (CNA) titled the Economic Impact of Nuclear Energy

⁷ The Regulation of Nuclear Trade: 87.

Industry in Canada in 1978; 2) the Nuclear Industry Review: Problems and Prospects 1981-2000 by Energy, Mines and Resources in 1982; 3) a 1985 decision by the federal government to curtail nuclear Research and Development (R & D) spending for five years; 4) an internal report on the future of the nuclear industry made by EMR in 1988; and 5) a 1990 decision by the federal government to increase nuclear R & D for seven years.

The first report, an economic study by Leonard and Partners for the CNA, was used to convince the federal government of the economic importance of the Canadian nuclear industry. It concluded that "Canada has developed a valuable asset and investment" in the CANDU reactor and that the return on governmental investment is "providing beneficial returns to Canada as a whole." The report warned that "existing industry capability and technology could be reduced [only] to the disadvantage of Canada." In its recommendations, the report emphasized that it was necessary to "export CANDU power stations" to maintain the reactor order level. This report, for the first time, systematically identified all of the economic benefits that accrue from the nuclear industry.⁸ Because the report was commissioned by the CNA, it represented the position of the CANDU lobby and therefore can be seen as articulating the economic arguments that this group regularly puts to the federal government.

The second report was a complete review of the nuclear industry by the Department of Energy, Mines and Resources in 1982.

⁸ Leonard and Partners Ltd: 26-28.

EMR's industry review emphasized the need for CANDU exports, but also saw fit to defend the government's non-proliferation policy. Confronting critics who had argued that the government's stringent non-proliferation policy had been the major factor in the lack of CANDU exports, the review pointed out that "with the possible exception of a second sale to Argentina, it is difficult to demonstrate that sales have been lost due to Canada's safeguards requirements." Instead, the review argued that "as more and more countries sign bilateral agreements with Canada, our non-proliferation policy is becoming more widely understood and accepted." If Ottawa weakened its non-proliferation policy, the review argued, "it is likely that the Canadian public would demand the termination of all nuclear exports." Thus, the review concluded that "significant modifications to nuclear safeguards policy should not be considered as an option."

The Nuclear Industry Review clearly illustrates the dilemma that existed for CANDU exports in this period. The commercial arguments for further CANDU exports were very convincing, but the political/security concerns over nuclear proliferation still dominated. As will be argued in the case studies that follow, the Review understated the damage done to CANDU exports by Canada's non-proliferation policy. However, even if the Review had recognized the true extent of the damage, it would still have come to the same conclusion: no lessening of nuclear safeguards. Thus, the Nuclear Industry Review is clear

* Problems and Prospects: 50.

evidence of the continuing dominance of political/security concerns over economic in the Canadian nuclear reactor export programme during the period 1977-92.

Despite the importance attached to nuclear exports in the above two reports, in its May 1985 budget, the newly-formed Progressive Conservative government announced that over a five-year period it would gradually reduce by \$100 million the level of parliamentary appropriations to AECL for nuclear R & D. In 1984, parliamentary appropriations to nuclear R & D stood at \$184.4 million, 87% of total R & D expenditures by AECL. By 1990, parliamentary appropriations had been reduced to \$154 million, and this amount constituted only 53% of the R & D total¹⁰ (for additional information on nuclear R & D spending see Figure 2.6).

The 1985 decision reflected the diminishing influence that commercial interests had on the Canadian government's nuclear policy. By cutting R & D, the life-line of the nuclear industry, Ottawa was indicating that maintaining a domestic nuclear industry that could not export its product was not worth the cost. It was obvious that the Canadian government did not consider that the benefits of the industry justified a continuing high level of government subsidy.

In response to the 1985 nuclear R & D reductions, EMR produced a study which once again spelled out the benefits of a nuclear industry, but also highlighted the costs that would befall Canada if its nuclear industry disappeared. EMR asserted that

¹⁰ AECL Annual Reports 1983-84 to 1990-91.

"while Canada could, in theory, do without the Candu, it is much better off in practice to retain this option."¹¹ Thus, EMR produced a paper which was designed to nudge the government towards action that would ensure the survival of the nuclear programme until such time as the export market improved.

AECL and the Future of the Canadian Nuclear Industry's major component was a plea for increased nuclear R & D spending. The study noted that Canada's R & D efforts had been "remarkably cost-effective" when compared to other nuclear suppliers (see Figure 6.1 for R & D comparisons amongst G7 countries). In addition, EMR argued that importing LWRs (which was the alternative to maintaining a domestic nuclear programme) would not eliminate "the need for R & D spending."¹² Finally, in its recommendations to secure the survival of the Canadian nuclear industry, EMR stated that the government must "ensure that the R & D program is maintained at a level which retains confidence of present and prospective Candu customers." EMR suggested that a turn around in the market for the CANDU was right around the corner and that the federal government had to make a strong commitment at that time in the form of increased R & D spending and "direct federal risk-sharing" to ensure that AECL was ready when that time came.¹³

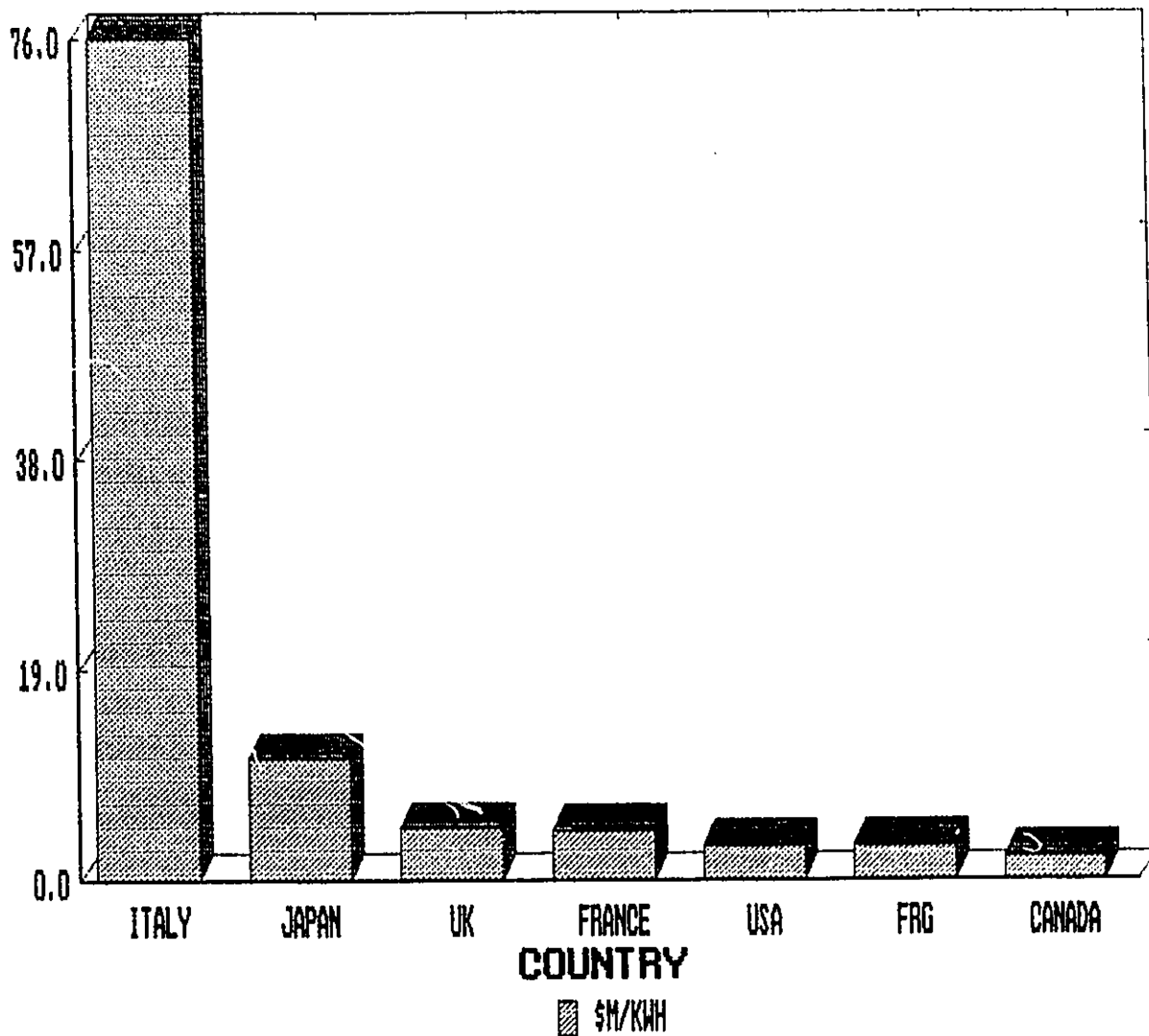
¹¹ Energy, Mines and Resources. AECL and the Future of the Canadian Nuclear Industry: A Proposed Discussion Paper (1988): 4.

¹² Future of the Canadian Nuclear Industry: 56-57.

¹³ Future of the Canadian Nuclear Industry: 97-8.

COST PER UNIT NUCLEAR ELECTRICITY

FIGURE 6.1
R & D RATIOS FOR G7 COUNTRIES (1986)



SOURCE: Compiled from data in Energy, Mines and Resources, AECL and the Future of the Canadian Nuclear Industry: A Proposed Discussion Paper (1988): 57.

The EMR study in part led to the government's 1990 decision to increase R & D spending. The 1990 initiative entailed a seven year plan of increased funds for nuclear R & D, provided by a consortium of governments and government agencies, including the federal government, Ontario Hydro, Quebec and New Brunswick. In total, the increased funding would result in an additional \$66 million annually for nuclear R & D.¹⁴ It was assumed by members of the nuclear industry that this was a seven year trial period, and if no new sales emerged, in particular foreign sales, then the programme would be terminated.¹⁵

The ability of AECL to reacquire substantial nuclear R & D investments shows that by 1990 the commercial objective of exporting nuclear reactors and technology was again beginning to assert itself. In the 1985 decision, it appeared that the federal government could accept the loss of the domestic nuclear industry, but the 1990 decision is evidence of a reversal in thinking.

The purpose of examining these government reports and decisions is to show the struggle for survival that the Canadian nuclear industry went through during this period. It is clear that up to 1990, the government's security preoccupations and declining support of research and development did not facilitate marketing success. By 1990, however, the prospects for exports had brightened and with Canada's concerns about proliferation diminishing, the

¹⁴ The federal government would provide \$31.1 million, Ontario Hydro \$30 million, Quebec \$3 million, and New Brunswick \$1 million. Energy, Mines and Resources, News Release (March 30, 1990): 1.

¹⁵ Interview by the author with EMR official, June 1992.

circumstances were now right for a renewed emphasis on economic objectives, as reflected in increased R & D spending by Ottawa and other government agencies.

Romania Cernavoda 1-5 1978-82

Canada had been negotiating with Romania since the 1960s for a CANDU sale. However, nothing came out of these early discussions, except establishing contacts with Romanian nuclear officials. In 1975, however, Romania approached AECL to purchase a 600 Mwe CANDU. Instead of a turnkey project as had been discussed earlier, it wanted AECL to provide a licensing and service agreement while Romania would handle the project management function by itself.¹⁶

The first step, a nuclear co-operation agreement with Romania, which was a party to the NPT, was signed in 1977.¹⁷ Within the non-proliferation framework established by the safeguards agreement, AECL signed three agreements with the Romanian foreign trade office ROMENERGO, in December 1978: a licensing agreement which allowed ROMENERGO to build between one to four CANDU reactors, with a "significant amount of components and services being provided by Canadian industry"; an engineering services agreement which saw AECL provide ROMENERGO with design information for a CANDU, modified to meet Romania's electrical grid; and a

¹⁶ Nuclear Policy Review, Background Papers: 267.

¹⁷ Canada Treaty Series. Agreement between Canada and the Socialist Republic of Romania 1978 No. 10 (Ottawa: June 14, 1978).

procurement agreement under which AECL agreed to act as ROMENERGO's agent for the purchasing of components for the reactor.¹⁸ Export Development Corporation financing was also a major component of this transaction, with a \$860 million loan for the first reactor arranged in 1978 (for full financing information of the Romanian CANDU programme see Figure 6.2). In August 1981, Romania decided to build a second CANDU, and eventually five CANDUs, each with varied amounts of Canadian content, were envisaged under the Canada-Romania cooperation programme.

Figure 6.2

Federal Financing of Romanian CANDU Programme
(in \$millions)

1978	860
1979	1,003.3
<u>1991</u>	<u>315</u>
Total	2178.3

SOURCE: For the 1978 and 1979 loans, the data are from Export Development Corporation's Annual Reports 1974-79. For the 1991 EDC loan, the information is from Government of Canada News Release No. 199 (Sept 17, 1991).

In addition to the general economic arguments for concluding exports that were set out in Chapter Two, there was one additional commercial factor which made the Romanian sale attractive. In this case, the CANDU sale was being made without the use of sales agents who had been an integral part of the earlier South Korean and Argentine transactions. That was important because AECL wanted to prove to the Canadian government that it could

¹⁸ Nuclear Policy Review, Background Papers: 345.

produce a CANDU export that was "clean", i.e. that did not rely on the sometimes unethical practices of agents.¹⁹

At the same time, there were three political/security concerns which were raised over the Romanian transaction. First, was the undesirability of transferring sensitive nuclear technology to a Warsaw Pact country. Observers wondered why Romania, when it decided to construct a nuclear reactor, ignored its Soviet ally, which had its own nuclear industry and which had already exported reactors to all of the other Eastern European countries. There were, in other words, questions about the ulterior motives of the Romanian government, which had previously tried to operate its economy free of foreign interference in committing "itself to Canadian technology on such an essential part of its economy." In short, would Canada be aiding Soviet attempts at nuclear espionage with a CANDU export to Romania? Second, Flora Macdonald, then external affairs critic for the Progressive Conservatives, pointed out that Romania was dominated by the Soviet Union, which had refused IAEA inspections, despite the fact that it had signed the NPT. Macdonald suggested that Romania would also refuse inspections on its nuclear facilities.²⁰ Finally, there were concerns that Romania might sell CANDUs to undesirable countries. Critics pointed out that:

Romania has a long history of trading without regard to morality: its economic partners include dictatorships of all political stripes, including the Shah of Iran,

¹⁹ The Globe and Mail (July 29, 1978): B3.

²⁰ Morrison and Wonder: 83.

Saddam Hussain of Syria [sic], and Kaddafi of Libya --- all oil suppliers.²¹

However, Ottawa discounted these political/security risks for two reasons. First, Romania had signed the NPT and had agreed to IAEA safeguards. It was noted that the USSR was not required to allow IAEA inspections under the NPT because it was an NWS, but Romania was an NNWS and therefore it had to allow inspections. Further, in the Canada-Romania nuclear co-operation agreement, both sides had agreed to IAEA inspections as well as to a "prior written agreement" from both countries before re-transfers could be completed.²² Thus, Canada felt that it had written guarantees from Romania which addressed all possible security concerns.

Second, in addition to these written guarantees, Canada was confident that the USSR would act as a constraint on Romania. While the USSR would not allow inspections of its facilities (its right as an NWS), it, nevertheless, enforced strict nuclear safeguards requirements on its Eastern European allies. As Minister of External Affairs, Don Jamieson, pointed out:

Romania is clearly within the Soviet orbit, certainly a country in a sense that is involved, if I can use appropriate language, in terms of the Soviet influence. ... In other words, it is not very likely --- if I can be diplomatic about it --- that there would be any development of nuclear weapons in a country such as Romania.²³

²¹ Wally Keeler, "Canada's CANDU Sale to Romania" Peace Magazine (June/July 1989): 8-9.

²² Agreement between Canada and Romania: Articles III and IV.

²³ Morrison and Wonder: 83.

There were also political considerations which facilitated the CANDU export to Romania. The first of these was Canada's belief at the time in "peaceful coexistence" with the Soviet bloc. This attitude was much stronger in Canada than in its principal ally, the United States. From a Canadian perspective, to make such an important technological link between countries of NATO and the Warsaw Pact as engaging in nuclear cooperation would help bridge the distance between the two blocs. The second factor was the nature of Romania's foreign policy and of President Nicolae Ceausescu himself. Ceausescu was considered the "maverick" of Eastern Europe because of his attempts at creating an independent foreign policy for Romania. Events such as establishing diplomatic relations with West Germany in April 1967 and refusing to join in the USSR's invasion of Czechoslovakia in 1968 made Ceausescu the "darling" of the West. In later years, this image was reinforced by Romania's condemnation of the USSR's invasion of Afghanistan and by its violation of the Soviet-led boycott of the 1984 Olympics in Los Angeles. Thus, Ottawa felt that Romania was different from the rest of Eastern Europe. In fact, there was an element in External Affairs which thought that Romania could be turned into another Yugoslavia, an independent communist country, and cooperating with it in the nuclear domain was thus seen as one way of achieving this objective.²⁴

In sum, commercial interests influenced the Canadian government to complete the CANDU sale with Romania while political/

²⁴ Interview by the author with DEA officials, July 1992.

security concerns did not constrain the Canadian government. It felt that the possible risks of nuclear proliferation had been addressed by explicit guarantees from Romania and the implicit understanding that the USSR would ensure that the CANDU would be used for peaceful purposes only.

Argentina Atucha II 1979

Although the Romanian case appeared to suggest that CANDU exports could be reconciled with a stringent nuclear non-proliferation policy, other events soon suggested that Canada's commercial interest in nuclear exports and security interests in avoiding proliferation were incompatible. The prime example of this, and the only case where even the Canadian government openly acknowledged that it lost a sale due to its safeguards requirements, was the deal to provide Argentina with the Atucha II reactor in 1979. AECL, despite having the better bid, lost the contract to build Atucha II to the West German firm, Kraftwerk Union. In addition it also lost the contract to build a heavy water plant to KWU's partner, Sulzer, of Switzerland. It has been determined that Canada lost this contract due to Argentina's unhappiness over Canada's retroactive strengthening of safeguards on the Embalse reactor (see Chapter 5) and because West Germany's nuclear safeguards requirements were not as stringent.

Canada did have important commercial interests in concluding a second CANDU sale with Argentina. In addition to the normal benefits of reactor exports, there were four immediate

commercial gains which would occur if the Atucha II sale could be made: 1) contracts to supply Argentina with between three and four reactors valued at over \$300 million a piece; 2) sale of a \$300 million heavy-water plant; 3) potential sale of a natural uranium fuel fabrication plant; and 4) the possibility of sales in uranium mining and exploration technology and equipment.²⁵

An additional commercial consideration was that in 1978 two major reports came out with critical comments on the future of the Canadian nuclear industry. The first, the Ontario government's Porter Report on electric power planning, suggested that Ontario cut back on building nuclear reactors.²⁶ Since Ontario was the largest domestic purchaser of nuclear reactors, this was devastating news to the industry. The second, the Federal Task Force on Canadian Nuclear Export Marketing, warned that "if no new orders are obtained, which is probable... thousands of jobs will be lost."²⁷ These two reports gave added economic incentive to conclude the Atucha II deal.

However, the Canadian government still possessed significant political/security concerns with respect to nuclear cooperation with the Argentine government. In addition to the general security preoccupations outlined in earlier chapters, two additional developments had emerged which gave Ottawa some anxiety.

²⁵ The Globe and Mail (Aug 30, 1979): B1.

²⁶ See Government of Ontario. Royal Commission on Electric Power Planning. A Race against Time: Interim Report on Nuclear Power in Ontario (1978).

²⁷ Toronto Star (Dec 16, 1978): C5.

The first was the success of the military coup in Argentina in March 1976. Although this effectively ended the civil war in Argentina, it meant that a military junta was now in control of Argentina's nuclear programme. The military had always maintained an inordinate amount of influence over Argentina's nuclear programme, but now there was no political counter-balance. As Maclean's asked, following the 1976 coup, "who are the people behind this bloody self-destruction, who many believe capable of making a nuclear explosive if they could obtain the needed material from a reactor?"²⁸

The military coup also led Ottawa to contemplate a second concern: human rights. From 1976 through to 1983, when democracy again returned to Argentina, the military cracked down on left wing groups using methods such as arrests, torture, killings, and, perhaps the most insidious method, "disappearances".²⁹ Responding to the stories of human rights violations in Argentina, an interest group called No CANDU for Argentina formed. No CANDU was an umbrella group which had the support of over fifty individual organizations, such as the Canadian Labour Congress, seven provincial federations of labour, the major unions in Canada's nuclear industry, the Latin American Working Group, the Group for the Defence of Civil Rights in Argentina, a number of church groups, and the New Democratic Party. This committee, which was

²⁸ Maclean's (Oct 4, 1976): 61-62.

²⁹ For additional information on human rights violations in Argentina during the 1970s see Amnesty International, Argentina: The Military Juntas and Human Rights (London, 1987).

formed in the summer of 1977, called for the halt of all exports of Canadian nuclear technology and equipment to the Argentine military junta of General Jorge Videla. No CANDU was formed on the premise that "Canada is selling a potential weapon of mass destruction to a regime that represses, tortures, and murders its own citizens."³⁰ Thus, a new political/security concern was starting to emerge in relation to Canada's nuclear reactor export policy: the human rights record of the purchasing country.

Although human rights was only just starting to emerge as an issue in Canadian foreign policy at this time, it did have an influential supporter in the new External Affairs Minister, Flora MacDonald. Macdonald, in her first address to the United Nations on September 25, 1979, singled out Argentina as a human rights violator, stating that "we are pleased to note the investigation now under way by the Inter-American Human Rights Commission into the situation in Argentina."³¹

There was also an additional political consideration facing the Canadian government. The election of the Progressive Conservatives in 1979 meant that P.C. MPs had to reconcile their harsh rhetoric from their time in opposition with the greater demands of being in power. The Conservatives had been extremely vocal in their opposition to past nuclear exports in general and to

³⁰ Bob Carty, "No CANDU for Argentina" New Internationalist 6 (March 1978): 27.

³¹ Secretary of State for External Affairs Flora MacDonald, "An Examination of Conscience at the United Nations" Statements and Speeches (Sept 25, 1979): 3.

Argentina in particular. A typical statement against the earlier Embalse sale to Argentina that emanated from Conservative opposition benches was:

We have supplied a reactor to Argentina, one of the most unstable countries in the world, and I want to debate this point as a moral issue and not as a commercial one. It is interesting to note that we not only supplied a reactor to Argentina but we did it at enormous cost to Canadian taxpayers.³²

Thus, the P.C. government must have felt constrained by its reaction to the earlier Embalse sale when it came to consider a second CANDU export.

The Atucha II case was precedent-setting in Canada's nuclear reactor export policy because it was a critical test of whether or not Canada would weaken its safeguards requirements made in 1976 if that were crucial to concluding a sale. Illustrating the conflict that Ottawa felt over the Atucha II case was the division which emerged inside of the Progressive Conservative cabinet between "those who wanted to put the reactor on the next plane and never ask for payment, and those who didn't want to sell it at all, even if they paid us in advance, in gold."³³ Those ministers who were against the sale were: External Affairs Minister Flora MacDonald, Communications Minister David MacDonald, and Health and

³² Debates (Oct 26, 1976): 475.

³³ Toronto Star (Oct 4, 1979): A10. Division over Atucha II also existed inside of the Department of External Affairs between the Minister, Flora MacDonald, and the Under-Secretary of State, Allan Gotlieb. "MacDonald opposed the reactor sale, but Gotlieb, who sympathized with her revulsion of an odious regime, nonetheless believed that Canada had committed itself to a deal." J.L. Granatstein and Robert Bothwell, Pirouette: Pierre Trudeau and Canadian Foreign Policy (Toronto, 1990): 209.

Welfare Minister David Crombie. Of these three, only the two MacDonalDs were part of Prime Minister Joe Clark's "inner" Cabinet. Those ministers who were in favour of giving approval for the sale were: Minister of Industry, Trade and Commerce and Minister of State for Economic Development Robert de Cotret and International Trade Minister Michael Wilson. Only de Cotret was a member of the "inner" Cabinet. Prime Minister Clark was relatively silent on the issue, waiting instead for the Cabinet to reach a consensus.²⁴

In the end, the Canadian government decided that it would continue to try to obtain the Atucha II contract, but it would not weaken its nuclear non-proliferation policy; Argentina would still be required to accept "full-scope" safeguards. This illustrates the dominant influence that political/security concerns maintained on the government because it refused to reduce its non-proliferation requirements despite the economic necessity of making the sale. However, the government still went ahead with the Argentine negotiations even though it would have been justified in not attempting a sale for political reasons that went beyond ensuring that satisfactory safeguards were in place.

With respect to the safeguards negotiations, Ottawa knew that its position on non-proliferation would probably cost it the Atucha II project due to Argentina's repeated vows that it would not be pressured into signing the NPT. Carlos Castro Madero, the head of the Argentine Nuclear Energy Commission (CNEA), stated that:

²⁴ Warner Troyer, 200 Days: Joe Clark in Power (Toronto, 1980): 114-115.

the Canadian government is prohibiting the export of technology to Argentina because we have not signed the Nuclear Non-Proliferation Treaty. We have not signed the NPT because it's discriminatory. It does not treat all states fairly. We fully support the NPT effort, but disagree with the fairness of the treaty.³⁵

Given the position of Buenos Aires, it was really no surprise when it selected KWU's bid for Atucha II, despite the fact that AECL's bid was 30% lower.³⁶ Argentina listed two official reasons for its rejection of the Canadian bid. First, Argentina was disappointed with Canada's construction on the Embalse reactor. As Madero asserted, the Embalse reactor was:

originally slated for completion by 1980, its start-up has since been pushed back to 1982 at a swollen cost of about \$1 billion after a succession of contract negotiations... In contrast, the German KWU built the Atucha I project in six years at the price specified in the contract.³⁷

Second, Argentina wanted to maintain competition among all potential nuclear suppliers. More specifically, Argentina did not want its reactor and heavy water plant to be supplied by the same country, as Canada was pressing for, but, rather, it wanted to be able to split the contracts, something that the joint German-Swiss bid allowed.³⁸

³⁵ The Financial Post (Jan 21, 1978): 11.

³⁶ Canada's bid was \$1.075 billion, while West Germany's was \$1.579 billion. The Globe and Mail (Oct 4, 1979): A1.

³⁷ Maclean's (Oct 15, 1979): 45.

³⁸ William Courtney, "Nuclear Choices for Friendly Rivals" in Joseph A. Yager ed, Nonproliferation and U.S. Foreign Policy (Washington, 1980): 248.

However, despite these official reasons for rejecting the Canadian bid, a consensus has emerged that Argentina turned to West Germany to supply Atucha II principally because of apprehensions over Canada's non-proliferation policy. Argentina considered Canada to be an unreliable nuclear supplier after Ottawa successfully pressed to reopen the safeguards agreement on Embalse. There was additional concern in Buenos Aires that, given the division that existed inside the P.C. cabinet over the issue of nuclear safeguards, Ottawa might again seek to strengthen safeguards once Atucha II was signed. The Canadian government attempted to reassure Argentina that it would operate in good faith, even sending International Trade Minister Wilson to Buenos Aires at the eleventh hour to calm Argentine concerns. However, even this attempt backfired on Ottawa because at the same time that Wilson was coaxing the Argentine generals, External Affairs Minister Flora MacDonald was giving her speech in the United Nations, a speech where not only did she single out Argentina for human rights violations, but spoke out on nuclear non-proliferation, stating that:

We demand that stringent safeguards be applied to countries buying Canadian nuclear power facilities or materials... We want to ensure that the continued recourse to nuclear power is undertaken in the most stringent conditions possible, guaranteeing against any non-peaceful use.³⁹

Members of Canada's nuclear industry also charged that the loss of the Atucha II contract was due to government waffling over the issue of nuclear safeguards since the 1974 Indian

³⁹ MacDonald: 5.

explosion. Ross Campbell, Vice-President of AECL for CANDU, asserted that "Argentina was so nervous about the indecision of successive governments here they felt they could not put the monopoly in Canada's hand... Through our own indecision we have created a competitor that wasn't there before."⁴⁰

In addition to the concerns that Argentina had over potential shifts in Canada's policy, it also desired to acquire Atucha II under less-stringent safeguards than what Ottawa demanded. CNEA Chairman Madero was worried that Canada's full-scope safeguards requirements would affect "Argentina's capacity to develop an independent program with a minimum of possibilities of outside interference."⁴¹ Since the German requirements only pertained to the Atucha II reactor itself rather than Argentina's entire nuclear programme, as Canada wanted, the former's safeguards were less stringent than those of Canada.

In sum, the Atucha II case is a very good example of the two competing foreign policy objectives at work. In the end, Canada's political/security concerns were the dominant influence in its negotiations over the Atucha II reactor sale, as Canada maintained its requirement of full-scope safeguards. However, there were also clear signs that commercial incentives played a significant role in this case, especially since Ottawa was willing to proceed with negotiations even though it had good political reasons related to the nature of the Argentine regime and its human

⁴⁰ Winnipeg Free Press (Oct 2, 1979): 1.

⁴¹ Courtney: 249.

rights violations for not attempting at all to consummate a deal. Canada's apparent ambivalence about the Atucha II transaction meant that it communicated conflicting signals. Since Canada was willing to negotiate, Argentina had reason to believe that Canada's non-proliferation policy might not be concrete and could be weakened at any time. On the other hand, there was also the risk that Canada might seek to strengthen the safeguards after the sale as it had done in the past. Given this uncertainty, in the end the Argentines deemed Canada unreliable and chose to award the contract to West Germany. The nuclear industry, as well as some Cabinet members, pressed for a weakening of Canada's non-proliferation policy to obtain the Atucha II sale, but in the end Canada's commitment to full-scope safeguards remained.

Export Failures in the 1980s

After Canada's mixed record of sales in the late 1970s --- a sale to Romania, but a failure in the case of Argentina --- several attempts were made in the 1980s to export the CANDU. Canada pursued a variety of countries in order to conclude a sale, but was unsuccessful throughout the 1980s. In some cases, it was the inability of the purchasing country to come up with the funds needed for a CANDU, but in other cases Canada's political/security concerns were a significant factor in the loss of the sale. The cases during this period were: 1) Japan; 2) selected Arab countries; 3) Mexico; 4) Turkey; and 5) Israel.

Canada's first significant export defeat was its attempt to produce a sale to Japan in 1979. Canada had placed a great deal of emphasis on obtaining a CANDU sale to Japan because, for a variety of reasons, it is a very attractive market. Japan is an economic powerhouse; very influential with other Pacific Rim countries; the only industrialized country that will import reactors; and a firm believer in the benefits of nuclear power, with over 27% of all its electricity generated by nuclear energy.⁴²

In addition to the economic attractiveness of Japan, the Canadian government also had no proliferation concerns with this country. Japan is a signatory of the NPT and has agreed to full-scope safeguards. Moreover, Japan has been at the forefront of the international campaign against nuclear weapons. Since Japan is the only country to experience the military application of the atom, it has a unique moral authority to ensure that nuclear power remains peaceful. In fact, the Japanese constitution specifically prevents any application of nuclear power for military purposes. Thus, it can be concluded that Japan is probably the least likely of all countries to utilize nuclear power for military ends. It is thus ironic that it was Canada's implementation of its non-proliferation policy that played an important role in Japan's decision not to purchase a CANDU.

⁴² World Nuclear Industry Handbook 1992: 15.

Although Canada has engaged in nuclear co-operation with Japan since 1959⁴³ and there were sporadic attempts at making a sale from the mid-1960s onward, Canada undertook a serious marketing effort only in the mid-1970s. Included in this effort were state visits by both Prime Ministers Trudeau and Clark to flog reactors to the Japanese. Unfortunately, the CANDU became a victim of internal battles inside Japan's bureaucratic political structure. The Japanese Ministry of International Trade and Industry (MITI) and the semi-governmental Electric Power Development Company favoured the purchase of the CANDU, while the Japanese Atomic Energy Commission (JAEC) and the Science and Technology Agency suggested that, instead, Japan should continue developing its domestic FUGEN reactor. A decision was made in August 1979, when the JAEC ruled that "at the present stage, it is difficult to find positive reasons for introducing the CANDU reactor." In an attempt at softening the blow, the report added that "should the situation change, calling for a review of Japan's nuclear reactor development line, we would at that point reconsider the situation including the CANDU reactor."⁴⁴

In assessing Japan's decision, Mike Donnelly has noted that "the fundamental explanation surely is that CANDU does not fit easily into the country's over-all nuclear strategy, which aims at

⁴³ Canada Treaty Series. Agreement and Exchange of Notes between Canada and Japan 1960 No. 15 (Ottawa: July 2, 1959).

⁴⁴ Donnelly: 18. For more information on the Canada-Japan CANDU negotiations see Langdon: 110-115.

maximum self-sufficiency and national autonomy."⁴⁵ However, a second factor emerged which gave CANDU critics in Japan a crucial advantage in the bureaucratic in-fighting that occurred. That second factor was the unilateral implementation of Canada's non-proliferation policy in 1977-78. Japanese opponents of the CANDU option point to Canada's safeguards policies, alleging that "Canada is not always a totally reliable partner, citing export policies, which have sometimes been arbitrary, erratic and, on occasion, subject to change without prior notice."⁴⁶ The incident which most damaged Canada's reputation was the temporary suspension of uranium shipments to Japan following the Indian explosion of 1974.

On January 1, 1977, Canada suspended uranium shipments to Japan as well as to the European Community, pending renegotiation of all safeguards arrangements with these countries, in particular nuclear reprocessing guarantees. Although there might have been some justification for this action with respect to the EC countries (in particular, Ottawa wanted guarantees from France that it would not use uranium of Canadian origin as part of its military programme), there was no logical justification for the suspension of uranium shipments to Japan. Even "Canadian officials admitted that they knew Japan had no intention or likelihood of engaging in a weapons program, but the sanction was levied anyway."⁴⁷ Further, the ban occurred just after Prime Minister Trudeau had signed a

⁴⁵ Donnelly: 21.

⁴⁶ Donnelly: 20-21.

⁴⁷ Langdon: 110.

Framework for Economic Co-operation agreement with the Japanese, souring relations at the very moment when Canada was seeking closer economic ties.⁴⁸ The situation was eventually resolved, and uranium shipments were resumed in January 1978 after a new bilateral nuclear safeguards agreement was reached.

In sum, it is apparent that Canada's implementation of its non-proliferation policy was a significant factor leading to the Japanese decision not to purchase a CANDU. Canada could doubtless have reached a safeguards agreement with Japan without going to the extreme measure of a unilateral suspension of the uranium trade. While that move did show the importance that nuclear non-proliferation issues now had in Ottawa, the effect of its seemingly irrational action was to undermine efforts at exporting the CANDU to Japan. Canada's exaggerated political/security concerns in this instance led to the loss of what could have been the most commercially beneficial CANDU export ever.

A second area in which Canada was starting to show interest during the 1980s was the Middle East. In early 1982, Energy Minister Marc Lalonde discussed the possibility of selling CANDU reactors to Kuwait and Saudi Arabia. This denoted a potential shift in Canada's non-proliferation policy because, at the time, neither country was a signatory of the NPT. Although Canada later maintained that the discussions were conditional on the acceptance of full-scope safeguards, as Walker and Lonroth point out, "the mere fact that the discussions were held" was "a departure from the

⁴⁸ Langdon: 109-110.

former practice of regarding the Middle East as a 'no-go area' for Canadian nuclear exports."⁴⁹ As stated earlier in Chapter Five, in 1975 the Canadian cabinet placed a blanket prohibition on all CANDU sales to the Middle East, but the Lalonde visit indicated that a revision of this policy had taken place to allow for country-by-country negotiations.

Although Canada failed to convince Kuwait and Saudi Arabia to purchase nuclear reactors, by attempting to do so it raised questions about Ottawa's commitment to its non-proliferation policy. Why was Canada initiating discussions with countries which were bound to insist on the alteration of elements of Canada's non-proliferation policy if cooperation agreements were to be successfully concluded? Why would Kuwait or Saudi Arabia, the two largest oil exporters in the world, need peaceful nuclear reactors? Why was Canada pursuing sales in the volatile Middle East region at all? Even though these negotiations did not progress, the fact that they even took place demonstrates the continuing presence of economic considerations in Canadian reactor export policy at the time when security concerns related to proliferation were at their apex.

In the end, the only Middle Eastern country with which Canada signed a nuclear co-operation agreement, which is a necessary precursor for exports, was Egypt.⁵⁰ By completing a co-

⁴⁹ Walker and Lonroth: 151.

⁵⁰ Canada Treaty Series. Agreement between Canada and the Arab Republic of Egypt 1982 No.6 (Ottawa: May 17, 1982).

operation agreement with that country in 1982, Canada was acknowledging that the security risks with Egypt had largely disappeared. Egypt is a signatory of the NPT and would accept full-scope safeguards on any nuclear supplies from Canada or other countries. Moreover, as a result of the 1979 Camp David Peace Treaty with Israel, Egypt had become the only Arab country which did not have a significant motivation for developing nuclear weapons. Although no CANDU sale has come out of Canada's agreement with Egypt, this has been due to Egypt's financial difficulties rather than any security concerns on Canada's part.

In sum, Canada's dealings with the Middle East in 1982 illustrate the commercial necessity facing Canada to produce a CANDU export. These pressures forced Canada to revise a previous policy which banned all nuclear exports to the Middle East, but were not strong enough to lead Canada to lessen its full-scope safeguards requirements. In the end, by completing an agreement only with Egypt --- the sole Arab country to meet all of Canada's requirements --- Canada signalled that its political/security considerations remained the dominant influence over its reactor export policy.

A third market to which Canada attempted to export a reactor was Mexico. Canada had lost two earlier contracts in Mexico to the United States in 1975, but was hopeful of a Mexican sale by 1982. Mexico was considered to be a perfect country to export to for various reasons: it was a Third World country with an industrial infrastructure that was capable of handling nuclear

power; Canada had a chance to compete fairly against the other nuclear suppliers; and Ottawa had no political/security concerns about concluding a sale. Not only was Mexico a signatory of the NPT and would agree to full-scope safeguards, but it was not likely to become engaged in conflict with any regional rivals. In addition, Ottawa considered Mexico to be a stable and democratic country, albeit only when compared with the standard set by other Third World countries.

Since Mexico was such an attractive market both economically and politically, the Canadian nuclear industry put together an expanded marketing plan to gain the sale. AECL, in partnership with the nuclear components firms, "launched a full scale marketing effort" which was "equivalent to that of its most serious competitors." AECL was also aided by the Canadian government which "supported the efforts through the full cooperation of its embassy and through several visits of senior Cabinet ministers and by the Prime Minister."⁵¹ Indeed, when Prime Minister Trudeau visited Mexico City in January 1982, he tried to link CANDU exports to expanded trade relations generally between the two countries.

In addition to AECL's marketing efforts, Ottawa came up with financial inducements. A \$6 billion loan was proposed, with the Export Development Corporation supplying \$1.5 billion, and with Canadian government revenues, funnelled through the EDC, adding an additional \$4 billion. At the time, Canadian interest rates were at

⁵¹ Problems and Prospects: 28.

16%, while the loan to Mexico would be at rates between 7-8%. As The Globe and Mail noted, "the difference between borrowing and lending costs represents the subsidy Canada is prepared to make to sell nuclear reactors to foreign buyers."⁵² A second financial inducement was a proposition from Ottawa that Canada would import an amount of oil from Mexico equal to the amount of nuclear equipment that it exported to Mexico.⁵³

Despite Canada's efforts, Mexico decided in June 1982 not to purchase any nuclear reactors. The financial problems of Mexico --- in particular its massive foreign debt --- precluded a project of the size of a nuclear reactor. The Mexican case illustrates the problems that Canada faced in its nuclear reactor export programme during the 1980s because even when its commercial interests and political/security concerns were synchronized a sale was not always forthcoming.

The fourth market where Canada failed to produce a CANDU export was Turkey. The proposed Turkish purchase of a CANDU was the closest that Canada came to concluding a sale in the 1980s. In 1985 a nuclear co-operation agreement was signed between Canada and Turkey because both sides believed that a CANDU sale was imminent. However, because of Turkey's proposal that BOT financing (build, own and operate, and transfer) be applied to the reactor, the sale fell through. This procedure would see the reactor's ownership divided between AECL with a 60% share and a privately-owned Turkish

⁵² The Globe and Mail (Jan 12, 1982): B1.

⁵³ The Globe and Mail (Jan 12, 1982): B1.

consortium with 40%. In order for AECL to recoup its substantial investment it would have to sell the CANDU's power to the Turkish government. Within a few years, AECL would then sell its share of the reactor to the Turkish government for what Istanbul considered a fair market price. Ottawa was concerned that this arrangement would leave too much financial risk with AECL for too long a period of time. According to Canadian officials, Ottawa wanted a sovereign guarantee of payment before it would allow the sale to proceed, but the government did not get it.⁵⁴

Although in the past Canada may have had political/security concerns about exporting nuclear materials to Turkey, primarily because of its conflict with Greece,⁵⁵ that was not the case in 1985.⁵⁶ Thus, the Turkish sale was lost for commercial rather than political/security reasons.

The final potential market that became available in the 1980s was Israel. In 1989, the Israeli Energy Minister, Moshe Shachal, expressed a "very strong interest in CANDU." However, Michel Hebert of AECL, quickly reiterating Canada's policy, replied that "we have our rules and all of the changes (in policy) would have to be on the Israeli side if they are really interested in CANDU."⁵⁷

⁵⁴ Interview by the author with EMR official, June 1992.

⁵⁵ Morrison and Wonder: 83.

⁵⁶ Interview by the author with DEA official, July 1992.

⁵⁷ The Globe and Mail (Oct 27, 1989): A1.

It is unlikely in the foreseeable future that Canada would export a CANDU to Israel, a threshold nuclear weapons state which has not signed the NPT and has been involved in four significant wars with its neighbours since 1948. Canadian officials have confirmed that Israel made overtures to Canada in the late-1980s to purchase a CANDU, but that Ottawa will not even negotiate with it until the situation in the Middle East has changed dramatically.⁵⁸

The preceding cases illustrate the difficulties that Canada had in exporting the CANDU in the 1980s. In some instances --- Egypt, Mexico, Turkey --- it was problems with financing that prevented the sales from being completed, but in others --- Japan and Israel --- it was Canada's political/security concerns which were the barrier. Thus, Canada discovered during this period that it is very difficult to reconcile CANDU exports with a stringent nuclear non-proliferation policy.

South Korea Wolsung II 1990

On December 27, 1990, South Korea decided to purchase a second CANDU reactor from Canada, the Wolsung II. This was a very critical sale not only because it was the first export of a CANDU in nine years, but because, in many respects, Wolsung II could be

⁵⁸ Interview by the author with officials at AECL, EMR, and DEA, May-July 1992.

credited with saving the Canadian nuclear industry.⁵⁹ While it was obvious that Canada's commercial interests played a dominant role in the Wolsung II export, the sale was facilitated by the fact that there were no significant political/security concerns with South Korea.

In assessing the commercial interests associated with the Wolsung II deal, the first benefit was the immediate financial gain that would accrue to Canada. The Wolsung II project would pump over \$400 million into the Canadian economy, providing more than 7,000 jobs over a four-year period.

A second factor was that Wolsung II was a straight cash deal; no government financing was involved. Therefore, when comparing Wolsung II with the financial packages that were arranged for Canada's other reactor exports (see Figures 4.1 and 6.2), one can see the economic attractiveness of the sale.

A third commercial factor was the hope that Wolsung II would lead to future CANDU exports to South Korea. Due to South Korea's insatiable appetite for energy, Korea Electric Power Corp. had decided to double its nuclear generation capacity by the year 2001 by building an additional nine nuclear reactors. Although five of the planned reactors had already been contracted out, AECL felt confident that it could obtain three of the remaining bids. AECL's confidence was partially realized in January 1992, when South Korea

⁵⁹ In a confidential interview by the author with an official from EMR, he confided that the 1990 R & D decision discussed earlier was based on the assumption that Wolsung II was imminent. If Canada had lost the sale, it could very well have been the end of Canada's reactor export programme.

asked AECL to bid on an additional two reactors. Interestingly, AECL is the only company which South Korea has asked to bid.⁶⁰

A fourth economic benefit of Wolsung II pertained to Canada's interest in obtaining CANDU sales in other parts of Asia. Indonesia, with which Canada already has a nuclear co-operation agreement⁶¹ and to which a nuclear laboratory has already been exported, has frequently been mentioned in this context.⁶² As Robert Gadsby, Vice-President and representative for AECL in South Korea, has stated, "I'm optimistic we will see Candu exports to other parts of Asia...This is one of the key areas in the world to be."⁶³

Finally, it was hoped that Wolsung II would strengthen Canada's trading relationship with South Korea. With its double-digit growth rates, South Korea's economy is starting to become an economic powerhouse and, in fact, some experts have suggested that it could seriously challenge Japan's position in Asia by the next century. Thus, securing ties in that market, especially in high-tech products like nuclear reactors, is of vital importance for Canada. Currently, South Korea is Canada's fifth largest trading partner worldwide and its second largest market in all of Asia,

⁶⁰ Toronto Star (Jan 4, 1992): D1.

⁶¹ Canada Treaty Series. Agreement between Canada and Indonesia 1983 No. 31 (Ottawa: July 12, 1982).

⁶² Interview by the author with AECL official, May 1992.

⁶³ The Globe and Mail (Oct 8, 1991): C6.

with two-way trade in 1991 exceeding \$4 billion.⁶⁴ AECL is Canada's largest business in South Korea, and its former chairman, Robert Ferchat, also presides over the Canada-Korea Business Council. As Canada's ambassador in Seoul, Len Edwards, has stated, "The sales of the Candu reactors have done much to build awareness of Canada in Korea."⁶⁵

In sum, there were overwhelming commercial advantages to exporting the CANDU reactor to South Korea. Not only were there economic benefits that would accrue to the nuclear industry and the Canadian economy as a whole, but, as stated previously, many industry insiders felt that the very survival of the CANDU programme hinged on the South Korean market.

Despite the vital economic significance of the Wolsung II export, Canada's security concerns might still have killed the sale had the political situation in South Korea in 1990 not been deemed satisfactory. Most of the significant proliferation issues had been resolved during the earlier Wolsung I negotiations, and now South Korea was considered an almost ideal customer. South Korea had ratified the NPT in 1975 and over the ensuing years, Canada had no cause to doubt the Koreans' commitment to nuclear non-proliferation.

⁶⁴ Canada's exports to South Korea were \$1.8 billion, while its imports were \$2.1 billion. Compiled from data from Statistics Canada. Catalogue 65-006. Imports by Country (Jan-Dec 1991): 118-120 and Statistics Canada. Catalogue 65-003. Exports by Country (Jan-Dec 1991): 148-152.

⁶⁵ The Globe and Mail (Oct 8, 1991): C6.

Further, as David Fischer has commented, "were it not for the history of violent relations between the two Koreas there would be no reason to doubt Seoul's continuing attachment to the NPT."⁶⁶ Even if South Korea were to consider renouncing the NPT, it would still have to weigh the consequences on both its security relationship with the United States as well as its trade relations with the U.S. and Japan. Neither country would look favourably on South Korea's abrogating its commitment to nuclear non-proliferation.

As evidence of the lack of concern that the Canadian government had over South Korea's development of a nuclear weapons programme, in 1990, Ottawa started to consider allowing the Koreans to reprocess the spent fuel from the CANDU reactors. During the nuclear safeguards negotiations over Wolsung I in 1974-76, Canada had placed a great deal of emphasis on preventing South Korea from purchasing a French reprocessing plant (see pages 110-113), but in 1990 Canada's position changed.

The reason for this shift in policy was the advent of the Tandem Fuel Cycle (TFC). The development of the TFC was one of the major reasons why South Korea decided to purchase Wolsung II. The TFC will give the CANDU a technical advantage over its light water-reactor competitors in that the spent fuel from the CANDU (which contains more fissile products than the original fuel) will be

⁶⁶ David Fischer, Stopping the Spread of Nuclear Weapons: The Past and Prospects (London, 1992): 225.

reusable. Although the TFC is not yet fully developed, AECL believes that it will have the necessary technology in a few years.⁶⁷

The Canadian government is exploring two possible options to implement the TFC. The first option would see the spent fuel returned to Canada, as provided for in the 1976 agreement⁶⁸, using Canadian reprocessing technology to separate the fissile materials, and then returning the fissile material back to South Korea to be reused in the nuclear fuel cycle. A second alternative would be to allow the Koreans to reprocess the spent fuel at home, albeit under the supervision of Canadian officials.

The major security concern with this type of nuclear reprocessing will likely come from the United States. Washington is still opposed to the Koreans reprocessing any nuclear fuel and has reservations about either of Canada's proposed options. First, the Americans are concerned about the security of shipping high radioactive fissile materials across the ocean. Second, the Americans still do not wish to see South Korea either purchase or develop its own reprocessing technology since this would provide it with plutonium that could be used in nuclear weapons. It will be interesting to see if Canada can develop a technical solution to this security problem.⁶⁹

⁶⁷ All technical information on the Tandem Fuel Cycle is based on an interview by the author with EMR officials, June 1992.

⁶⁸ Agreement between Canada and the Republic of Korea: See in particular Article V and the Exchange of Notes.

⁶⁹ Interview by the author with officials from EMR and DEA, June-July 1992.

The fact that Canada is willing to compromise on nuclear reprocessing is not an indication that Ottawa is willing to lessen its nuclear safeguards to obtain a CANDU export, but rather an indication of the diminishing threat of nuclear proliferation from South Korea. This apparent shift in policy is due to the technical advances resulting from the Tandem Fuel Cycle which makes the reuse of spent fuel for peaceful purposes possible, and the change thus does not represent a safeguards "sweetener". Had Canada changed its mind during the 1974-76 period, it would have been an indication of the lessening influence of political/security concerns on Canada's nuclear reactor export policy, but by doing so in 1990 it was an indication of the perceived diminishing threat of nuclear proliferation on the part of Korea.

In sum, it can be seen that commercial interests were the dominant influence on the decision to pursue a second CANDU export with South Korea. Political/security considerations did not act as a constraint not because their influence had waned, but because Ottawa sincerely felt that there were no significant risks present in South Korea at the time nor any likely to emerge in the foreseeable future.

Strengthening Nuclear Co-operation with Romania 1991

While Canada was still celebrating the Wolsung II export, it had to deal with the "problem child" of the CANDU export programme. The five CANDUs which had been exported to Romania in the 1978-82 period had been continually plagued by difficulties.

However, the chaotic state of affairs at the Cernavoda project was multiplied when the Communist regime of Nicolae Ceausescu was overthrown in December 1989. After the fall of Ceausescu, Canada had to consider seriously whether it wanted to reinforce its nuclear assistance to the new government or terminate all assistance. The 1990-91 period saw much debate inside the Canadian government as it weighed the costs of continuing with the Cernavoda project against those of cutting its losses and pulling out.

In the end, Canada decided in September 1991 to supply Romania with an additional \$315 million EDC loan to complete Cernavoda 1. It is expected that once this first unit is completed, additional EDC loans will be forthcoming in order to complete the other four CANDUs. In assessing which foreign policy objective was most influential in the decision to strengthen Canada's commitment to Cernavoda, in this instance there was no clear-cut dilemma between the two objectives as with many of the other cases this study has examined; rather, there were competing arguments within each objective.

The principal economic argument against further assistance to Cernavoda was the legacy of the Ceausescu regime. In assessing all of the economic difficulties that existed during the ten years of nuclear co-operation between Canada and Romania's Communist regime, they could be summed up into one: the obsession of the Ceausescu government with alleviating its high foreign debt. This obsession caused four major conflicts with Canada.

The first conflict occurred when Romania's foreign debt, which had climbed to over \$10.5 billion by 1982, forced the country into massive financial restructuring. These circumstances led Ottawa to suspend all EDC loans for over a year beginning in March 1982, while Romania attempted to reschedule its debts with its creditors.

A second source of conflict occurred because of Ceausescu's demand that Canadian suppliers of CANDU components buy Romanian products equal in value to what they sold in Romania. Romania insisted on countertrade because of its acute hard currency shortage which it hoped to alleviate by finding markets for its industrial and agricultural products. However, Canadian critics of the proposal labelled it "CANDUs for strawberries." Although Canadian companies, in fact, refused to take Romanian strawberries, other products like cars, tractors, and textile products were swapped for CANDU components. AECL defended the countertrade provisions by asserting that "it was either a countertrade deal or no deal at all", and that if Canada did not "take the business" there were "plenty of countries" which would.⁷⁰ The Romanians were able to play hardball during the countertrade negotiations because, as a spokesman for Versatile Vickers Inc, a components supplier producing calandrias for the CANDU, pointed out "they are our only customers, and they know that."⁷¹

⁷⁰ Ascent (Fall 1983): 5.

⁷¹ The Globe and Mail (Aug 11, 1983): B3.

A third source of economic conflict on the Cernavoda project was the level of Canadian content in the reactors. In previous sales AECL had acted as the contractor on the site and awarded subcontracts to Canadian companies itself, but with the Cernavoda project, AECL had sold its nuclear technology and the Romanians acted as their own contractor. The result was that Italian and U.S. firms were awarded contracts to build expensive turbo-generators for the non-nuclear portions of the CANDU. As well, Romania decided to attempt to build some critical fittings on its own. Further, in keeping with Ceausescu's obsession with saving hard currency, Romania decided to handle all administrative responsibilities.⁷² Romania's insistence on going it alone resulted in many unhappy Canadian companies which were upset at losing business on what was supposed to have been a Canadian project. As well, many Canadians believed that Romania did not have the technical expertise to produce the required products. Romanian officials also had trouble administering such a large industrial project because they lacked the organizational skills required.

All of the above problems resulted in substantial delays in the construction of the CANDUs. The Canadian site chiefs would not allow inferior products into the reactors so that on many occasions the Romanian workers had to redo their work five or six times. This meant that the on-line date for Cernavoda 1 steadily

⁷² The Globe and Mail (Jan 4, 1984): A1-2.

moved from the original projection of 1985 to the current prediction of 1994.⁷³

This legacy of problems with the Cernavoda reactors during the reign of Nicolae Ceausescu acted as an economic constraint on Canada's continuing with the project with the new Romanian government. These problems were aggravated by the fact that construction at Cernavoda ground to a virtual halt following the December 1989 revolution. For the CANDUs to be completed, it was clear that the Canadian government would have to pump even more money into the project. Further, despite the fact that the government had changed hands, Romania still lacked the administrative and technical infrastructure to finish the work. This fact, combined with the internal turmoil caused by the revolution, made it doubtful that the CANDUs would ever become operational. Critics of the plan argued that it was a case of the government "throwing good money after bad in helping to complete the CANDU reactor project in Romania."⁷⁴

Although there were significant economic concerns with continuing nuclear co-operation with Romania, there were more powerful economic arguments in favour of renewing and strengthening Canada's role in the project. First, it was contended that the amount of Canadian content in the reactors had increased

⁷³ An additional problem with the construction delays was that, due to the unpredictable nature of Ceausescu's behaviour, the Romanian workers were afraid to tell the Romanian leader that Cernavoda was falling behind schedule. The Globe and Mail (March 17, 1988): B1.

⁷⁴ Debates (May 14, 1990): 11370.

substantially since the 1978 agreements and would increase even more now that Ceausescu was dead. Increases in Canadian content would mean that AECL would take over a greater role in the management of the project, with an emphasis on quality control and organization which had not been there with the Romanian in charge.⁷⁵ Second, AECL would operate the reactor for the first 18 months.⁷⁶ Third, much of the money that Canada would supply to finish Cernavoda would be used to purchase Canadian goods and services and would be paid back with interest. Finally, Canada would not be on its own, as the Italian government had also agreed to provide \$150 million in loans to finish the non-nuclear components of the reactor, under the management of the state-owned Ansaldo company.⁷⁷

Thus, while there were some economic factors which acted as constraints on Ottawa, there were stronger economic arguments in favour of an additional financial commitment to Cernavoda. Most of the economic problems of the past were a direct result of Nicolae Ceausescu and the Communist regime, and both were gone now. Another significant difference between the previous management and the new team was that Canada would now have firm control, and therefore Canadian taxpayers' money would be spent on Canadian products. Finally, in a counter argument to critics who mentioned the large

⁷⁵ Interview by the author with EMR official, June 1992.

⁷⁶ Government of Canada News Release (September 17, 1991): 2.

⁷⁷ Toronto Star (Aug 25, 1991): B1.

amount of money Canada had already spent on Cernavoda, Ottawa could reply that it was "in for a pound, in for a penny."

The principal political/security factor which acted as a constraint against Canada's decision to strengthen its nuclear assistance with Romania was also a legacy of the Ceausescu regime: human rights. Canadian officials had held no misconceptions about Romania's human rights record during Ceausescu's reign and in January 1990, External Affairs Minister Joe Clark acknowledged that there were still "widespread and systematic human rights violations in Romania."⁷⁸

Although Canada was aware of general human rights violations in Romania, following the death of Ceausescu, stories started to emerge that slave labour had been used in the construction of the CANDUs. However, there continues to be some dispute over this allegation. The New York-based Hungarian Human Rights Federation claims that it has compiled extensive evidence that from the mid-1980s on slave labour was used at the Cernavoda site. In December 1989, Federation President Laszlo Hamos stated that the use of such labour "was so commonplace over the past years it seemed almost nonsensical to document specific cases." However, when pressed, Hamos did document one case:

The Romanian military directed a major recruitment of workers in September, 1987. About 1,800 workers were rounded up from factories in several Transylvanian towns and given five days to report to the nuclear

⁷⁸ Letter to the author by External Affairs Minister Joe Clark, Jan 1990. For additional information on Romania's human rights record in the 1980s see Amnesty International, Romania: Human Rights Violations in the Eighties (London, 1987).

plant. Failing this, they were to be charged with the crime of parasitism.⁷⁹

The Canadian government treated these stories with the seriousness that they deserved, but concluded that the workers were military conscripts not slaves. External Affairs noted that it was a "frequent practice in many countries, not least in Nicolae Ceausescu's Romania, to use military personnel on various large construction projects."⁸⁰ One of the reasons for the large number of conscripts working at Cernavoda was that every time Ceausescu visited the site and found that additional delays had occurred, he ordered more workers to the site. Both AECL and EMR officials contend that workers at Cernavoda were actually better treated than those elsewhere in Romania, claiming that it was a "preferred posting" rather than a gulag.⁸¹

It can be concluded that while life was extremely difficult for the conscripts working at Cernavoda, life was generally bad in Romania and that Canada was not directly encouraging the practice of slavery. Moreover, the "slavery" issue pertained to the Ceausescu era, not the present. Sorim Negrea, Romania's Trade Commissioner in Montreal maintains that the new government of Ion Iliescu is improving its human rights record, and that the rounding up of ethnic Hungarians for work on the CANDUs is

⁷⁹ Toronto Star (Dec 30, 1989): A1, 20.

⁸⁰ Letter to the author by External Affairs Minister Joe Clark, Jan 1990.

⁸¹ Ascent (Summer 1990): 6.

"in the past."⁶² While concerns do remain about Romania's observance of human rights, especially in terms of the treatment of its ethnic minorities, clearly this issue is not the constraint on nuclear cooperation that it might have been in the past.

At the same time, there were several political/security considerations that pointed to the desirability of renewed nuclear cooperation with Romania. First, if Canada had left the reactors half-built, Romania might have attempted to finish them on its own with substandard work, creating safety risks. By continuing with the project, Canada is in a position to ensure that Cernavoda reactors will be safe. Indeed, once the renewed commitment was made "the Canadian technical advisory team on-site strictly supervised completion of repair work to piping welding" which had previously been done by the Romanians, evidence of the safety advantages stemming from Canada's continuing cooperation.⁶³ Second, it is expected that the completed reactors will supply over 30% of Romania's electricity needs, and right now Romania is desperate for that electricity. If the project were not finished soon, it could push a country already close to the edge into a state of collapse. In short, economic conditions that currently exist in Romania act as a breeding ground for a return to an authoritarian dictatorship. Allowing the Romanians to "freeze in the dark" would only add to this potential. Third and related to this point, the threat of nuclear proliferation would have increased greatly if Canada had

⁶² Toronto Star (July 2, 1991): A22.

⁶³ AECL Annual Report 1990-91: 11.

ended its support of Cernavoda. Romania would have had the blueprints for Canadian nuclear technology while the former U.S.S.R., as a result of the collapse of the Warsaw Pact, would not have been in a position to ensure that Romania used its nuclear power for peaceful purposes only. However, by placing Canadian officials in charge (which would only have occurred with the additional funds) the Canadian government was in a position to take over the role of the Soviets. Officials in DEA have asserted that "the current regime has taken on all obligations of the former regime, and has informed on discrepancies of the past." For example, the Iliescu government has advised Canada about the occasion when Ceausescu ordered the diversion of Norwegian heavy water intended for Cernavoda to India for payment in hard currency.⁸⁴ Thus, the new Romanian government is operating in good faith with Canada, justifying Canada's decision to strengthen its commitment to Cernavoda.

In sum, while there were contrary arguments related to each, both commercial interests and political/security concerns essentially favoured a strengthening of Canada's commitment to the Cernavoda project. Only the horrible legacy of the Nicolae Ceausescu regime acted as a major constraint on the Canadian government. Ottawa determined that it could not abandon Romania now that it had overthrown its Communist government, and that to do so would create economic, political, and security problems in Romania

⁸⁴ Interview by the author with DEA official, July 1992.

that had the potential to reverberate throughout Europe and the international community at large.

Conclusion

It was during the period 1977-92 that Canada faced the consequences of its enhanced preoccupation with nuclear security in the preceding period. Except for the exports to Romania, Canada was not able to make a CANDU sale until December 1990 and the Wolsung II transaction. In several instances, most notably the Atucha II bid, but probably in the Japanese case as well, countries refused to purchase a CANDU because of Canada's reputation as an unreliable supplier. Thus, for the majority of the years 1977-92, CANDU reactors sat on the shelves of AECL as it waited for the rest of the world to catch up to Canada's rigid safeguards policies. In taking the lead in the fight against nuclear proliferation, Canada developed what was probably the strictest non-proliferation policy of the nuclear suppliers, but it also started to disappear as a reactor supplier.

The Canadian government held by its December 1976 non-proliferation policy even when there was pressure from inside the Progressive Conservative Cabinet to weaken its restrictions in 1979. Thus, in the end, Canada's political/security concerns remained dominant over the commercial interest in selling the CANDU. Even when the Canadian nuclear industry faced a real threat of collapse because of the failure to produce exports in the mid-1980s, Ottawa did not weaken its policy.

Ottawa was rewarded for its patience when in late 1990 a CANDU export to South Korea was announced. Wolsung II proved that it was possible to reconcile a stringent non-proliferation policy with CANDU exports. Thus, heading into the 1990s, Canada had proven to itself and other nuclear suppliers that a state need not water-down its nuclear safeguards in order to achieve reactor sales.

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Chapter Seven

Conclusion

Summary

This thesis has demonstrated that Canada has been an important international player in the development of nuclear technology for over fifty years. However, following the end of the Second World War, Canada made a conscious decision to concentrate its efforts on developing the peaceful aspects of nuclear power. The result of Canada's efforts in this respect was the CANDU power reactor.

Since Canada exports both the fuel and the technology to develop a potential nuclear weapons programme when it exports a nuclear reactor, it must take precautions to ensure that its exports will only be used for peaceful purposes. Thus, one of the principal objectives of Canada's nuclear export policy is to allow other countries to benefit from nuclear power while preventing them from utilizing it for military purposes.

Canada's nuclear reactor export policy must, then, reconcile two important foreign policy goals. The first is to realize the economic and political advantages that can accrue to Canada through the sale of nuclear equipment. The second is to ensure that nuclear export activity does not contribute to the proliferation of nuclear weapons, a development which has been almost universally accepted as undesirable.

As this thesis has demonstrated, there are many economic benefits that come to Canada with nuclear reactor exports. Taken

together, they represent a great incentive to pursue nuclear reactor sales. However, there are also significant economic obstacles that Canada must overcome to produce a CANDU export and these factors mean that Canada must struggle to conclude each and every sale. Moreover, the longer the time span between sales, the more urgent the necessity of making a successful transaction.

Balancing out Canada's commercial interests are its political/security concerns, with the major political/security preoccupation being the preservation of the non-proliferation of nuclear weapons. This has been a consistent foreign policy goal of Canadian governments from 1945 to the present.

In order to fully understand the conflict between commercial interests and political/security concerns in Canada's nuclear reactor export policy, an analysis of each reactor sale from 1945 to the present was concluded. The years 1945-74 witnessed a clear, gradual rise in the importance attached to security concerns. In 1956, when the first export was concluded, commercial interests clearly dominated over security concerns, but by 1974 an equilibrium was reached between the two forces. This equilibrium was not due to a lessening of the commercial interest in concluding sales, for, in fact, the imperatives for reactor exports were increasing. Rather, the shift in policy could be directly traced to the rising importance that Canada placed on preventing nuclear proliferation. An examination of the nuclear safeguards agreements which were concluded during this period illustrated the rise in influence of political/security concerns. In Canada's first export

to India in 1956, the CIRUS reactor was almost entirely free of safeguards, but by the last two agreements (with Argentina and South Korea in 1973), Ottawa insisted on comprehensive IAEA safeguards.

The equilibrium that was reached by 1974 was disrupted by the May 18, 1974 Indian nuclear explosion. This explosion --- which Canada inadvertently aided through uranium diverted from the CIRUS research reactor as well as by supplying the Indians with nuclear technology transfers throughout the 1950s and 1960s --- launched the beginning of this study's second period. In Canada's response to the Indian explosion, the equilibrium between commercial interests and political/security concerns was shattered. From 1974 to 1976, the Canadian government strengthened its non-proliferation policy and took significant steps to enforce its new position. In implementing these new policies, Canada terminated nuclear assistance with both India and Pakistan and retroactively strengthened its safeguards agreements with Argentina and South Korea. Thus, by December 1976, Ottawa had made a firm decision that commercial interests, no matter how attractive or necessary, would be subordinate to political/security concerns when it came to nuclear reactor exports.

The final period of this study, 1977-92, saw Canada's nuclear reactor programme suffer economic damage because of its strict safeguards policies during the preceding period. Many countries now considered Canada to be an unreliable supplier and refused to purchase CANDUs from it. Thus, for the majority of this

period --- except for five problem-ridden CANDU exports to Romania over the years 1978-82 --- Canada failed to conclude any reactor sales. The loss of sales to Argentina and Japan in 1979 could be traced directly to Canada's efforts to prevent nuclear proliferation during the previous period. Nevertheless, Ottawa refused to weaken its full-scope safeguards requirements during this period, despite the critical economic necessity of finding export markets. During the 1980s, Ottawa had to seriously contemplate the possibility of its domestic nuclear industry disappearing, but not even this risk moved the government to lessen its non-proliferation demands. When Canada finally obtained an export in 1990 with South Korea's purchase of Wolsung II, it was concluded under full-scope safeguards. Thus, Canada was able to show that it was possible to reconcile a stringent non-proliferation policy with CANDU exports. By 1992, the conflict between commercial interests and political/security concerns had been resolved in that it was clear that a sale would only be completed if all of Canada's non-proliferation concerns were met regardless of the economic advantages to be derived from any particular export.

Looking to the Future

In reflecting on the future of Canada's nuclear reactor export policy, it appears that the ability of political/security concerns to constrain CANDU exports is likely to become less and less, not because their importance is receding, but because the

international nuclear non-proliferation regime is gaining acceptance and strength. Therefore, in the future the success of CANDU exports will be determined almost solely by economic criteria rather than sales being inhibited by political/ security considerations.

Two hopeful trends are emerging in the 1990's. First, there are new economic opportunities to conclude CANDU exports by the year 2000. Second, the threat of nuclear proliferation is declining and in all likelihood will continue to diminish, removing the constraints on Canada's exploiting the new potential opportunities for exports.

i) CANDU Export Opportunities

Assessing realistically its chances of CANDU sales, AECL is concentrating its efforts on four markets: South Korea, the United States, the former Soviet Republics, and Eastern Europe. Each market possesses different challenges and expectations for sales, and the approaches that Canada will use will be different in each instance.

The first, and most important, market that AECL is directing its attention to is South Korea. After South Korea purchased Wolsung II in 1990, it asked AECL to bid on an additional

two reactors.¹ Thus, AECL officials are justifiably "very confident" about further CANDU exports to South Korea.²

The United States is the second market to which Canada is giving particular attention. However, in order to export nuclear reactors to the U.S., two obstacles must still be overcome: the United States must decide that its power needs justify building additional reactors and the American utilities must be willing to shift from light-water to heavy-water technology. Denny Shiflett, a Vice-President for AECL, has said that the company recognizes that "there is no market for nuclear plants in the United States today." However, he believes that that will change by the year 2000. "When that time comes," AECL wants "US utilities to consider the CANDU as a viable option."³ Due to the long lead times necessary to make reactor sales, by starting its marketing program now, Canada should be in a good position to make sales when the Americans start building in ten years hence.

The third market where AECL is exploring possible CANDU exports is the former Soviet Union. Although nuclear experts maintain that the technology of the Commonwealth of Independent States (CIS) is very good and the scientists and technicians who work on CIS reactors are very capable, the spectre of the 1986 Chernobyl nuclear accident still resounds. The accident at the

¹ The bids for Wolsung III and IV and their economic spin offs was discussed earlier. See above, pp. 172-174.

² Interview by the author with AECL official, May 1992.

³ Ascent (Winter 1992): 19.

Chernobyl plant was the worst in the history of civilian nuclear energy, and the fears of another catastrophe still run deep. These fears increased when there was a minor accident at the Leningrad nuclear plant in early 1992. The problems with the CIS civilian nuclear industry are thus in its safety aspects and organizational systems. It is in these areas that Canada feels it can make inroads.

It is clear that the republics cannot shut down their reactors despite the risks associated with their continued operation. Yevgeny Velikov, a senior advisor to Russian President Boris Yeltsin, has warned that closing the plants would cause "an immediate and radical slump in energy production which would have tragic social-economic consequences."⁴ In 1990, over 12% of the USSR's electricity needs were met by nuclear power, and this proportion cannot be replaced by other sources.⁵ If the republics cannot shut down the reactors and they cannot keep them running as is, the logical solution is to bring in international help to work on upgrading the safety standards of CIS reactors. Thus, the Group of Seven countries are working on a potential \$12 billion programme to prevent another Chernobyl-like nuclear catastrophe from occurring in Russia and the surrounding area.⁶

It is in this area that Canada can use its expertise. Not only do CANDU reactors have a high performance record, but their

⁴ The Globe and Mail (May 30, 1992): A13.

⁵ World Nuclear Industry Handbook 1992: 15.

⁶ The Toronto Star (July 3, 1992): A8.

safety record is also first class. Energy Minister Jake Epp, on a trip to Russia and the Ukraine in May 1992, stated that Canada is ready to help Russia and the Ukraine replace or improve their reactors. Epp told Russian and Ukrainian leaders that Canada is ready to provide them both with nuclear equipment and expertise.⁷ Canada's commitment to improve the safety of the Russian reactors was confirmed during Russian President Boris Yeltsin's visit to Canada in June 1992, when a \$30 million accord to "make Canadian expertise available to the nuclear power industry in Russia and other countries, [and] to help alleviate the risk of nuclear accidents at Soviet-designed nuclear power stations" was signed.⁸

Canada is particularly capable of assisting the Russians in improving the safety of their nuclear reactors for two reasons. First, the safety culture that exists in the Canadian nuclear industry is second to none. Second, while the Russian-designed RBMK reactors have no close Western equivalent, they have design and operational features comparable in some ways to Canada's CANDU system, in particular their pressure tubes. This fact makes Canada a better advisor than other nuclear suppliers whose LWR-designs are not nearly as similar. Canada is working with all 15 of the former republics on reactor safety assessments. The aim is to find some short-term solutions and then determine which of the RBMK reactors must be shut down. Ottawa hopes that when the Russians have to construct replacement reactors, they will utilize a joint Russian-

⁷ The Toronto Star (May 30, 1992): A14.

⁸ Interview by the author with EMR official, June 1992.

Canadian design that would closely resemble a CANDU. However, it is very unlikely that the Russians would purchase a CANDU outright or that Canada would offer one as part of the aid package currently being negotiated with the other Western industrialized states.⁹

The final market where Canada is directing its attention is Eastern Europe. Canada has already made inroads in Eastern Europe via its sale of five CANDUs to Romania, but AECL is also targeting Czechoslovakia and Hungary. In 1990-91, AECL completed a market feasibility review and analysis of both Czechoslovakia and Hungary to determine whether there were opportunities for exports.¹⁰ Following this review, AECL determined that the best prospects for Canada lay in Hungary, and steps were taken to ensure that AECL could take advantage of the opening of the Hungarian market.¹¹ However, the Hungarian reactors are very effective; they provide 50% of Hungary's total electricity production, and they have a lifetime load factor of 84.4%. Moreover, Hungary's reactors only came on-line in the mid-1980s.¹² Thus, despite the confidence of the Canadian government, the opportunity for CANDU exports to Hungary must be considered remote, although Canada may be able to provide other nuclear services.

In sum, there are definite opportunities for Canada to produce CANDU exports in the 1990s. The 1990 sale to South Korea

⁹ Interview by the author with EMR official, June 1992.

¹⁰ AECL Annual Report 1990-91: 12.

¹¹ Wilson, "Address to the Canadian Nuclear Association": 4.

¹² World Nuclear Industry Handbook 1992: 15-20.

gave AECL a needed dose of confidence, and has acted as a spark to pursue additional sales. Led by a great technological product, and facing a world radically different from the 1980s, Canada is prepared to take full advantage of the opportunities that are available. In addition, since Canada's political/security concerns have been, for the most part, met, these considerations will not act as a constraint on Canada's desire to conclude CANDU sales. Thus, by the year 2000, one can easily visualize CANDUs in construction around the world.

ii) The Threat of Nuclear Proliferation

The second trend that is emerging is that the threat of nuclear proliferation appears to be diminishing. Although some would suggest that the threat still exists and is in fact increasing, the signs more clearly point to the effective containment of the proliferation threat.

The principal argument to the effect that there is an increased threat of nuclear proliferation pertains to the break-up of the Soviet Union. It has been suggested that this event could lead to several if not all of the former republics gaining nuclear weapons arsenals, increasing the number of NWS from five to as many as twenty. This fear has, however, been overstated. Although four of the republics have some nuclear weapons (Russia, the Ukraine, Belarus, and Kazakhstan), due to an agreement amongst the members of the Commonwealth of Independent States, Russia has sole

authority over the nuclear arsenals. In addition, all four republics have given assurances that they will abide by the NPT.¹³

A second concern, that Soviet scientists might sell their knowledge to the highest bidder among various Third World dictators, has also been raised. It has been suggested, for example, that Libyan Leader Muammar Qaddafi has been hiring unemployed Soviet nuclear scientists to develop nuclear warheads for Libya. There are, however, limits to what the Qaddifis of the world can achieve by such means. First, the former Soviet scientists are only able to provide the information that exists in their heads. The necessary infrastructure --- nuclear equipment and laboratories --- would not travel with them. Second, many scientists are needed to develop a nuclear weapons programme and the likelihood of an adequate number becoming "hired guns" for any one unsavoury regime is remote. Third, in addition to nuclear scientists, a sufficient number of nuclear engineers is also required. Fourth, there is still a great need for nuclear scientists in Russia to work on: improving the safety of the RBMK reactors; the dismantling of nuclear weapons; and disposing of weapons-grade fissile material. According to officials at External Affairs, one of the reasons for the Western nuclear aid package was to ensure that the nuclear scientists would remain working in Russia.¹⁴ Finally, as Sergei Kapitza, physics professor at the Academy of Sciences in Moscow, has pointed out, "this fear is based

¹³ The Globe and Mail (May 23, 1992): A4.

¹⁴ Interview by the author with DEA official, July 1992.

on some strange and irrational assumptions and stereotypes." Kapitza argues that "to single out nuclear scientists from Russia -- however difficult their current position --- is an expression of distrust, if not a direct insult to that community."¹⁵ Ethics thus seem likely to act as an additional constraint on dangerous dictators profiting from the demise of the Soviet nuclear weapons programme.

A final possible threat to the international nuclear non-proliferation regime is the role of the "emerging suppliers", developing countries which have created an indigenous nuclear industry and now seek exports for essentially the same reasons as the major suppliers. The emerging suppliers include countries like: China, India, Argentina, and South Korea. A potential problem with these states is that they might not follow the guidelines which have been established by the Nuclear Suppliers Group, and might sell their nuclear equipment without the full-scope safeguards which are finally the norm for the major nuclear suppliers. This fear is starting to be realized to some degree, with nuclear sales being made to pariah states like Pakistan and Syria by China and India respectively. Despite the potential threat that the emerging suppliers present, there is reason to believe that this problem can be effectively addressed. Only a few of the new suppliers (China and India in particular) seem likely to disregard the export conventions that have already been established. For instance,

¹⁵ Sergei Kapitza, "Soviet Scientists: Low Pay, No Pay, Now Insults" The Bulletin of the Atomic Scientists (May 1992): 15-16.

Argentine nuclear officials, commenting on past Canadian-Argentine nuclear relations, told Ottawa bureaucrats that Canada was "right" and Argentina was "wrong", and that in the future Argentina would use Canada's stringent non-proliferation policy as a guideline for its own export policy.¹⁶ As well, most countries have acknowledged that the emerging suppliers constitute a potential threat to the nuclear non-proliferation regime and therefore this will be the number one priority during the 1995 NPT renewal conference.¹⁷

While there may be some grounds for asserting that the risks of nuclear proliferation are increasing, the counter arguments are much more persuasive. There are four major reasons for contending that nuclear proliferation concerns have diminished and will continue to diminish in the future: 1) the collapse of the Soviet Union and the Warsaw Pact has led to the greatest strides made so far in obtaining nuclear disarmament; 2) the outcome of the Gulf War has reduced the risk of Iraq becoming a dangerous nuclear power and enhanced the prospects of a reduction in Middle East tensions; 3) the joint North and South Korean declaration rejecting the possession and use of nuclear weapons has removed the danger of proliferation on that peninsula; and 4) the number of states which have signed the NPT has risen, and is likely to continue to rise.

The end of the Soviet bloc in 1989 and the end of the Soviet Union itself in 1991 have been great boosts to efforts to

¹⁶ Interview by the author with an EMR official, June 1992.

¹⁷ Interview by the author with a DEA official, July 1992. For more information on the emerging suppliers see Potter, The Challenge of the Emerging Suppliers.

eliminate nuclear proliferation. The ending of the bi-polar world has given humankind an opportunity for true and lasting peace. It has meant that really for the first time vertical proliferation can be tackled. The need for Russia and the U.S. to continue to expand their nuclear weapons programmes is now non-existent. A further factor is that the nuclear arms race has bankrupted Russia as well as inflicted a great deal of economic damage on the U.S., thus leaving both countries desiring an end to the costly vertical proliferation of nuclear weapons.

In June 1992, during a state visit to the U.S. by Russian President Boris Yeltsin, the largest nuclear arms reduction agreement in history was signed by Yeltsin and American President George Bush. This agreement will eliminate thousands of long-range missiles, including all of Russia's SS-18 rockets and one half of all American submarine-based rockets. Russia has also pledged to cut its entire nuclear weapons programme by 2003. Even deeper cuts would have occurred at this time except for the expense and difficulty of destroying nuclear weapons. As one U.S. official commented, "You're not simply throwing away bows and arrows."¹⁸

The second reason for the diminishing threat of nuclear proliferation is the outcome of the Gulf War. It has resulted in the dismantling of the Iraqi nuclear weapons programme and the initiation of an on-going Middle East peace process which holds the promise of reducing tensions in the region in general and especially between Israel and the Arab states.

¹⁸ The Globe and Mail (June 17, 1992): A1.

One of the outcomes of the Gulf War was the enforced dismantling of Iraq's nuclear weapons programme by IAEA inspectors. This development has had two major results for the international nuclear non-proliferation regime. First, the IAEA has been able to eradicate Iraq's potential ability to develop nuclear weapons. Thus, the world has seen the elimination of a possible nuclear weapons state which, because of the nature of its regime, posed a significant threat to its neighbours. Second, when IAEA inspectors were finally allowed to examine Iraqi nuclear facilities, they discovered that Iraq's weapons capability was not nearly as close at hand as was predicated during the build-up to the Gulf War. It was confirmed that Iraq was still years away from being able to produce nuclear bombs. That Iraq did not have the bomb is a credit to the efficacy of existing IAEA safeguards.

Another outcome of the Gulf War is that it has led to the beginning of a new Middle East peace process. Although it is always difficult to predict events in the Middle East, it is clear that tensions have been significantly reduced since the end of the war. Just getting all parties to the table, as was the case with the 1991 Madrid Peace Talks, is a major accomplishment. The June 1992 victory of the Labour Party in Israel and defeat of the hardline Likud government may also enhance somewhat the prospects of Israel agreeing to trade land for peace. With reduced tensions in the region, there is less incentive for countries to develop nuclear weapons, in particular the threshold state of Israel.

The third reason to believe that the threat of nuclear proliferation is diminishing is the easing of tensions between North and South Korea. The Korean peninsula has always been considered a high-risk region for nuclear proliferation because of the fact that the two Koreas are still technically in a state of war. However, the threat of nuclear proliferation in the region was significantly curtailed on December 31, 1991, when the two Koreas signed a joint declaration in which:

South and North Korea agree that neither side will develop, possess or use nuclear weapons or possess nuclear reprocessing and uranium enrichment facilities, and that nuclear energy will be used only for peaceful purposes. The declaration also provides for the creation of a joint committee that will implement inspections of nuclear facilities in both countries to verify the denuclearization of the peninsula.¹⁹

Therefore, Korea is another region where the threat of nuclear proliferation is being effectively addressed.

The fourth reason why the threat of nuclear proliferation is diminishing in the 1990s is that the number of hold-out states that have not signed the NPT is declining. The NPT is the best weapon in the fight against nuclear proliferation and therefore the more countries that sign it, the lower the threat will be. Already, four important hold-out states have signed the NPT in the 1990s: France, China, North Korea, and South Africa. France and China are considered as NWS under the NPT, but, nevertheless, in the past they had refrained from signing. The French signature was important for symbolic reasons only. Although it had refused to sign the

¹⁹ Department of External Affairs. "McDougall Praises Korean Nuclear Declaration" News Release (Jan 2, 1992): 1.

Treaty, it had always acted as if it were a party state. France's ratification of the Treaty was, therefore, only a technicality, albeit an important one. China's ratification was more important for the non-proliferation regime because China's position had been in line with those states which felt that the NPT was a discriminatory treaty in spite of the fact that China itself benefited from this discriminatory policy. Therefore, when China signed the NPT, it was an acknowledgement that the NPT, even if discriminatory, was still the best instrument to prevent nuclear proliferation. North Korea's ratification of the NPT, which was a part of its agreement with South Korea, brought another threshold nuclear weapons state in line. South Africa's ratification of the NPT was important for two reasons. It was a threshold nuclear weapons state and it had been a traditional kindred spirit with India in leading the opposition to the NPT. The ratification of the NPT by these four states, all with significant nuclear programmes, has thus indicated the growing acceptance of the Treaty in recent years.

Two other important threshold states, Argentina and Brazil, have also declared their intention to sign the NPT in the near future. At the moment, both countries are working on guidelines which will allow them to sign the Treaty of Tlateloco, which created a South American nuclear weapons free zone. Once both countries have signed that treaty, their adherence to the NPT will follow. Of the two, Argentina is the more important signatory for several reasons. It has the most advanced nuclear programme in the

region; it has traditionally been the most adamant Latin American state in its opposition to the NPT; and it has always been assumed that Brazil would follow Argentina's lead on the NPT.

Although great strides have been made in acquiring worldwide support for the NPT, there remain three threshold nuclear weapons states which continue to refuse to sign: Israel, Pakistan, and India. The question of whether the first two countries will sign the NPT is pretty straight forward. It can be speculated that Israel will only sign the NPT if there is a successful outcome to the Middle East peace talks. On the other hand, it is expected that Pakistan will sign the NPT the day that India does. Thus, the important hold-out country remains India.

There is no question that India has suffered a great deal for its refusal to sign the NPT and in particular for its flouting of the Treaty with its 1974 nuclear explosion. Its nuclear programme was damaged by Canada's termination of its nuclear assistance and by the subsequent stringent safeguards applied by the other nuclear suppliers. As well, India's stature in the non-aligned movement was affected when, one by one, the other non-aligned countries acceded to the Treaty. Therefore, India is increasingly being isolated in the world community as a result of its position on the NPT.

There is a great push on now by many countries to convince India to accede to the Treaty. Public statements by world leaders will be used to persuade India to come into line. For example, in a 1992 commencement address at Johns Hopkins University

in Baltimore, Prime Minister Mulroney suggested that "as part of an effective international effort, Canada would be prepared to terminate all of its economic co-operation programs, including aid and tariff preferences, with any country" that did not sign the NPT.²⁰ In addition to public statements, quiet diplomacy among diplomats will also be used to pressure India to ratify the NPT.

Not only is the number of countries which are party to the NPT increasing, but there are plans to strengthen the Treaty at the 1995 renewal conference. One area where it is hoped that the NPT could be strengthened is in regards to nuclear testing by nuclear weapons states. Although the optimal result would be a complete ban on testing, it is unlikely that this could be achieved because of resistance from the United States and China.²¹ However, it is believed that an agreement decreasing the frequency and kilotonnage of any future nuclear tests can be reached.²² Additional improvements which are being pursued are to tighten nuclear export controls and IAEA safeguards in order to obtain greater co-ordination and transparency. Each country would be obligated to list all of its own facilities and all of its exports

²⁰ Office of the Prime Minister. Notes for an address by Prime Minister Brian Mulroney, Johns Hopkins University, Baltimore, Maryland May 21, 1992: 5.

²¹ The U.S. feels that it must continue nuclear testing to: ensure the reliability of its weapons; to act as a deterrent to possible nuclear attackers; and, for credibility purposes, to show to the American people that their weapons work. These arguments were outlined by DEA officials in interviews with the author in July 1992.

²² Interview by the author with a DEA official, July 1992.

as well as provide the IAEA with any new reactor designs in advance to allow for more efficient inspection procedures.²³ After spending almost the entire decade of the 1960s on reaching agreement on the original wording of the NPT and then over another twenty years in persuading a substantial majority of nuclear countries to sign it and the NWS to follow its provisions with respect to vertical proliferation, finally an effort can be made to strengthen the original treaty.

In sum, it is apparent that the threat of nuclear proliferation has been significantly reduced in the early 1990s and that this trend will likely continue throughout the rest of the decade. The end of the Cold War, the effects of the outcome of the Gulf War, the easing of tensions among potential proliferators, and, most importantly, an increased recognition by states of the importance of the NPT in preventing the proliferation of nuclear weapons, have all contributed to an easing of the fear of nuclear proliferation.

With an increasing opportunity to export CANDUs coinciding with a diminishing threat of nuclear proliferation, the Canadian nuclear industry is seemingly headed into its best commercial period ever. The nuclear recession is over, and it appears that the traditional dilemma of having to reconcile the competing foreign policy objectives of commercial interests and political/security concerns has been resolved. This resolution has come in the form of acceptance by the majority of states of full-

²³ Interview by the author with a DEA official, July 1992.

scope nuclear safeguards. Thus, Canada is free to assess future nuclear reactor sales primarily on the basis of economic criteria rather than having to worry about the security implications of any transactions.

The twin issues of CANDU exports and nuclear non-proliferation are intrinsically linked. Canada cannot succeed with its export programme if there is a strong threat of nuclear proliferation, and the Canadian government cannot have an influence on reducing that threat if it does not possess an export programme by means of which it obtains the ability to apply pressure. What has now become apparent is that the leadership position that Canada took on nuclear proliferation in the years 1974-76, when it adopted a strong safeguards policy, was right. Although Canada's nuclear industry suffered economic hardships for almost fifteen years as a ~~result~~ of this policy, the end result was a strengthened international non-proliferation regime. Canada deserves some of the credit for this outcome and, therefore it is to be hoped that it will be rewarded for its perseverance by acquiring new CANDU orders in the years to come.

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