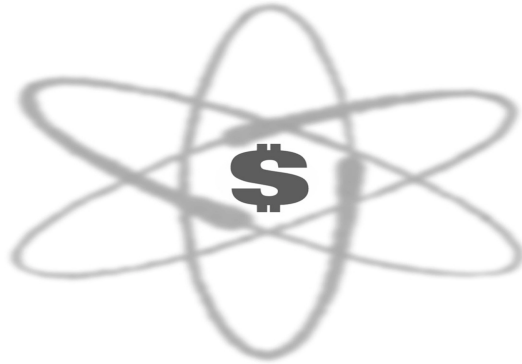


Financial Meltdown

Federal Nuclear Subsidies to AECL



by
David H. Martin
Nuclear Awareness Project

Campaign for Nuclear Phaseout
Ottawa, Ontario, Canada

Financial Meltdown
Federal Nuclear Subsidies to AECL
by
David H. Martin
Nuclear Awareness Project

© copyright November 2000

Campaign for Nuclear Phaseout
Campagne contre l'expansion du nucléaire
412-1 rue Nicholas Street
Ottawa, Ontario, Canada K1N 7B7
tel: 613-789-3634 fax: 613-241-2292
e-mail: cnp@web.net
web site: www.cnp.ca

Campaign for Nuclear Phaseout (CNP) is a non-profit alliance of safe-energy and environmental groups from across the country, founded in 1989. CNP is dedicated to the phaseout of nuclear power in favour of safer, cleaner energy alternatives. With a solid base of support from close to 300 endorsing organizations, CNP has carried out an extensive educational program.

Additional copies of *Financial Meltdown: Federal Nuclear Subsidies to AECL* are available from the Campaign for Nuclear Phaseout.

David H. Martin is a researcher with twenty years of experience working on nuclear, as well as other energy and utility issues. He is the Research Director of Nuclear Awareness Project, a non-profit environmental organization dedicated to raising public awareness about nuclear issues and energy alternatives. The group carries out research and public education projects; operates a public resource centre; and publishes a newsletter.

Nuclear Awareness Project
PO Box 104
Uxbridge, Ontario, Canada L9P 1M6
Tel/FAX 905-852-0571
e-mail: nuaware@web.net

Table of Contents

Executive Summary	3
1. Total Government Subsidies to AECL	4
2. Government Backtracks on AECL Subsidy Reduction	10
3. AECL: Viability & Acceptability	12
3.1. Accountability and Transparency: AECL out of Control	15
3.2. Corruption at AECL	15
4. More Nuclear Mega-subsidies to Come?	17
4.1. The Canadian Neutron Facility	18
4.2. AECL's Rad-Waste and Decommissioning Liability	19
5. Reactor Exports: Fated to Fail	22
5.1. The Economics of Nuclear Power	23
5.2. South Korea	24
5.3. Romania	26
6. Whiteshell Laboratories: More Subsidies	28
6.1. Whiteshell Environmental Assessment Process	31

List of Tables

Table 1. Federal Government Subsidies to AECL	7
Table 2. Subsidies to AECL: Government Promise Vs. Actual Subsidy (\$ million)	11
Table 3. Radioactive Wastes at Whiteshell Waste Management Area & Concrete Canister Storage Facility	31

Executive Summary

Atomic Energy of Canada Limited (AECL) is a federal crown corporation that designs and markets CANDU reactors, and conducts other nuclear-related activities. AECL was created by the federal government, and from the beginning has relied on public funding. Now, almost fifty years later, AECL continues to depend on subsidies from taxpayers. Despite glowing promises of economic benefits and profit, it has always been a case of jam tomorrow, but never jam today. Government subsidies to AECL from 1953 to 2000 total \$16.6 billion (\$2000). It's time to stop the financial meltdown, and end federal nuclear subsidies to AECL.

In its March 1996 budget announcement, the Chrétien government promised to reduce its subsidies to AECL. Subsidies were to be reduced to \$174 million in 1997; \$132 million by 1998; and \$100 million per year thereafter. The government has seriously backtracked on this commitment. Its budget promise was exceeded by 14% in 1997; 27% in 1998; 27% in 1999; and 57% in 2000. The average annual subsidy to AECL in those four years was \$162 million.

While the federal government has implemented draconian cutbacks to social programs such as health care, it has continued to throw billions of dollars at nuclear power, a sunset technology. By way of comparison, AECL's \$156 million subsidy in 2000 could have bought 50 MRI (Magnetic Resonance Imaging) machines and operated them for a year. Instead Canadians are forced to pay for private clinics and travel to the United States. AECL's subsidy in 2000 could also have paid for about 2,200 nurses for one year, or for 12,500 heart operations.

The federal government spent 13 times more on subsidies to AECL in 2000 than on its total funding for renewable energy (\$156.5 million to AECL in 1999-2000, \$12 million/year for renewables ¹). The impact on the federal budget would be 'revenue neutral' if the government eliminated subsidies to AECL and instead funded renewable energy and efficiency programs. Efficiency and renewable energy technologies are two of the most important solutions to the climate change crisis. Nuclear power is not a viable solution to climate change because of its high cost and its own serious environmental problems.

The government has also given AECL a huge amount of financial support that does not show up on its books as direct subsidies:

- In 1996, the government provided a loan and guarantee of \$1.5 billion to China so that AECL could sell them two CANDU reactors.
- From 1996-2000, \$38.1 million was committed in an unsuccessful attempt to preserve AECL's Whiteshell laboratory in Manitoba.
- In 1996, \$120 million was committed for two MAPLE reactors at AECL's Chalk River facility that are owned by a private company (MDS Nordion).
- In 2000, another \$120 million has been promised to AECL over five years as part of the government's 'rust-out' program.

With AECL, subsidies in the past become the reason for even greater subsidies in the future. Now AECL wants \$500 million to build a new reactor known as the Canadian Neutron Facility. This reactor should only be built on a user-pay basis, with no public funding. Users such as Ontario

1. *2000 Report of the Commission of the Environment and Sustainable Development*, May 30 2000, Chapter 3, paragraph 3.34, p. 3-12.

Power Generation, and private sector companies which expressed support, such as Alcan International Ltd., Xerox Canada, and Marubeni Canada Ltd., should pay both the capital and operating costs of the reactor.

AECL has also served notice that it needs another mega-project -- a new heavy water plant for the reactors that it hopes to sell.

Taxpayers are being forced to pay a billion dollars or more to clean up radioactive waste and decommission AECL's old nuclear facilities. Because of its huge cost and because human health and the environment are at stake, an open process involving the public should be convened to consider AECL's decommissioning plan, including its expected costs and the proposed terms for management of the decommissioning fund. AECL and the federal government should establish an actual fund to cover the future costs and the total cost (allowing for accrual of interest over time) should be paid into this fund during the active operating life of the facilities. This fund should be separate from the operations of AECL, and should be managed and accounted for by an independent body.

AECL is a crown corporation out of control. The government has refused to allow any public consultation on the future of this publicly funded crown corporation, and has withheld basic information. Its corporate plans have not been filed with parliament since 1995, despite a legislative obligation to report annually. AECL ceased to report its overseas 'agent fees' in 1998. Agent fees were the vehicle for multi-million dollar bribes in the past. Secrecy and lack of accountability have been justified in the name of national security, despite the fact that Canada does not have a nuclear weapons program, and in the name of commercial confidentiality, despite the fact that AECL is not a commercial company in any normal sense of the word.

AECL is not economically viable. Ontario Hydro (now Ontario Power Generation) dramatically reduced its funding of AECL, and prospects for further reactor sales are dismal. Ironically, AECL has focused on CANDU sales just when most of the world has stopped building new nuclear plants and has opted for cheaper, cleaner and safer generating options such as renewable energy and high efficiency natural gas. There have been no new reactor orders in North America since 1979. CANDU nuclear power is plagued by high cost, abysmal performance, endemic technical problems, the risk of catastrophic accidents, and environmental problems such as radiation releases and radioactive waste.

Since the goal of selling 'ten reactors in ten years' was set by the government in 1995, AECL has sold only two reactors to China, and more sales to South Korea, Romania, or China are unlikely. Even if AECL sells a few more reactors, it would still be a net loss for Canada given \$16.6 billion of past subsidies, and the billions more that would be required in the near future. After almost fifty years of ongoing taxpayer subsidies to AECL, it is time to phase out federal support for nuclear power in favour of renewable energy and efficiency measures. Halting subsidies to AECL is an important step towards a green energy future for Canada.

1. Total Government Subsidies to AECL

Atomic Energy of Canada Limited (AECL) is a federal crown corporation that designs and markets CANDU reactors, and conducts other nuclear-related activities. AECL receives its parliamentary appropriation through Natural Resources Canada, and reports to the Minister of Natural Resources. As shown in Table 1, government subsidies to AECL from 1953 to 2000² total \$16.6 billion (\$2000). This is a real cash subsidy to AECL, and the figures are based on AECL's own annual reports.

2 . In the table and throughout this report, we use the end-year of the fiscal years 1952-1953 to 1999-2000, ending on March 31st.

In 1993, AECL released its own commissioned study of subsidies that was done by Ernst & Young. That study reported subsidies to AECL for the years 1953 to 1993 of \$4.754 billion in as-spent, dollars-of-the-year. To get this figure, Ernst & Young offset several billion dollars of additional subsidies by assuming that the federal treasury would be 'rewarded' by the sale of 'assets' such as the heavy water inventory. This has not happened.

In 1998, Natural Resources Canada funded a study entitled *Nuclear Energy Policy in Canada 1942 to 1997*. The study was sponsored by the Carleton Research Unit on Innovation Science and Environment (CRUISE), and written by Robert Morrison, former Director of the Nuclear Energy Division at Natural Resources Canada. Morrison's study included tables of government subsidies to AECL from 1953 to 1997, which duplicated the figures in the Ernst & Young table (1953 to 1993) and added on subsidies from 1994 to 1997. Morrison reported total subsidies to AECL from 1953 to 1997 of \$5.480 billion in as-spent, dollars-of-the-year.

In May 2000, the Commission of the Environment and Sustainable Development stated that "Since 1946, the federal government has spent about \$6 billion on nuclear technology, mostly through Atomic Energy of Canada Limited."³ Again this figure is cited in as-spent, dollars-of-the-year.

Subsidies given to AECL are valuable tax dollars that could have been spent on important social programs that have been slashed by the federal government since 1994. AECL's \$170.5 million subsidy in 2000 could have bought 70 MRI machines and operated them for a year.⁴ Instead Canadians are forced to pay for private clinics and travel to the United States, or wait lengthy periods for treatment here. AECL's subsidy in 2000 could also have provided salaries for about 2,400 nurses for one year, or paid for 13,600 heart operations.⁵

Subsidies given to AECL could also have been spent in the promotion of renewable energy technologies, or energy efficiency. Canada has committed itself to the 1997 Kyoto Protocol, an agreement on climate change to reduce emissions of six greenhouse gases, including carbon dioxide. Canada is committed to reducing its emissions to six percent below 1990 levels by 2008-2012. However, Canadian emissions were already 13 percent above 1990 levels by 1997.

Two of the most important solutions to the climate change crisis are the promotion of greater energy efficiency, and greater use of renewable energy sources. Nuclear power is not a viable solution to climate change because of its high cost and its own serious environmental problems. It has been shown that it is possible, using available technologies, to reduce greenhouse gas emissions in Canada by 50%, while shutting down coal, oil and nuclear generating plants by 2030.⁶

Canada's Commissioner of the Environment and Sustainable Development notes that the federal government is spending about \$12 million annually on renewable energy.⁷ By comparison, in the

3 . *2000 Report of the Commission of the Environment and Sustainable Development*, May 30 2000, Chapter 3, paragraph 3.33, p. 3-11.

4 . Magnetic Resonance Imaging (MRI) machines cost about \$1.5 million to purchase and about \$1 million per year to operate. Source: Ontario Hospital Association, November 2000.

5 . Source: Ontario Hospital Association, November 2000.

6 . Ralph Torrie, *Power Shift: Cool Solutions to Global Warming*, David Suzuki Foundation, April 2000, p. 9. <http://www.davidsuzuki.org/PDF/powershift11.pdf>

7 . *2000 Report of the Commission of the Environment and Sustainable Development*, May 30 2000, Chapter 3, paragraph 3.34, p. 3-12.

four years since it moved to reduce AECL funding (1997-2000 inclusive), the federal government has provided average subsidies of \$168 million per year to AECL, or 14 times the annual funding for renewable energy. The Commissioner of the Environment and Sustainable Development has suggested that the government should promote renewable energy and energy efficiency.⁸ This vital policy objective could be achieved in a revenue neutral fashion by phasing out subsidies to AECL and instead funding renewable energy and efficiency programs.

Despite measures to reduce its funding, AECL continues to maintain a bloated international infrastructure with over 3,400 employees. The Canadian infrastructure is mainly Ontario-based, and includes two huge research enclaves, with about 2,000 employees at the Chalk River Nuclear Laboratories in the Ottawa Valley, and about 1,200 employees (including the head office) at Sheridan Park in Mississauga. There is a residual presence at the Whiteshell research facility in Manitoba. In addition, AECL maintains offices in Ottawa, Gloucester and Montreal. AECL also has two wholly-owned subsidiaries: AECL Technologies Inc., incorporated in Delaware, USA in 1998, and AECL Technologies B.V., incorporated in the Netherlands in 1995. Off-shore, as part of its elaborate CANDU marketing operation, AECL also has offices in nine different countries: Argentina, China, Indonesia, South Korea, The Netherlands, Romania, Thailand, Turkey, and the United States.⁹

8 . *2000 Report of the Commission of the Environment and Sustainable Development*, May 30 2000, Chapter 3, paragraph 3.87, p. 3-22.

9 . AECL, *AECL Annual Report 1999-2000*, p. 49.

Table 1 - Federal Government Subsidies to AECL

Fiscal End Year	< R&D >	< REACTORS					>> HEAVY WATER					>> FINANCIAL					2000 Equivalent TOTAL		
	R&D	Prototype Reactor Funding	Pickering [2] Pay-back	CANDU 3 Slowpoke	Decomm	Loans [5] Forgiven	HWP Loans Payment	HWP [8] Support	LaPrade [11] Maintenance	[5] HWP Closures	Dividends/ [5] Guarantees/ Investments	Additional Subsidies	Subsidiaries Divested	Nominal TOTAL					
1953	21.4	-	-	-	-	-	-	-	-	-	44.7	[13]	-	66.1	414.5				
1954	19.6	-	-	-	-	-	-	-	-	-	-	-	-	19.6	121.3				
1955	29.5	-	-	-	-	-	-	-	-	-	-	-	-	29.5	182.6				
1956	30.3	-	-	-	-	-	-	-	-	-	-	-	-	30.3	184.4				
1957	30.5	0.5	-	-	-	-	-	-	-	-	-	-	-	31.0	183.2				
1958	23.8	0.8	-	-	-	-	-	-	-	-	-	-	-	24.6	141.3				
1959	26.6	2.1	-	-	-	-	-	-	-	-	-	-	-	28.7	162.8				
1960	24.7	5.8	-	-	-	-	-	-	-	-	-	-	-	30.5	171.7				
1961	26.5	11.7	-	-	-	-	-	-	-	-	-	-	-	38.2	213.4				
1962	29.1	4.8	-	-	-	-	-	-	-	-	-	-	-	33.9	187.2				
1963	37.1	-	-	-	-	-	-	-	-	-	-	-	-	37.1	200.2				
1964	44.9	-	-	-	-	-	-	-	-	-	-	-	-	44.9	238.7				
1965	45.2	-	-	-	-	-	-	-	-	-	-	-	-	45.2	235.0				
1966	52.7	-	-	-	-	-	-	-	-	-	-	-	-	52.7	264.4				
1967	58.0	-	-	-	-	-	-	-	-	-	-	-	-	58.0	279.2				
1968	66.5	-	-	-	-	-	-	-	-	-	-	-	-	66.5	306.7				
1969	68.6	-	-	-	-	-	-	-	-	-	-	-	-	68.6	303.7				
1970	69.0	-	-	-	-	-	-	-	-	-	-	-	-	69.0	295.4				
1971	68.9	-	-	-	-	-	-	-	-	-	-	-	-	68.9	288.1				
1972	77.0	-	-	-	-	-	-	-	-	-	-	-	-	77.0	308.4				
1973	78.2	-	-	-	-	-	-	-	-	-	-	-	-	78.2	294.3				
1974	87.9	-	-	-	-	-	-	-	-	-	-	-	-	87.9	300.0				
1975	85.9	-	-	-	-	-	-	-	-	-	-	-	-	85.9	264.7				
1976	93.6	-	-	-	-	-	-	-	-	-	-	-	-	93.6	268.7				
1977	96.8	85.5	-	-	-	-	-	13.3	-	-	-	-	-	195.6	523.8				
1978	101.7	275.4	[3]	0.0	[4]	-	-	26.8	-	-	-	-	-	403.9	1,004.4				
1979	110.3	8.9	0.0	[4]	-	-	-	-	-	-	-	-	-	119.2	273.1				
1980	114.7	8.8	0.0	[4]	-	-	-	-	-	-	-	-	-	123.5	257.4				
1981	123.1	10.2	0.0	[4]	-	-	816.9	[7]	9.3	[9]	65.0	8.6	-	1,033.1	1,936.1				
1982	145.7	11.4	0.0	[4]	-	-	-	-	9.3	-	112.9	4.5	-	283.8	482.6				
1983	169.9	12.7	0.0	[4]	-	-	-	-	11.3	-	118.3	3.1	-	315.3	504.2				
1984	184.5	12.4	0.0	[4]	-	-	-	-	12.3	-	124.7	2.5	-	336.4	517.7				
1985	192.4	11.1	-	-	2.6	-	-	-	12.3	-	104.6	2.5	-	325.5	483.4				
1986	172.7	-	-	-	3.9	18.3	-	-	13.3	-	29.2	2.3	35.4	275.1	393.4				
1987	176.8	-	-	-	4.9	11.9	-	-	3.3	[10]	-	1.9	18.8	217.6	299.1				
1988	143.3	-	-	-	10.4	20.3	[6]	-	3.3	[10]	0.0	[12]	0.5	2.6	0.0	[14]	-	180.4	239.1
1989	135.9	-	-	44.4	11.1	10.3	[6]	-	4.5	[10]	0.0	[12]	-	-	-	-	-	206.2	260.9
1990	141.5	-	-	29.2	12.2	12.0	[6]	-	1.6	[10]	0.0	[12]	-	-	-	-	9.1	205.6	249.3
1991	154.3	-	-	-	-	11.4	[6]	-	1.8	[10]	0.0	[12]	-	-	-	-	-	167.5	193.9
1992	162.1	-	-	-	-	11.9	[6]	-	1.9	[10]	0.0	[12]	-	-	0.0	[14]	-	175.9	201.1
1993	167.3	-	-	-	-	10.9	-	-	2.1	[10]	0.0	[12]	-	-	-	-	-	180.3	202.7
1994	161.5	-	-	-	-	9.8	-	-	2.3	[10]	0.0	[12]	-	-	-	-	-	173.6	191.3
1995	169.5	-	-	-	-	10.5	-	-	-	-	-	-	-	-	-	-	-	180.0	195.2
1996	164.3	-	-	-	-	10.3	-	-	-	-	-	-	-	-	-	-	-	174.6	186.8
1997	167.4	-	-	-	-	-	-	-	-	-	-	-	1,500.0	[15]	19.9	[16]	-	1,687.3	1,769.6
1998	132.2	[1]	-	-	-	-	-	-	-	-	-	-	-	20.6	[17]	-	-	152.8	158.0
1999	102.4	-	-	-	-	-	-	-	-	-	-	-	-	-	8.0	[18]	-	110.4	112.4
2000	105.7	-	-	-	-	-	-	-	-	-	-	-	-	-	32.1	[19]	-	137.8	137.8
TOTAL	4,691.5	462.1	0.0	73.6	45.1	137.6	816.9	88.6	594.8	25.9	56.8	1,544.7	80.6	9.1	8,627.2	16,583.1	[20]		

Notes to Table 1. Federal Government Subsidies to AECL

The first version of this table was originally produced in 1996 as part of a study for the Campaign for Nuclear Phaseout (CNP), entitled *Nuclear Sunset: The Economic Costs of the Canadian Nuclear Industry*. The table at that time included subsidies for the years 1952 to 1995 inclusive, which then totalled \$12.919 billion (\$1995).

The original table of subsidies was in response to a study by the consulting firm of Ernst & Young for Atomic Energy of Canada Limited (AECL), entitled *The Economic Effects of the Canadian Nuclear Industry*, October 1993. At that time, Ernest & Young reported total subsidies to AECL for the years 1952-53 to 1992-93 of \$4.754 billion (nominal dollars, or 'dollars-of-the-year').

In 1998, Natural Resources Canada (the department of the Canadian government responsible for AECL, nuclear energy and uranium mining) funded a study entitled *Nuclear Energy Policy in Canada 1942 to 1997*. The study was written for the Carleton Research Unit on Innovation Science and Environment (CRUISE) by Robert Morrison, former Director of the Nuclear Energy Division at Natural Resources Canada. Morrison's study included tables of government subsidies to AECL from 1953 to 1997, which virtually duplicated the Ernst & Young table in its entirety (1953 to 1993) and added on subsidies from 1994 to 1997. Morrison reported total subsidies to AECL from 1953 to 1997 of \$5.480 billion (nominal dollars, or 'dollars-of-the-year').

Some of the following notes refer to the Ernst & Young (E&Y), and Morrison studies. AECL has never directly challenged or refuted any of the subsidy tables previously published by the Campaign for Nuclear Phaseout.

- [1] In 1998, AECL reported Research and Development funding of 142.386, but in 1999 changed it retroactively to \$132.215 (*AECL Annual Report 1998-1999*, p. 44). See also Note 17 below.
- [2] Subsidies from 1957 to 1962 were for the NPD reactor. Subsidies from 1977 to 1985 were for the Douglas Point and Gentilly-1 reactors.
- [3] Includes non-cash contribution of \$124.1 million respecting accrued interest on loans used to finance the prototype nuclear power reactors.
- [4] Ernst & Young (E&Y) and Morrison assumed an "offset expenditures" principle concerning the Pickering payback agreement from 1977 to 1983 which totals \$195.6 million. In other words, E&Y assumed that these payments from Ontario Hydro offset Federal Government funding that would have been available, if not for the Pickering payback agreement. This is not an appropriate assumption. In 1993, Ontario Hydro wrote off \$410 million in amounts owed under this agreement from AECL and the Government of Ontario. This negative payback was accrued as a result of the poor performance of Pickering Units 1 and 2, particularly between 1984 and 1987.
- [5] E&Y and Morrison combined LaPrade Heavy Water Plant (HWP) Maintenance with HWP Closures and Decommissioning under the column "Plant Closure/Safekeeping" (E&Y) and "Decommissioning" (Morrison). They also placed decommissioning figures from 1986 and 1987 under "NPR [Nuclear Power Reactor] /Funding". This table has listed figures separately for Reactor Decommissioning, LaPrade Maintenance, and HWP Closures — as they were reported annually by AECL. Reactor Decommissioning includes subsidies for the closing of Gentilly-1, NPD, Douglas Point, WR-1, and NRX.
- [6] Lower figures were included in the E&Y and Morrison tables, although figures used in this table are clearly identified in AECL annual reports.
- [7] Due to the inadequacy of future sales of heavy water, Parliament forgave Heavy Water Plant (HWP) loans and interest effective April 1, 1980 for the LaPrade, Glace Bay and Port Hawkesbury HWPs, in the amount of \$816.948 million. E&Y and Morrison reported costs of \$672.2 million directly and non-cash costs of \$157.4 million, but only included \$672.2 million in their tables of subsidies.
- [8] Payments to the Province of Nova Scotia for purchase of the Glace Bay Heavy Water Plant.
- [9] Review of AECL annual reports for this table reveals that E&Y and Morrison missed a taxpayer contribution of \$9.3 million in fiscal year 1980-81.
- [10] E&Y and Morrison overstated the value of "Loans Payment Support" from fiscal year 1989-1990 to fiscal year 1992-1993. Morrison also overstated the value in 1993-1994. These values were corrected in this table for the actual amounts included in AECL annual reports.
- [11] The federal government provided subsidies to cover the on-going operating losses of the heavy water plants in operation.
- [12] E&Y and Morrison assumed an "offset expenditures" principle concerning Heavy Water Production support. This was not an appropriate assumption. E&Y's valuation of the heavy water inventory as having a book value of \$522.5 million at the end of fiscal year 1993, and Morrison's valuation of \$520.1 million at the end of 1996, both assumed that the federal government could actually realize this value. This assumption has proven false. A non-cash contribution for the interest accruing on AECL production support should be calculated in order to fully describe taxpayer costs, and would likely exceed \$50 million per year, but would require further information to confirm. In order not to overstate the taxpayer cost, this study assumes that

- these costs are zero. In 1996, AECL confirmed that an agreement had been reached with the Government, to "release the corporation from its obligation to repay parliamentary appropriations" (*AECL Annual Report 1995-1996*, p. 31). E&Y and Morrison assumed that the Government would indeed be repaid, in estimating the extent of Government support for AECL. The so-called Treasury Board Agreement, effective 1996-1997 directs AECL to hold the proceeds of heavy water sales or leases for use in decommissioning activities for ten years. This arrangement may be renewed after 2006 (*AECL Annual Report 1996-1997*, p. 33).
- [13] As noted in the *AECL Annual Report 1953-54*, nominal values of \$1.00 each were assigned in AECL's Balance Sheet to (1) research goods having a book value of \$3,352,239; and (2) land, buildings and equipment having a book value of \$41,357,693. As the Auditor General's Office noted at the time, "Since these constitute the essential stock in trade and equipment for the continuing research and development program of the Company [AECL], the nominal values shown may not be regarded as representing a true and fair view." In order to accurately reflect total subsidies to AECL, a total of \$44.7 million was added to the 1953 fiscal year in this table.
- [14] In 1988, AECL sold Nordion International Inc. (formerly the AECL division known as the Radiochemical Company) to the Canada Development Investment Corporation (CDIC) for eventual privatization. In 1991, CDIC sold Nordion to MDS Health Group Ltd. for \$165 million, and it was reported that AECL received \$150.5 million from CDIC, and that this, "together with interest earned thereon between the dates of receipt and disbursement, has been distributed to the Shareholder by way of dividends" (*AECL Annual Report 1991-1992*, p. 12). E&Y and Morrison noted a \$152.5 million dividend in 1992 from the Nordion sale. The sale resulted in lengthy litigation by MDS and Nordion, with AECL, CDIC and the Attorney General of Canada named as liable parties. An out-of-court settlement was announced in July 1996, involving a payment of \$5 million by the government, an interest-free loan of \$100 million from the government to MDS/Nordion, and an additional payment of \$12.5 million to MDS/Nordion by AECL. However, details including the total project cost, loan terms, long-term liability for waste management and decommissioning, and other terms of the settlement have not been disclosed. For these reasons, even if funds were advanced to the Receiver General, the amounts advanced will not offset liabilities.
- [15] In support of AECL's exporting efforts to China, the Federal Government has assumed a guarantee liability for \$1.5 billion. Since this sale could not be financed through conventional financing sources, it represents the largest single taxpayer funded obligation ever provided to AECL by the government. This guarantee is similar in nature to loan guarantees and financing support provided for heavy water production in the amount of \$816.9 million, which the government forgave, effective in 1980-81.
- [16] In 1997, AECL reported a \$30.039 million parliamentary appropriation for "Program Review", also referred to as "Restructuring Costs", for downsizing costs resulting from the government's 1995 Program Review. Morrison reported a "Program Review" subsidy of \$30 million. However, in 1998, AECL changed that amount retroactively for 1997 to \$19.9 million, which was explained as "pass-through of the government's contribution towards phasing out their investment in the Fusion Program" (*AECL Annual Report 1997-1998*, p. 36).
- [17] In 1998, AECL included "termination costs" of \$10.400 million in its parliamentary appropriations (*AECL Annual Report 1997-1998*, p. 36). In 1999, another item was added retroactively in the amount of \$10.171 million for "Whiteshell commercialization" (*AECL Annual Report 1998-1999*, p. 44). These two items have been combined under the heading "Additional subsidies" for the year 1998.
- [18] In 1999, AECL included \$8.0 million in its parliamentary appropriations for "Year 2000" expenses, described as "...part of the government's program to assist crowns and departments in defraying Year 2000 costs" (*AECL Annual Report 1998-1999*, p. 44).
- [19] In 2000, AECL reported \$24.5 million for "Year 2000" expenses and \$15.6 million for "Termination costs" in its parliamentary appropriations. No detailed explanation was offered for the Termination costs appropriation, other than to say that it represents "...the release of a previously frozen allotment by the government to cover termination costs incurred during the Program Review implementation period" (*AECL Annual Report 1999-2000*, p. 44). In addition, the \$8.0 million appropriation in 1999 for "Year 2000" is treated as an "advance" which is recorded in 2000 as a "reduction" of appropriations. This table records a net appropriation for these items in the amount of \$32.1 million under the heading "Additional subsidies" for the year 2000.
- [20] Based on the Gross Domestic Product Price Index. This index was chosen because it is an historically consistent set of data available back to 1952-53. Since this index is a composite of economic activity and pricing, it generally converts nominal to real values at rates less than the rate of inflation.

2. Government Backtracks on AECL Subsidy Reduction

In the federal budget of March 1996, the Chrétien government announced that it would continue massive subsidies for Atomic Energy of Canada Limited (AECL) indefinitely, but that the level of funding would be reduced from historic levels. The 1996 *Budget Plan* stated,

AECL's federal funding will be \$174 million in 1996-97, and is scheduled to fall to \$132 million by 1997-98. As a result of Program Review, an additional \$32 million in direct federal funding will be eliminated by 1998-99.¹⁰

The government has seriously backtracked on this commitment, and it has tried to cover its backtracks in several ways: by putting subsidies into special categories under the pretence of one-time funding; by concealing subsidies derived from heavy water sales and leases; and by providing financial support that does not appear in the AECL annual reports as part of the parliamentary appropriation.

Below, we have made a comparison of the government's March 1996 budget promise to the actual direct subsidies, how the government has tried to cover up its backtracking on these commitments, and a notation of the hidden heavy water subsidy. The direct subsidies and hidden heavy water subsidies are summarized in Table 2.

Government Backtracks in 1996-97

Following a retroactive amendment, AECL subsidies for 1996-97 were reported as \$167.4 million for research and \$19.9 million for "Program Review", explained as "pass through of the government's contribution toward phasing out their investment in the Fusion Program".¹¹ Thus the direct subsidy for 1997 was \$187.3 million.

This did not include an additional disguised subsidy of \$11.0 million from the sale and/or lease of heavy water, recorded for the first time on AECL's books in 1996-97 (and amended retroactively the following year).¹² The government decided that funds from the sale of the heavy water inventory would simply be turned over to AECL rather than reimbursing taxpayers for the subsidies that they had paid for the production of the heavy water.¹³ Thus, government subsidies to AECL in 1996-97 (not including financial support for foreign reactor sales and construction of new reactors at Chalk River) actually amounted to \$198.3 million, a 14% increase over the March 1996 budget commitment of \$174 million.

In this same year, the government made several other significant financial commitments to AECL which did not show up as direct subsidies. The most notable was an astounding loan and guarantee of \$1.5 billion to finance the sale of two CANDU reactors (known as Qinshan Phase III) to the People's Republic of China. This was one of the largest loans and guarantees in Canadian history.

In addition, in July 1996 the government settled a longstanding lawsuit with MDS Nordion and its parent company MDS Inc.. The lawsuit was the end result of an abortive 1988 privatization of an

10 . Department of Finance (Canada), *Budget Plan*, Tabled in the House of Commons by the Hon. Paul Martin, Minister of Finance, March 6, 1996, p. 45.

11 . *AECL Annual Report 1997-1998*, p. 36.

12 . *AECL Annual Report 1997-1998*, p. 30.

13 . *AECL Annual Report 1995-1996*, p. 31.

AECL division responsible for production of medical isotopes and irradiation equipment. AECL had dramatically underestimated the cost of building a new reactor, resulting in the lawsuit. In the 1996 out-of-court settlement, the government agreed to pay \$5 million of the cost of two new MAPLE reactors for radioisotope production that would be owned by MDS Nordion, as well as providing a \$100 million interest-free loan to finance the reactors and a new reprocessing facility.¹⁴ AECL also agreed to provide another \$12.5 million towards the cost. These amounts did not include \$40 million previously spent on the MAPLE facility. Government Backtracks in 1997-98

Following another retroactive change, AECL reported a research subsidy for 1997-98 of \$132.215 million¹⁵, as well as “termination costs” of \$10.400 million¹⁶, and \$10.171 million for “Whiteshell commercialization”¹⁷. When these subsidies are added on to the disguised heavy water subsidy of \$15.4 million¹⁸, the annual total of subsidy is \$168.2 million, exceeding the March 1996 budget commitment of \$132 million by 27%.

Table 2: Subsidies to AECL – Government Promise vs. Actual Subsidy
(\$ million)

Fiscal Year (to Mar 31)	March 1996 Budget Promise	Direct Subsidies	Hidden Heavy Water Subsidy	Total Subsidy	% above promise
1996-1997	\$174	\$187.3	\$11.0	\$198.3	14%
1997-1998	\$132	\$152.8	\$15.4	\$168.2	27%
1998-1999	\$100	\$110.4	\$16.3	\$126.7	27%
1999-2000	\$100	\$137.8	\$18.7	\$156.5	57%
Four-year average annual subsidy = \$162.4 million					

Sources: (1) Department of Finance (Canada), *Budget Plan*, March 6, 1996, p. 45.
(2) AECL Annual Reports 1997 to 2000

14 . “Agreement Reached Ensuring Supply of Medical Isotopes”, *MDS Nordion News Release*, July 9, 1996.

15 . *AECL Annual Report 1998-1999*, p. 44.

16 . *AECL Annual Report 1997-1998*, p. 36.

17 . *AECL Annual Report 1998-1999*, p. 44.

18 . *AECL Annual Report 1998-1999*, p. 36.

Government Backtracks in 1998-99

In 1999, AECL reported \$102.4 million for “research” subsidies to AECL, and \$8.0 million for “Year 2000” expenses.¹⁹ When these subsidies are added on to the disguised heavy water subsidy of \$16.3 million²⁰, the total subsidy is \$126.7 million, exceeding the March 1996 budget commitment of \$100 million by 27%.

Government Backtracks in 1999-2000

In 2000, AECL reported a “research” subsidy of \$105.65 million. In addition, the net total of subsidies for “Year 2000”, “Year 2000 Frozen Allotment”, and “Termination Costs” was \$32.1 million.²¹ When the disguised heavy water subsidy of \$18.7 million²² is added on, the total subsidy for the year is \$156.5 million, exceeding the March 1996 budget commitment of \$100 million by 57%.

3. AECL: Viability & Acceptability

Following the 1995 program review and the March 1996 budget announcement, AECL re-asserted that its corporate strategy is “to continue growing the CANDU business and to finalize sales in our key markets”.²³ This was not a new strategy. Under Reid Morden, who became President in the fall of 1994, AECL had already merged its two separate Research and CANDU Operations units into one entity, emphasizing a focus on the CANDU business.

In response to the 1995 program review, AECL moved to eliminate non-CANDU-related research programs. The federal government also decided to end the Fusion Program administered by AECL by March 31, 1997. There was also recognition that AECL could not justify maintaining three huge research establishments, at Whiteshell in Manitoba, Chalk River in the Ottawa Valley in Ontario, and Sheridan Park in Mississauga, Ontario. AECL moved to largely shut down Whiteshell, but was forestalled by political intervention (see Whiteshell section below).

AECL has reached a key turning point in its history. In the past, AECL has depended on subsidies from the federal government as well as financial support from Ontario Hydro (now Ontario Power Generation). However, this ended in 1997 with the expiry of a federal/provincial funding arrangement. In April 1990, a seven-year agreement had been signed between the federal government and the three provinces with nuclear plants, which saw a dramatic increase in funding from Ontario Hydro to AECL.

In principle, the agreement was an attempt to unify the nuclear research efforts of AECL and Ontario Hydro. However, the interests of AECL and Ontario Hydro were fundamentally at odds. AECL’s primary hope for success was through overseas sales, but Ontario Hydro’s interest was mainly in the operation and maintenance of its existing reactors. In 1990, this difference was of

19 . AECL Annual Report 1998-1999, p. 44.

20 . AECL Annual Report 1998-1999, p. 36.

21 . AECL Annual Report 1999-2000, p. 44.

22 . AECL Annual Report 1999-2000, p. 36.

23 . Reid Morden, *Information Notice for Employees*, AECL, March 7, 1996, p. 2.

less concern because Ontario Hydro had released a plan in December 1989 for massive generating system expansion that included up to 15 new nuclear power reactors. The expansion would have provided enough work for both AECL and Ontario Hydro's nuclear division. However, by February 1993, Ontario Hydro's grandiose expansion plans had completely collapsed, and there was no chance that any new reactors would be built in Ontario.

Just as the seven-year agreement expired in 1997, the Ontario government decided to introduce competition in the electricity sector.²⁴ Faced with dramatically reduced funding from Ontario Hydro, AECL had desperately advocated a merger between itself and Ontario Hydro's nuclear division to form "Nuclear Canada". AECL proposed that nuclear power; CANDU R&D, plant maintenance and operation; and radioactive waste management should all be handled by one company. AECL Chair Robert Nixon, and former President and CEO Reid Morden stated, "None of the partners [in the Canadian nuclear industry] can maintain their CANDU-related activities independently of the other partners."²⁵ However, the momentum behind a merger was not enough to overcome the conflicting interests of the two organizations. Ontario Hydro was facing a nuclear crisis of its own, involving high operating costs combined with dramatically declining performance at its nuclear plants, and was not interested in sharing AECL's problems as well.

The vehicle for the seven-year funding agreement had been the CANDU Owners Groups (COG), an organization founded in 1984 nominally as a research body to provide support for CANDU utilities in Canada and abroad. Most of the funding was provided by Ontario Hydro, with the lion's share of the research being conducted by AECL. Following the end of the seven-year agreement 1997, total COG research expenditures have dropped from a high of almost \$200 million in 1992-93 to about \$13 million in 1999-2000.

The dramatic decline of funding for AECL by Ontario Hydro/Ontario Power Generation has coincided with several projects that will require mega-subsidies in the near future. These include the building of the \$500 million Canadian Neutron Facility reactor, refurbishment of various facilities at the huge Chalk River laboratories, and building a new heavy water plant to provide heavy water for theoretical CANDU sales. These expansion plans are in addition to the unavoidable cost of radioactive waste management and decommissioning for AECL's five sites.

The Canadian government's continued support for nuclear power is on the wrong side of history. Long touted as the energy source of the future, nuclear power can now be confirmed as a technology in decline. Around the world, nuclear power grew by more than 700% in the 1970s, and 140% in the 1980s, but only about 5% in the 1990s²⁶, when it went from being the world's fastest growing form of energy to the slowest. The world's nuclear generating capacity is expected to peak by 2002 at the latest, and will then begin a period of sustained decline.²⁷ The United States Department of Energy, in its long-term forecast for nuclear power world-wide has suggested that under its low growth scenario, nuclear power capacity will decline 49% between 1997 and 2020.²⁸

24 . Ontario Government, *Direction for Change: Charting a Course for Competitive Electricity and Jobs in Ontario*, November 1997.

25 . Letter from Robert Nixon and Reid Morden (AECL) to Donald Macdonald, Chair, Advisory Committee on Competition, January 30, 1996, "Keeping the CANDU Industry Viable", p. 3.

26 . Worldwatch Institute, "Nuclear power nears peak", *News Alert*, March 5, 1999.

27 . Christopher Flavin & Nicholas Lenssen, "Nuclear Power Nears Its Peak", *World Watch*, July/August 1999, p. 36.

28 . US Department of Energy, *International Energy Outlook 1999*, p. 77.

The market for nuclear power plants has evaporated in most of the developed world. In Canada, there have been no new reactor orders since 1974.²⁹ The former Ontario Hydro³⁰ proposed a massive nuclear expansion in 1989, for up to fifteen 881 MW reactors at four stations, but after more than three years of public hearings, this ill-considered scheme completely collapsed in 1992-93. The introduction of competition to electricity generation in Ontario in 2001 means that there is almost no chance of any new nuclear power plants ever being built again, mainly because of their high cost. The debate in Canada is no longer about building new nuclear plants, it is about when to shut down the old ones.

Ontario Hydro announced on August 13, 1997 that it would temporarily shut down its oldest seven reactors because of poor performance as well as management and safety issues.³¹ This included four reactors at the Pickering "A" nuclear station, just east of Toronto, and three reactors at the Bruce "A" nuclear station on the shore of Lake Huron near the town of Kincardine. Ontario Hydro had already shut down one reactor at the Bruce "A" station in 1995. Ontario Hydro also shut down Canada's last operating heavy water plant located at the Bruce site. CANDU reactors need large amounts of heavy water for both coolant and moderator, and permanent shutdown of Canada's only remaining heavy water plant has prompted AECL to serve notice that taxpayers will be expected to build a new heavy water plant.

The four Bruce "A" reactors lasted less than half of their expected 40-year lifetimes, before being shut down for long-term repair work. The Pickering "A" reactors lasted about 25 years, despite having been re-tubed at a cost of \$1 billion (Cdn) following a catastrophic pressure tube break at Pickering reactor #2 in 1983.³² The shutdowns left Ontario Power Generation with 12 reactors in operation — four at the Pickering "B" station; four at the Bruce "B" station; and four at the Darlington station. The closure of eight reactors is the largest long-term nuclear station shutdown by any utility in the world.

Outside of Ontario, there are only two nuclear power reactors in Canada — one operated by Hydro Québec (Gentilly-2) and one operated by New Brunswick Power (Point Lepreau). The Québec government declared a moratorium on nuclear reactors in the province in 1978. Hydro Québec has no plans to build more reactors, and is considering the early retirement of the one it has. Although there was discussion of building a second reactor at Point Lepreau, that possibility has quietly died, since the federal government is apparently not prepared to provide 100% financing.³³

29 . New Brunswick Power's Point Lepreau station (one 635 MW (net) reactor) was ordered in 1974, and began commercial operation in 1983. Ontario Power Generation's Darlington Nuclear Station (consisting of four 881 MW (net) reactors) was ordered in 1973, although the first reactor (Unit 2) did not begin commercial operation until 1990.

30 . In 1998, the Ontario government passed legislation which divided Ontario Hydro into several entities, the two main ones being Ontario Power Generation (including all of the generating facilities) and Ontario Hydro Services Company, (including all of the transmission network as well as the rural retail system). These two utilities remain owned by the provincial government, although electricity generation is being opened to competition in 2001.

31 . Ontario Hydro News Release, *Ontario Hydro moving ahead on major overhaul of its production facilities*, August 13, 1997. The four Pickering reactors were shut down December 31, 1997. The three Bruce A reactors were shut down March 31, 1998.

32 . CANDU reactors, unlike Light Water Reactors, have their fuel contained in hundreds of pressure tubes that run horizontally through the reactor vessel. These tubes are subject to high levels of stress, and may require replacement after twenty years. The replacement of the tubes in the four Pickering A reactors cost more than the original capital cost of the plant.

33 . The Liberal New Brunswick government of Premier Frank McKenna, originally elected in 1987, was on record as saying that it wanted AECL to finance the entire cost of a second reactor: CP, "New Brunswick ponders second reactor", *Globe & Mail*, October 15, 1990, p. B6.

3.1. Accountability and Transparency: AECL out of Control

In its March 1996 budget, the federal government released the results of its 1995 ‘program review’ of AECL. The review had been conducted by an interdepartmental committee of the federal government. Natural Resources Canada also commissioned a business analysis from the firm of Nesbitt Burns that was called *Project Atom*. Despite an access-to-information request,³⁴ the government and AECL have refused to release the reports by the committee and Nesbitt Burns, although the decisions based on them have multi-billion dollar implications for taxpayers. There was absolutely no consultation outside of the nuclear industry in the AECL Program Review, despite the fact that fundamental public policy decisions were being made.

In the *Report of the Auditor General — December 1998*, it was noted that the government has not approved AECL’s annual five-year corporate plan since 1994-95. Although required annually, the last time AECL’s corporate plan summary was submitted to parliament was in December 1995. The Auditor General noted that this is a violation of the accountability framework set out Financial Administration Act.³⁵ This situation continues up to the present time.

Secrecy and lack of accountability have been justified in the name of national security, despite the fact that Canada does not have a nuclear weapons program, and in the name of commercial confidentiality, despite the fact that AECL is not a commercial entity in any normal sense of the word. Since AECL receives a significant part of its cash flow from the government, it cannot be considered a competitive company. Lack of accountability and secrecy have allowed AECL to lurch between financial crisis and commercial failure, all the while dependent on government subsidies for almost 50 years.

3.2. Corruption at AECL

In April, 2000, a long-time AECL officer, Loretta Chan, was charged with receiving kickbacks for contracts relating to the 1996 deal with the Peoples’ Republic of China to build two CANDU reactors at Qinshan. There have been allegations that Chan received up to \$300,000 in kickbacks from shippers for the project between 1995 and 1998. Ms. Chan, a Canadian citizen of Hong Kong origin, was working on the shipping of equipment to the \$4 billion Qinshan project in the Peoples’ Republic of China. She had been under investigation for several years, and AECL subsequently suspended her for two years, with pay.³⁶

AECL has a long history of corruption. One way of transferring bribes to potential CANDU purchasers has been through agent fees. While agent fees undoubtedly include fees for legitimate public relations and promotional activities, monies allocated as agent fees by AECL have also been used in the past for bribery. The payment of bribes by AECL to secure CANDU sales has been well documented in the cases of Argentina and South Korea.

In 1973, AECL and the Italian company Italmimpianti signed a deal with Argentina for the Embalse reactor in which agent fees were used as bribes. In April 1974, AECL President Lorne Gray

34 . Nuclear Awareness Project filed an Access to Information request for the two reports, and Natural Resources Canada refused to supply the documents. An appeal to the Information Commissioner of Canada was rejected in April 1998, citing commercial confidentiality.

35 . Auditor General of Canada, *Report of the Auditor General of Canada — December 1998*, Chapter 29, pp. 29.8-29.10.

36 . Estanislao Oziewicz, “Charges laid in CANDU kickback case”, *Globe and Mail*, April 15, 2000, p. A22.

approved the deposit of \$2.4 million in a Swiss bank account.³⁷ An Argentinean investigation in 1985 revealed that José Ber Galbard, then Argentine Minister of Economic Affairs, was the recipient of the \$2.4 million, plus another \$1.1 million in May 1974, and an additional \$300,000 two years later.³⁸

In January 1975, AECL and the Korea Electric Power Corporation (KEPCO) signed a deal for a CANDU reactor.³⁹ In December 1974, AECL President Lorne Gray had agreed to pay an agent (Shaul Eisenberg of Tel Aviv) a fee of \$20 million.⁴⁰ Despite the public outcry over this blatant corruption, Eisenberg's 'commission' was only reduced to \$18.5 million, and AECL retained him to negotiate the sale of a second reactor.

In December 1994, AECL's Korean agent, Park Byong-chan, of the Samchang Corporation was sentenced to 18 months in prison for corruption and bribery.⁴¹ In 1991, Park had given \$350,000 in bribes to Ahn Byong-wha, then the President of KEPCO.⁴² In December 1990, AECL had announced the contract for sale of a second CANDU reactor (Wolsong-2), and less than a year after Ahn delivered the bribe, AECL announced the sale of two more reactors to South Korea in September 1992. Ahn was sentenced at the same time as Park to three years in prison for corruption.⁴³ AECL President Reid Morden denied any knowledge of the bribery, although Samchang Corporation had been listed as a recipient of AECL agent fees since 1991. AECL has made no attempt to retrieve funds from Samchang that were used illegally for bribes.

In 1976, following these incidents, the Treasury Board of Canada adopted the "Government Policy and Guidelines Concerning the Commercial Practices of Crown Corporations"⁴⁴, known as the 'Andras Guidelines', after the Hon. Robert Andras who was President of the Treasury Board at the time. The guidelines explicitly prohibited bribes and required disclosure, stating, "(4) a.

Corporations will disclose in their annual reports the names of their agents, as well as the aggregate of all remuneration paid to such agents." In April 1995, the Chrétien government quietly replaced the Andras Guidelines with the "Guiding Principles for the Management of Crown Corporations" (Treasury Board of Canada).

37 . Ron Finch, *Exporting Danger: A History of the Canadian Nuclear Energy Export Programme*, Black Rose Books, Montréal-Buffalo, 1986, p. 54.

38 . (AP), "\$4 million bribe given on Candu Argentina says", *Toronto Star*, June 13, 1985. See also: Joel Ruimy, "RCMP should probe bribery scandal in Candu sale to Argentina, Tory says", *Toronto Star*, June 14, 1985.

39 . Finch, *ibid.*, pp. 58-59.

40 . Finch, *ibid.*, pp. 58-61.

41 . CBC Radio, *Sunday Morning* (program segment hosted by Bob Carty), May 21, 1995.

42 . CBC Radio, *ibid.*.

43 . "South Korea: Ex-Kepeco head sentenced", *Nucleonics Week*, December 15, 1994, p. 16. See also: Ray Silver, "AECL Breaks with South Korean Agent in Wake of Kickback Scandal", *Nucleonics Week*, August 11, 1994.

44 . Treasury Board (Government of Canada), *Statement by the Honourable Robert Andras President of the Treasury Board on Government Policy and Guidelines Concerning the Commercial Practices of Crown Corporations*, December 16, 1976.

The Guiding Principles gave greater autonomy to Crown Corporations, made no mention of corruption, and had no requirement for disclosure of agent names and aggregate fees. AECL continued to report agent names and fees up to and including its 1997-98 annual report. However, in 1999, for the first time in 22 years, providing no notice or rationale, AECL stopped the practice. AECL has suggested that by withholding the names of agents and the aggregate fees, it is preventing the bribing of these agents by their competitors.⁴⁵

For the 22-year period of 1976-77 to 1997-98 when reporting ceased, the agent fees paid out by AECL totaled \$68.7 million (dollars-of-the-year). In the last year of reporting, the aggregate fees for agents had risen to \$5.5 million, from \$3.9 million in 1996-97.⁴⁶ In its last report of agent fees, AECL noted that it had retained agents in Japan, the United Kingdom, the United States, South Korea, Turkey, and Thailand.⁴⁷ The reporting of agent fees did not prevent bribery -- as we have noted above, there is proof that it continued. However, the listing of the fees at least provided some transparency on the overall scale fees, and thus indirectly limited the *potential* for corrupt practices. The commercial confidentiality of AECL and the agents was protected by only reporting the aggregate amount. It is patently absurd to suggest that less transparency would prevent corruption.

In February 1999, a new Canadian law came into effect known as the *Corruption of Foreign Public Officials Act*. The Act prohibits the bribing of foreign public officials by Canadians or Canadian corporations, and as punishment has a maximum five-year sentence for individuals. However, it is not clear how the public can assure itself that Crown Corporations are not engaging in corrupt practices in the absence of adequate public disclosure.

4. More Nuclear Mega-subsidies to Come?

In addition to the annual subsidies to AECL, there are several mega-subsidies looming on the horizon for the crown corporation that has been characterized as a “black hole” for taxpayers money. Most immediate is the Canadian Neutron Facility, which is expected to cost \$500 million. AECL and the National Research Council have been lobbying heavily for this new nuclear mega-project. AECL President and CEO Allen Kilpatrick has said that the CNF “forms the basis for rejuvenating the nuclear industry”.⁴⁸

AECL has also served notice that it needs to build a heavy water plant to produce heavy water for possible future CANDU sales. This would undoubtedly be another billion-dollar project, although no hard proposals have been made public yet.

AECL’s plan for decommissioning its old nuclear facilities, remediating its contaminated sites, and managing its radioactive wastes is much closer to a decision point. The cost may be in the order of \$1 billion or more. AECL is under a licensing obligation to produce a preliminary decommissioning plan including cost estimates by January 31, 2002.

Expenditure for decommissioning and waste management expenses cannot be avoided, since those liabilities have already been incurred. The controversial issues are the nature of the plan, its budget,

45 . Interview with Larry Shewchuk, AECL Public Relations, November 8, 2000.

46 . *AECL Annual Report 1997-98*, p. 41.

47 . *AECL Annual Report 1997-98*, p. 41.

48 . Allen Kilpatrick, President & CEO of AECL, President’s 2000/01 Corporate Plant Update, October 2000, p. 3.

financing arrangements, and the nature of the implementing agency and its mandate. However, further massive expenses and liabilities for the government *can* be avoided by simply deciding that there will be no public subsidies for the CNF reactor or for a new heavy water plant.

4.1. The Canadian Neutron Facility

Following the construction of two MAPLE reactors at Chalk River for production of radio-isotopes, AECL also plans to build a much larger and more expensive reactor known as the Canadian Neutron Facility (CNF). Together, the MAPLEs and the CNF are intended to replace the functions of the NRU reactor at Chalk River. In 1998, AECL joined with the National Research Council (NRC)⁴⁹ to promote the CNF, prematurely announcing that construction of the CNF would begin in 1999, with start-up in 2005. The NRU was scheduled for shutdown in year 2000, but following a drawn-out lawsuit and delay in construction of the MAPLE reactors, the Atomic Energy Control Board (now the Canadian Nuclear Safety Commission, CNSC) allowed AECL to continue operating the NRU until December 31, 2005.⁵⁰

The CNF is a pool-type reactor based on the MAPLE X-10 design with a nominal power of 40MW (thermal). The reactor assembly (including the reactor vessel) is located in a light-water pool about 15 metres deep. The fuel is aluminum clad and enriched to about 20% uranium-235, and the coolant is light water. It is proposed that the reactor have a dual purpose. One purpose to test fuel and components for existing as well as new CANDU reactor designs. The other purpose is for “materials research”. Neutron radiation produced in the reactor would be used to study the nature of various materials through neutron scattering.⁵¹ Such research has commercial applications.

The estimated cost of the reactor is \$460 to \$500 million. The reactor and reactor building are expected to cost about \$250 million; materials research equipment and facilities over \$100 million; equipment and facilities for CANDU reactors, over \$100 million.⁵²

As in the past, AECL is coming to Canadian taxpayers asking for another mega-subsidy. The final cost will be much more than \$500 million, when operating costs and the costs of reactor

decommissioning and waste management are added on. The proposed users of the facility should pay for the capital and operating costs, as a market-based hurdle for the decision to build this facility. A motion by the Township of Uxbridge, in Durham Region, Ontario states in part as follows:

Be it therefore resolved... That the Township of Uxbridge request of the government of Canada that it require the users of the proposed Canadian Neutron Facility to pay for the construction

49 . The NRC is a research and development organization owned and operated by the Canadian government. NRC President Arthur J. Carty is an *ex officio* member of the Canadian Nuclear Safety Commission, formerly the Atomic Energy Control Board.

50 . “Renewal of the Operating Licence at the Chalk River Laboratories of Atomic Energy of Canada Limited, Appearance by AECL”, *AECB BMD 98-86.1*, June 9, 1998, Table C.

51 . General background on the CNF can be found in two studies: A.G. Lee *et al.*, *A Description of the Canadian Irradiation Research Facility Proposed to Replace the NRU Reactor*, AECL-11231, July 1995. See also: A.G. Lee *et al.*, *Progress in Developing the Concept for the Irradiation Research Facility*, AECL Whiteshell Laboratories, Canadian Nuclear Society 17th Conference Proceedings, June 9-12, 1996, Fredericton, New Brunswick, Vol. 2.

52 . “NRU Replacement not mentioned in the government’s budget”, *UNECAN News*, March 10, 2000, p. 1.

and operation costs of the facility, and that the Canadian Neutron Facility be designed to have zero radiation emissions during normal operation and a full containment system which will function reliably during any nuclear reactor accident. ⁵³

The CNF has been described as a “partnership” between the National Research Council, AECL, the universities and industry ⁵⁴, although it is clear that none of these partners are willing to put up any of the capital cost of the facility. Several private sector corporations, including Alcan International Ltd., Marubeni Canada Ltd., Xerox Canada have spoken in favour of the project, but to date, they have neglected to mention if they are willing to invest in it.

Perhaps more importantly, there has been no mention as yet of funding from Ontario Power Generation, Hydro Quebec, or New Brunswick Power, for use of the CNF for their reactor support programs. As the largest owner and operator of CANDU reactors, it would be appropriate for Ontario Power Generation to pay a large share of the capital and operating costs, since half of the reactor’s facilities will be devoted to research and the testing of reactor fuel and components. The value of the reactor for research in AECL’s ongoing reactor export program should also be questioned. This would only have value if one believes that AECL’s export program will be successful. Based on past experience, this is extremely unlikely.

There should be absolutely no public funding for the CNF, and a clear up-front agreement from all potential users (academic, private-sector and utilities) that the reactor would function on user-pay basis to cover all operating costs. The private sector and utilities, notably OPG, should be required to provide operating *as well as* capital costs of the reactor. Failure to build a new reactor to replace the NRU is not a disaster. Materials research using neutron sources can be conducted at other facilities.

4.2. AECL's Rad-Waste and Decommissioning Liability

For eight years running in AECL’s own annual reports for 1992 to 1999, the Auditor General of Canada strongly criticized AECL for failing to account properly for the cost of decommissioning and radioactive waste management. Decommissioning activities include dismantling radioactive facilities such as old reactors and laboratories; cleaning up radiation-contaminated sites; managing the associated nuclear wastes; and eventually returning sites to green field condition.

AECL's historic practice for financing decommissioning costs was simply to send the bill to the taxpayers each year for expenses as they were incurred. As in previous annual reports since 1992, the Auditor General pointed out in AECL’s 1998-99 annual report that this was not a proper financial planning or accounting process:

There are significant costs associated with decommissioning the Corporation's [AECL’s] facilities and remediating its sites, including costs of residual waste storage and disposal. Generally accepted accounting principles require that these costs be recognized in a rational and systematic manner over the estimated useful lives of the corresponding facilities. However, the Corporation expenses these costs as the activities take place and has not recorded a liability for them. Government funding of these costs is similarly recorded. Failure to record a liability for these costs is not in accordance with generally accepted accounting principles. ⁵⁵

53 . Township of Uxbridge, Resolution No. 2000-18, February 28, 2000.

54 . NRC and AECL, *ibid.*, Summary.

55 . AECL Annual Report 1998-1999, p. 34.

AECL defied the Auditor General for eight years running, on the question of adherence to Generally Accepted Accounting Principles (GAAP) for these future liabilities. Pressure from the Auditor General resulted in AECL making some preliminary estimates of its decommissioning costs. In its 1995-96 annual report, AECL said that its decommissioning would take place over “the next four to five decades” (indicating the discount period for costs) and made a “preliminary estimate” of costs at \$300 million, most of which would be spent over the next ten years. ⁵⁶

By the following year, this story had changed. In its 1996-97 annual report, AECL stated that decommissioning activities would take place over the next 100 years (actively managed for a minimum of 75 years). The preliminary estimate had escalated to \$400 million, with \$200 million expected to be spent in the next ten years. ⁵⁷ This position was reiterated by AECL for the following two years. ⁵⁸

In its 1999-2000 annual report, AECL took a new position. For the first time ever, AECL reported a liability of \$377.5 million for decommissioning in its financial statements. The liability had been changed from the 1977 estimate of \$400 million, and was made retroactive to the 1998-99 fiscal year (in the amount of \$374.7 million). ⁵⁹

It is important to note that AECL has so far conducted only a *preliminary* decommissioning plan, so that the \$377 million represents only a partial estimate of total decommissioning costs. This is reflected in the fact that AECL anticipates activities over a *minimum* of 100 years -- activities for the full program will take much longer. In November 1998, for the first time as part of the bi-annual re-licensing of AECL’s Chalk River and Whiteshell Laboratories, AECL presented preliminary decommissioning plans. ⁶⁰ AECL has five sites with a wide variety of nuclear and conventional facilities, some of them shut down permanently, some shut down but not operating, and some still operating. ⁶¹ The five sites are Chalk River Laboratories, Whiteshell Laboratories, the shutdown NPD Reactor at Rolphton, the shutdown Gentilly-1 reactor at Hydro Québec’s Gentilly nuclear site, and the shutdown Douglas Point reactor at Ontario Hydro’s Bruce Nuclear Power Development.

In 1998, it was also revealed for the first time that AECL’s decommissioning plan involves continued operation of the Chalk River Laboratories until 2100, and “institutional control” of the site until at least 2200. The maintenance of the Chalk River site as a nuclear sacrifice zone for the next two hundred years is a controversial issue. The period of time during which people must be excluded from the Chalk River site is a cost-benefit decision. The decommissioning process could be carried out more quickly, but it would cost more. Those trade-offs should be a matter of public debate. AECL has done everything in its power to avoid the possibility of any informed decision-

56 . AECL Annual Report 1995-1996, Note 10, p. 33.

57 . AECL Annual Report 1996-1997, Note 11, p. 34.

58 . AECL Annual Report 1997-1998, p. 40. See also: AECL Annual Report 1998-1999, p. 45.

59 . AECL Annual Report 1999-2000, p. 45.

60 . For the first time, the AECB issued separate licences for the Whiteshell and Chalk River Laboratories. Previously they received one combined licence.

61 . D.R. Champ, *AECL's Decommissioning Plan and Program*, AECL, March 1998.

making about the extent of the environmental problem at Chalk River, including the withholding of key environmental documents. ⁶²

AECL's detailed full decommissioning plan (including estimated costs) for AECL's Whiteshell and Chalk River sites is not scheduled to be submitted to the Canadian Nuclear Safety Commission (CNSC, formerly the AECB) until January 31, 2002. ⁶³

It should also be remembered that the \$377.5 million decommissioning liability recorded in 1999-2000 is simply an accounting provision. This liability has not been funded by either AECL or the government. The procedure for funding of the liability remains the same as it has been since 1996-97, when the government turned over the federal heavy water inventory to AECL, and allowed the sales and leasing of heavy water to be used for decommissioning costs. ⁶⁴ AECL has referred to this arrangement as the "Ten Year Treasury Board Agreement". ⁶⁵

Instead of reimbursing taxpayers for the government's massive \$816.9 billion bailout of AECL heavy water debts in 1981, funds from the heavy water inventory are simply being turned over to AECL. This is a very significant disguised subsidy, in the amount of the value of the heavy water inventory (valued at \$583.4 million in 1995-96). ⁶⁶ The Ten Year Treasury Board Agreement will be in place until 2005-06, when it may be continued or revert to the past practice of simply having the federal government pay the costs directly through annual parliamentary appropriations. Either way, these are *ad hoc* funding arrangements and an inadequate way to deal properly with these long-term liabilities.

AECL's actual decommissioning costs will be much higher than \$400 million. The May 1995 *Report of the Auditor General* estimated federal radioactive waste and decommissioning costs at \$850 million. ⁶⁷ AECL is not responsible for the entire \$850 million, but the Auditor General did not disclose AECL's portion, allegedly for reasons of commercial confidentiality and because some of the elements of the costing were subject to negotiation. The \$850 million included \$185 million for the cost for cleaning up radioactive waste in Port Hope, Ontario, so it is probable that most of the remaining \$665 million is the Auditor General's estimate of AECL's responsibility. Even the figure of \$665 million may be low, and it has been suggested that the clean-up of AECL's Chalk River Laboratories alone would cost over \$1 billion. ⁶⁸

62 . Martin Mittelstaedt, "AECL documents stay under wraps", *Globe and Mail*, May 7, 1998, p. A14.

63 . Canadian Nuclear Safety Commission, CNSC Staff Plan of Action on Financial Guarantees for Decommissioning, CMD 00-M62, October 24, 2000, p. 6.

64 . *AECL Annual Report 1995-1996*, p. 31.

65 . D.R. Champ, *AECL's Decommissioning Plan and Program*, AECL, March 1998, Appendix D, p. 23.

66 . It should be noted that in 1992, the government granted AECL the right to treat \$97 million of the heavy water appropriations as "non-repayable appropriations". This was carried as an asset on the balance sheet of the corporation in 1992, but was written off against contributed capital retroactively in the 1993 financial statements. This is another disguised subsidy that did not appear as a line item under parliamentary appropriations.

67 . *Report of the Auditor General of Canada to the House of Commons*, Chapter 3, "Federal Radioactive Waste Management", May 1995, ¶ 3.136, p. 3-32.

68 . Art Milnes, "AECL fights with groups on cleanup", *Pembroke Observer*, August 27, 1994. The article cites Irene Kock of Nuclear Awareness Project.

AECL's failure to account fully for its decommissioning and radioactive waste management costs conceals its financial insolvency. The need for this strategy is obvious according to AECL Chairman Bob Nixon: "If AECL were to do this [deal properly with decommissioning], with present levels of funding, there would be little left for its prime task, the development of nuclear power." ⁶⁹ As the former Treasurer of Ontario in the Liberal Government of David Peterson, Mr. Nixon no doubt understands what is at stake. If AECL cannot carry on its core business, as well as cover its liabilities properly, it is obviously not a viable business venture.

AECL, the federal government, and the Auditor General have been derelict in their duty for not dealing with the radioactive waste management and decommissioning problem in a responsible manner. An open process involving the public should be convened to consider AECL's decommissioning plan, including cost estimates, and the proposed terms for management of the fund. AECL and the federal government should establish an actual fund to cover the future costs of radioactive waste management and decommissioning of AECL's various facilities after the end of their service lives. The total cost (allowing for accrual of interest over time) should be paid into this fund during the active operating life of the facilities. This fund should be separate from the operations of AECL, and should be managed and accounted for by an independent body.

5. Reactor Exports: Fated to Fail

While the 1995 Program Review of AECL was kept secret, it is known that Phase 1 of the Nesbitt Burns study, *Project Atom*, focused on AECL's export business, and formed the basis of a plan to sell 'ten CANDUs in ten years'. In a notice to AECL employees after the 1996 budget announcement, former President and CEO Reid Morden stated,

The CANDU business is, in fact, what AECL is all about. We will continue to seek opportunities in the global marketplace, and our goal is to secure ten CANDU sales over the next ten years. ⁷⁰

Only two reactors have been sold since that goal was set in 1995. AECL has suffered two high profile defeats in its attempted reactor sales campaign. On July 25, 2000 Turkish Prime Minister Bulent Ecevit announced that he was cancelling the controversial nuclear power plant that had been proposed for Akkuyu Bay on Turkey's Mediterranean coast north of Cyprus. In justification, Ecevit said that "the world is abandoning nuclear power... It is unnecessary for us, for the time being, to invest in nuclear energy." AECL wasted a huge amount of taxpayers' money on the Akkuyu bid — more than \$40 million according to a Turkish media report. But that would only have been a small part of the cost if AECL had won the bid. A leaked Cabinet document in 1997 revealed that the Chrétien government had agreed to provide \$1.5 billion in financing. ⁷¹ The loan would have matched the \$1.5 billion provided for the sale of two reactors to China in 1996.

Even if the Turkish government had not decided to cancel the Akkuyu nuclear plant, it was very uncertain whether AECL would have won the bid. AECL was competing against Nuclear Power International (NPI -- a consortium of the German company Siemens and the French company Framatome), and a third bidder, a partnership of Westinghouse (USA/UK) and Mitsubishi

69 . John Hulbert, "AECL board chair voices optimism", *North Renfrew Times*, October 1, 1997, p. 2.

70 . AECL, *Information Notice for Employees from Reid Morden*, March 7, 1996.

71 . For more detail on the Akkuyu deal, please see: David H. Martin, *Nuclear Threat in the Eastern Mediterranean: The Case Against Turkey's Akkuyu Nuclear Plant*, Nuclear Awareness Project, June 2000. <http://www.cnp.ca/issues/nuclear-threat.html>

(Japan). It was common knowledge that NPI had submitted a bid lower (\$2.4 billion US) than AECL (\$2.6 billion US, or almost \$4 billion CDN).⁷²

AECL lost another reactor bid in June 2000. The Australian Nuclear Science and Technology Organization (ANSTO), had initiated a bidding process in 1998 to replace its aging HIFAR reactor at Lucas Heights, near Sydney. The replacement reactor was specified to be a 14-20 MW (thermal) pool-type reactor. At the end of 1998, ANSTO narrowed down the bidders to four companies, including AECL, Siemens (Germany), Technicatome (France), and Invap (Argentina). In June 2000, ANSTO announced that it had chosen Invap for the contract, because it was within budget (not to exceed (Aus) \$278.5 million in 1999 dollars), and had the highest Australian content (53%).⁷³ Details of the AECL bid have been kept secret.

AECL's current possibilities for further CANDU sales are South Korea, Romania, and China, and it has also undertaken major promotional activities in Thailand and Viet Nam. This study includes a more detailed examination of the possible CANDU export deals with South Korea (section 5.2) and Romania (section 5.3). While there remain a few possibilities for reactor sales, the general trend is for nuclear power decline due to high cost, environmental impacts, safety concerns, and public opposition.

5.1. The Economics of Nuclear Power

In addition to safety concerns and performance problems, high cost has been a key reason for the decline of nuclear power. It has long been argued by the nuclear industry that while nuclear power plants may have very high capital (construction) costs, the operating costs are very low, leading to a overall low lifetime unit energy cost. In fact, despite lower fuel costs, lifetime unit energy costs for nuclear power plants are very high.

A study conducted for the Independent Power Producers' Society of Ontario found that CANDU nuclear stations were roughly about twice the cost of gas-fired industrial cogeneration plants, both before and after environmental externalities were factored in. The study found that nuclear costs (based on Ontario Power Generation's most modern plant, the Darlington Nuclear Station) were 11.708 cents/kWh (1997 \$Cdn), and gas-fired industrial cogeneration was 5.521 cents/kWh. When mid-range environmental externalities were added, the corresponding costs were 14.989 cents/kWh for CANDU nuclear and 6.621 cents/kWh for gas-fired industrial cogeneration.⁷⁴

In its final annual report,⁷⁵ Ontario Hydro stated that its average cost of nuclear generated electricity had reached an all-time high of 7.721 cents/kWh. Ontario Hydro's massive debt of \$38 billion and liabilities were largely incurred through its ill-considered nuclear program. This figure includes some provision for the future liabilities associated with the radioactive waste management

72 . "Akkuyu gets 3 bids", *Nuclear Engineering International*, November 1997, p. 2.

73 . Ann MacLachlan, "Invap chosen as preferred bidder for ANSTO's replacement reactor", *Nucleonics Week*, June 8, 2000, pp. 8&9.

74 . David Argue Consulting, *A Review of the Economic Cost of Power in Ontario*, Independent Power Producers' Society of Ontario (IPPSO), May 1997. The cost comparisons were based on a standard 20 year life with a 10% discount rate, and a 65% load factor.

75 . Ontario Hydro ceased to exist on March 31, 1999, and its generating assets were turned over to Ontario Power Generation.

and decommissioning of reactors of about \$2.3 billion.⁷⁶ In fact, Ontario Hydro had already identified total future liabilities for reactor decommissioning and nuclear waste management of \$18.7 billion (\$1998).⁷⁷ The Province of Ontario has identified a total Stranded Debt of \$20.9 billion, remaining after the restructuring of the utility, which does not include the future liabilities for decommissioning and waste management. This stranded debt is largely a measure of how uneconomic nuclear power has been in Ontario, since it represents in large part the amount of the debt that cannot be serviced by the new commercial companies.

5.2. South Korea

South Korea has been AECL's biggest customer. By means of a series of bribes, AECL has greased the sale of four CANDU reactors to the Korea Electric Power Corporation (KEPCO — a state-owned electrical utility that owns and operates all of the reactors in the country). The CANDU reactors at Wolsong began operation in 1983, 1997, 1998 and 1999.

AECL's sales to South Korea are only a qualified success. South Korea's so-called 'two reactor policy' has allowed a small CANDU program, but its Pressurized Water Reactor (PWR) program is dominant.⁷⁸ South Korea has 20 PWRs operating or under construction, as compared to four CANDUs. KEPCO made a technology transfer deal to develop its own standardized 1,000 MW PWR known as the Korean Standard Nuclear Plant (KSNP), based on the System-80 design of the American company Combustion Engineering. The fate of CANDU and the two-reactor-policy is focused on which reactor design will be chosen for a two-reactor plant at Shin Wolsong (formerly known as Bonggil) close to the Wolsong site. The original plan for Shin Wolsong was to build up to four reactors, but in 2000 KEPCO decided to proceed with two reactors and AECL was asked to submit a bid for two 900 MW design reactors. AECL is competing against a domestic proposal for two KSNP reactors. A decision was expected from KEPCO by the end of October 2000.⁷⁹

AECL's 900 megawatt CANDU-9 reactor design is untested, since all of AECL's previously built reactors in Canada and around the world are 600 to 700 MW designs known as 'CANDU-6'. AECL claims that the four 881 MW reactors at Ontario Power Generation's Darlington Nuclear Station serve as reference plants. However, the Darlington reactors were designed and built by the former Ontario Hydro, with a unique four-reactor configuration, sharing containment and other systems. The Canadian regulator, the Canadian Nuclear Safety Commission (formerly the Atomic Energy Control Board) has given pre-licensing review to AECL's 900 MW CANDU design, but there is no actual reference plant.

76 . Ontario Ministry of Finance, *Stranded Debt Fact Sheet*, April 1, 1999.

77 . Ontario Hydro, "Nuclear Waste Management Booklet Update", 1 page, March 1, 1999.

78 . Pressurized Water Reactors use ordinary ('light') water as the moderator, and pressurized light water as the coolant, with enriched uranium as the fuel. The PWR operates at sufficiently high coolant pressures that the water is kept in a liquid state and passes to a steam generator, creating steam in a secondary system to drive a turbine. Together, PWRs and Boiling Water Reactors (BWRs) dominate the world market. They are called Light Water Reactors (LWRs), because they use ordinary water (as opposed to heavy water in CANDU reactors) for both coolant and moderator.

79 . "KEPCO requests AECL bid for two CANDU-9 units", *UNECAN News*, September 7, 2000, p. 6.

KEPCO had originally planned to announce the winner of this bidding process late in 1996, but the decision was first postponed until June 1997.⁸⁰ At that time the decision was delayed again — the reason given was the scandal that was sweeping the country following the revelation of massive bribes for government loans by family-based conglomerates known as chaebols. There are good reasons for the government to be concerned about the risk of a bribery scandal in the nuclear industry, since AECL owes its presence in South Korea to bribery (see section 3.2, *Corruption at AECL*).

The main reason for the delays in proceeding with the Shin Wolsong reactors has been the financial crisis plaguing south-east Asia. South Korea experienced its own crisis which has been blamed largely on bad loans and political cronyism. South Korea agreed to a \$60 billion (U.S.) rescue package and bailout in December 1997.⁸¹ The crisis worsened when South Korea was forced to bail out five major banks in May 1998, at a cost of another \$35.5 billion (U.S.).⁸² Following the delay of the Shin Wolsong announcement from June to December 1997, it was to have been made in February and then April 1998. Neither of these deadlines were met.⁸³ The prospects for further CANDU sales dimmed in January 1998, when officials at the architectural and engineering firm of Korea Power Engineering Company (KOPEC), a KEPCO subsidiary, reportedly leaked news that KEPCO would opt for the PWR option — effectively killing the two-reactor policy. The KOPEC officials reportedly stated that engineering personnel at Wolsong CANDU reactors are already being shifted to work on PWR projects.⁸⁴

South Korea's high-priced nuclear program has been encouraged and protected by a monopolistic national electrical utility (KEPCO) that has subsidized electrical prices at the cost of mounting debt. Electricity prices have been cut five times since the late 1980s, and industry is given huge cross-subsidies from residential electricity consumers. This has resulted in high growth in electricity demand, with a massive expansion of nuclear power, and KEPCO's revenues have not kept pace with its ballooning debt.⁸⁵ However, plans by President Kim Dae-Jung to introduce competition through privatization of KEPCO and its nuclear manufacturing subsidiary KHIC were shelved after opposition party gains in the April 2000 election. Job reductions and higher electricity prices that were part of the restructuring proposal have been controversial.⁸⁶

In early September 2000, the KEPCO Board of Directors approved the construction of two 1,000 MW Korean Standard Nuclear Plants (KSNP) at Kori. KEPCO plans to have the two reactors operating by 2009, however contracts with vendors still must be negotiated and are expected in

80 . Mark Hibbs, "Influence-buying concern delays Bonggil vendor choice until June", *Nucleonics Week*, April 17, 1998, pp. 14-15.

81 . Reuters, "Lenders answer South Korea's SOS", *Toronto Star*, December 31, 1997, p. D10.

82 . Michael Schuman, "Seoul steps up banks' bailout", *Globe and Mail*, May 21, 1998, p. B10.

83 . Mark Hibbs, "AECL says it's still in the running for PHWR contracts at Bonggil", *Nucleonics Week*, February 12, 1998, pp. 1 & 12.

84 . Mark Hibbs, *ibid.*

85 . Mark Hibbs, "Kepco's debt position threatened by power subsidies, experts warn", *Nucleonics Week*, March 9, 2000, pp. 1 & 12.

86 . Mark Hibbs, "Kepco privatization timetable set back by political pressure", *Nucleonics Week*, June 8, 2000, p. 13.

2001.⁸⁷ South Korea now has 16 reactors operating with four more KSNPs under construction at Yonggwang and Ulchin, as well as the two at Kori to be built. Six more reactors are planned up to the year 2015, but the decision about whether to build more CANDU reactors is still uncertain. The Shin Wolsong proposal was initiated in 1994. Another source of delay may be the South Korean government's attempt to gain the support of local governments in the Wolsong area.⁸⁸ The CANDU reactors at Wolsong became controversial when a leak from a valve in the Wolsong 3 reactor exposed 22 workers to radiation on October 4, 1999.⁸⁹

5.3. Romania

AECL has a long and complicated history in Romania, where it collaborated for many years with former Communist dictator Nicolae Ceaucescu in the creation of a nuclear program. Construction of the Cernavoda nuclear plant (originally to be five CANDU reactors) was plagued by poor manufacturing and construction standards, and aggravated by the use of forced labour, which continued even after the revolt against Ceaucescu and his execution in 1989. AECL officials ignored and then later rationalized the use of slave labour.

Following the revolt against Ceaucescu, AECL and its Italian partner Ansaldo came up with a generous financing package that included a \$315 million loan through the Canadian Export Development Corporation, and AECL took over management of the project.⁹⁰ The Cernavoda-1 reactor finally started operation in 1996, at a final cost of about \$2.5 billion — at least \$1 billion more than AECL's selling price for a similar reactor in 1995.⁹¹

In 1996 the Romanian electrical utility RENEL declared that it would complete Cernavoda-2 by the year 2000, but by 1998 this had been delayed until 2003. At that time RENEL and AECL stated that it would cost \$750 million (U.S.), or more than \$1 billion (Cdn) to complete Cernavoda-2.⁹² Since then, the nuclear division of RENEL has been split off, and is known as Societatea Nationala Nuclearelectrica (SNN) SA. On August 31, 2000, the Romanian government passed an ordinance which supported completion of Cernavoda-2 by the end of 2006. In order to bypass democratic opposition, the ordinance was passed by the government as a special measure while parliament

was not sitting. The ordinance provides financing from government sources, a sovereign guarantee of loans and various tax breaks for Cernavoda-2, as well as forgiving SNN's debts to Romania's Finance Ministry for completion of Cernavoda-1. It has been reported that the Romanian

87 . Mark Hibbs, "Kepco board approves Kori PWRs, vendor contracts likely in 2001", *Nucleonics Week*, September 7, 2000, pp. 1 & 10.

88 . Mark Hibbs, "Kepco board approves Kori PWRs, Vendor contracts likely in 2001", *Nucleonics Week*, September 7, 2000, pp. 1 & 10.

89 . Christopher Torichia, "Canadian reactor leaks in South Korean nuclear plant", *Toronto Star*, October 6, 1999.

90 . "Canada approves loan for construction of Romanian nuclear power stations", *Government of Canada News Release*, September 17, 1991

91 . Jennifer Wells, "Going Critical: Canada's nuclear misadventure in Romania", *Report on Business Magazine*, June 1995, p. 38.

92 . Ray Silver, "AECL chief says Romanian seeking funding for some Cernavoda-2 work", *Nucleonics Week*, August 13, 1998, p. 3.

government may contribute \$200 million (US) over the construction period.⁹³ However, the balance of the estimated \$750 million (US) cost must come from external sources, with AECL and Ansaldo undoubtedly being required to provide large shares. In an attempt to share risk and obtain financing, the partners have agreed to invite the participation of European companies, and Romania has also applied for a loan of \$350 million (US) from Euratom, the joint nuclear agency of the European Union. Romania is also trying to negotiate counter-trade (barter) deals for the electricity that would be generated by Cernavoda-2, or direct electricity export contracts. The project is difficult to finance because Romania already has a huge surplus of electricity, and there is no domestic market for the electricity from Cernavoda-2.

Despite the promise of a sovereign guarantee from the government, large-scale loans to Romania would be very risky. In 1998, the International Monetary Fund (IMF) put a constraint on Romania against taking large foreign loans, such as will be required to complete Cernavoda-2.⁹⁴ During a visit to Canada in May 1998, Romanian President Emil Constantinescu demanded a variety of financial concessions for the completion of Cernavoda-2, including: release from the requirement to provide a 100% guarantee for Canadian loans; a longer payback period for loans;⁹⁵ and a four year holiday before loan payments start.⁹⁶ In March 2000, Patrick Lavelle, Chairman of Canada's export-import bank, the Export Development Corporation (EDC), stated that "EDC is presently participating in interdepartmental meetings to determine whether Canada Account funds would be available in support of AECL's contract and, if so, under what conditions such support would be extended."⁹⁷

The possible use of the EDC's 'Canada Account' for loans to Romania is a significant issue, because it indicates the high degree of risk involved, and means that Canadian taxpayers would once again be required to take an enormous risk for AECL. EDC has two accounts with which to finance loans: its 'Corporate Account' and the 'Canada Account'. The Corporate Account is the EDC's normal business account. The Canada Account is used only for large, high risk loans, and requires the support of the Minister of International Trade and the Minister of Finance under the Export Development Act (section 23). Funding for Canada Account loans is paid to EDC by the Minister of Finance directly out of the Consolidated Revenue Fund (the government's main operating fund). Once the loans have been approved by the Ministers, Canada Account transactions are "offered, negotiated, executed and administered" by EDC, however the risk for these loans rests with the Canada Account, which is to say, the Government of Canada.⁹⁸ Even with a sovereign guarantee from the client state, private financial institutions refuse to finance large high-risk loans, given the experience of Mexico defaulting on loans in 1980. Canada Account loans are categorized into concessional and non-concessional, but with money coming directly from the government, it is obvious that EDC can provide money at very low fixed rates, and for longer periods than other commercial institutions. Romania already has Canada Account loans of almost

93 . Ann MacLachlan, "Cernavoda-2 completion bolstered by Romanian government support", *Nucleonics Week*, September 14, 2000, pp. 1, 10 & 11.

94 . Ann MacLachlan, "AECL offers Romania financing to begin Cernavoda-2 completion", *Nucleonics Week*, March 5, 1998, p. 3.

95 . Randall Palmer, "Italy offers to take Romanian nuclear power", *Reuters*, May 25, 1998.

96 . Geoffrey York, "Romania seeks reactor loan: Half-finished CANDU needs \$140 million", *Globe and Mail*, August 6, 1998, p. A12.

97 . Letter from Patrick Lavelle, Chairman of the Board of the Export Development Corporation, March 16, 2000.

98 . Export Development Corporation, Summary of the Report to Treasury Board on EDC's Canada Account Operations for the Fiscal Year 1997-1998, p. 1.

\$300 million outstanding, and has been in arrears on these loans. In a report on the Canada Account in 1998, the EDC identified Canada Account loans to Romania at March 31, 1998 of \$343.860 million, with \$293.111 million outstanding and \$9 million in payments past due.⁹⁹

6. Whiteshell Laboratories: More Subsidies

Whiteshell Laboratories (originally known as the Whiteshell Nuclear Research Establishment — WNRE) is a 4,000 hectare facility owned and operated by AECL on the east bank of the Winnipeg River at Pinawa, about 100 km northeast of Winnipeg. Whiteshell went into operation in 1963, initially to develop a prototype 40 MWt organic-cooled reactor known as WR-1 (Whiteshell Reactor-1). AECL's Underground Research Laboratory is located at Lac du Bonnet, about 15 kilometres to the northeast of the Whiteshell site. It is a test mine site intended to demonstrate the viability of deep-rock burial of high-level radioactive waste. Employment at Whiteshell peaked at about 1,000 employees in 1985.¹⁰⁰ By 1996 there were 750 employees at the site, which had a \$72 million operating budget in 1995-1996.¹⁰¹

As part of the 1995 federal government Program Review it was decided to reduce AECL's large and redundant research infrastructure, which included three major research facilities in Canada — the Chalk River Laboratories in Ontario's Ottawa Valley; the Whiteshell Laboratories in Manitoba, and the Sheridan Park complex in Mississauga in Ontario. Whiteshell was a logical candidate for shutdown, since most of its major facilities had already been shut down or were undergoing decommissioning by that time.

While a simple shutdown of Whiteshell would have been cheaper and easier, political pressure was exerted to maintain the facility. AECL had apparently proposed shutting down Whiteshell, laying off most of the 700 employees that remained in 1996-97, and transferring the remainder to either Chalk River or Sheridan Park¹⁰². However, the government decided it would try to privatize the facility.¹⁰³ There was no mention of pay-back to the public purse for the massive taxpayer investment in Whiteshell over the previous 40 years.

In January 1996 the federal government (the departments of Natural Resources and Secretary of State for Western Economic Diversification) established the Whiteshell Task Force to support privatization.¹⁰⁴ In its final report of June 1996, the Task Force recommended privatization of several key functions: AECL's Nuclear Fuel Waste Management Program; the AECL accelerator business; decommissioning of the facilities on the Whiteshell site; and site management. It also recommended the commercialization of other AECL technologies, and the establishment of a college at the site.

99 . Export Development Corporation, *Summary of the Report to Treasury Board on EDC's Canada Account Operations for the Fiscal Year 1997-1998*, p. 14.

100 . AECL, *Canada Enters the Nuclear Age*, p. 36.

101 . Marieta Consulting, *Report of the Whiteshell Task Force*, June 1996, p. 2.

102 . Dan Lett, "British Giant Wants Lab", *Winnipeg Free Press*, April 3, 1997, pp. A1 & A2.

103 . The privatization strategy was reportedly brokered by Foreign Affairs Minister Lloyd Axworthy (senior Manitoba MP), Anne McLellan (another western MP and then Minister of Natural Resources), former AECL President Reid Morden, and Peter Siemens (then Chair of the Whiteshell Task Force). See: Dan Lett, "Pinawa Spared AECL Axe", *Winnipeg Free Press*, May 26, 1998.

104 . *Report of the Whiteshell Task Force*, Appendix A: Terms of Reference, p. 23.

In December 1996, the government announced its plans for Whiteshell: ¹⁰⁵

- establishment of an Economic Development Authority with \$3 million funding over five years (\$1.5 million each from the Government of Manitoba and the federal department of Western Economic Diversification);
- creation of a \$20 million fund of “repayable assistance” over five years for companies locating at the site (\$10 million each from Manitoba and Western Economic Diversification; proposed terms for loans have not been revealed); and
- \$100,000 for a feasibility study for establishment of an educational facility by the Red River Community College (\$50,000 each from Manitoba and Western Economic Diversification).

On February 6, 1997 the formation of the Economic Development Authority for Whiteshell (EDAW) was announced by the federal and Manitoba governments. ¹⁰⁶

As part of the December 1996 announcement, a two-stage process was initiated for the privatization of key AECL functions at Whiteshell. The investment firm of Nesbitt Burns was engaged as the financial advisor for this process. In the first phase, over 50 firms were canvassed seeking expressions of interest by February 14, 1997. In the second phase, the government selected two parties, who submitted detailed “Definitive Proposals” on March 21, 1997. ¹⁰⁷

On April 18, 1997, former Natural Resources Minister Anne McLellan announced negotiations with a consortium known as Canadian Nuclear Projects Ltd. (CNPL). ¹⁰⁸ CNPL was headed by BNFL Inc. (the US subsidiary of the state-owned British Nuclear Fuels Ltd. plc), and also included Wardrop Engineering of Winnipeg, Acres International Ltd. (a Canadian engineering company), and SENES Consultants. BNFL controlled 55% of CNPL, Wardrop and Acres 20% each, and SENES, 5%. ¹⁰⁹

However, by February 1998, CNPL spokesperson David Campbell stated that “By itself, Whiteshell is probably not commercially viable.” ¹¹⁰ In April 1998, CNPL withdrew from negotiations with the federal government for the comprehensive privatization of Whiteshell. CNPL

105 . “Federal Government Moves to Commercialize Whiteshell”, *Canada/Manitoba News Release*, December 19, 1996.

106 . “Paul M. Soubry & Peter Siemens to Lead Whiteshell Economic Development Authority”, *Canada/Manitoba News Release*, February 6, 1997.

107 . “Negotiations to Commercialize Whiteshell Set to Begin”, *Natural Resources Canada News Release*, April 18, 1997, *Backgrounder*, “Commercializing Whiteshell Laboratories”.

108 . “Negotiations to Commercialize Whiteshell Set to Begin”, *Natural Resources Canada News Release*, April 18, 1997.

109 . “Negotiations to Commercialize Whiteshell Set to Begin”, *Natural Resources Canada News Release*, April 18, 1997, *Backgrounder*, “Canadian Nuclear Projects Limited”.

110 . Vance Gutman, “Whiteshell privatization clock is winding down”, *North Renfrew Times*, February 18, 1998, p. 1.

said that the possibility of privatizing Whiteshell had “disappeared or seemed improbable”.¹¹¹ It is likely that the release of the long-awaited federal environmental assessment on nuclear fuel waste management on March 13, 1998 also affected the outcome of negotiations. After eight years of consideration, a federal environmental assessment panel concluded that AECL’s proposal for deep geological disposal does not have the required level of acceptability to be adopted as Canada’s approach for managing nuclear fuel wastes.¹¹² This may have put the future of AECL’s Underground Research Laboratory in doubt, and made the viability of Whiteshell even more speculative.

On December 16, 1998, the federal government announced that AECL would end its activities at Whiteshell by December 2001.¹¹³ Another \$5 million in assistance was provided as part of the proposal, and a Memorandum of Understanding was signed with EDAW for privatization possibilities. AECL committed to make surplus land, buildings and equipment available. AECL committed that its “Reactor Safety Research Program” would continue on at Whiteshell with about 330 staff persons until December 2001. It was stated that the radioactive waste research program at the Underground Research Laboratory would be privatized.

Despite loans and grants of \$38.1 million since 1996, there has been little success in the attempt to privatize AECL’s activities at Whiteshell. One small company has been formed, Acsion Inc., which has “bought” an electron particle accelerator from AECL (the purchase price remained secret), which is expected to employ 14 people. Acsion has been given a \$200,000 loan by Whiteshell Economic Development Authority. Another small company, Granite Internet Services, has been given a \$74,250 loan to employ four people as an internet service provider. In a highly questionable deal, AECL has given away 34 acres of land, and buildings for \$1. The buildings include a residence building used for AECL employees that was originally built for \$650,000.¹¹⁴ The recipient of the property, Carvel Trading Ltd. headed by Harvey Davis, outlined a grand resort proposal, but does not seem to have the resources to carry out the project.

On June 19, 2000, the federal government announced yet another \$10 million subsidy in its ongoing attempt to privatize some aspect of AECL’s Whiteshell operation.¹¹⁵ \$5 million is being given by Natural Resources Canada directly to AECL to promote the privatization process, in particular, radioactive waste management research at the Underground Research Laboratory.

Another \$5 million will be provided by Western Economic Diversification (another federal agency) contingent on the successful privatization of the URL project.

111 . Tim Ruhnke, “CNPL withdraws from Whiteshell talks”, *North Renfrew Times*, April 15, 1998, p. 1.

112 . “Government Releases Report of Panel Studying the Disposal of Nuclear Fuel Waste”, *Canadian Environmental Assessment Agency News Release*, March 13, 1998.

113 . Natural Resources Canada, “AECL announces decision on future plans for Whiteshell”, *News Release 98-102*, December 16, 1998

114 . Dan Lett, “Pinawa pins hopes on resort project”, *Winnipeg Free Press*, July 27, 1998. See also: Gerald Flood, “Atomic town stuck in the 60s”, *Vancouver Sun*, March 27, 1999, p. B1.

115 . Natural Resources Canada, “Whiteshell receives a \$10 million federal boost”, *News Release*, June 19, 2000.

6.1. Whiteshell Environmental Assessment Process

In December 1999, as the “Responsible Authority” for nuclear issues under the Canadian Environmental Assessment Act, the Atomic Energy Control Board (now the Canadian Nuclear Safety Commission) decided that a Comprehensive Study Report ¹¹⁶ would be conducted on Whiteshell decommissioning, delegated the conduct of the study to AECL, and issued the scope for the study. As usual, the proponent of the undertaking writes the environmental assessment report itself (subject to review by the Responsible Authority, the AECB/CNSC). The scope document said that decommissioning activities would include, “...dismantling and/or decontamination and refurbishment of all structures, infrastructure and services, and the remediation of all lands in the project area, *except for an eight hectare area where continued management of radioactive waste under AECB licence is proposed to continue in the future.*” [emphasis added] ¹¹⁷

Despite public requests, the actual remaining waste management areas, as well as the Underground Research Laboratory were excluded from the study. ¹¹⁸ Radioactive waste identified by the CNSC is listed in Table 2. The Manitoba government has stated publicly that it wants radioactive waste to be removed from the Whiteshell site. Manitoba Highways Minister Darren Praznik stated, “The message we gave [AECL] is that if you leave Manitoba, we expect you to take your nuclear waste with you. We don’t want to be your dumping ground. [...] Essentially their plan is to lock up the buildings, install a monitoring system and hire security guards to watch the place.” ¹¹⁹

Table 3: Radioactive Wastes at Whiteshell Waste Management Area & Concrete Canister Storage Facility

Type of Radioactive Waste	Amount
Low-level radioactive waste	19,418 m3
Intermediate-level radioactive waste	848.1 m3
High-level liquid radioactive waste	180 L
Organic Liquids	7.8 m3
Irradiated fuel bundles & element storage cans in concrete canisters	2269

Source: Letter from R.E. Stenson, Project Officer/Assessment Specialist, Wastes and Decommissioning Division, Atomic Energy Control Board, to Dave Taylor, Concerned Citizens of Manitoba, July 9, 1998.

116 . A lower level of environmental assessment that does not involve the appointment of an independent panel for review, or provide funding for public interventions.

117 . AECB, *Decommissioning of the Whiteshell Laboratories: Scope of Project and Assessment for an Environmental Assessment Pursuant to the Canadian Environmental Assessment Act*, December 22, 1999.

118 . See for example: Letter from I. Kock, Nuclear Awareness Project, to Barclay Howden, AECB, November 25, 1999.

119 . Canadian Press, “Feds and province feuding over waste disposal”, *CP Newswire*, February 20, 1999.

In April 2000, AECL submitted its first draft of the Comprehensive Study Report to CNSC, which has provided comments, and is awaiting receipt of the second draft from AECL. This second draft will then be made public for a four week comment period. It is then subject to further possible changes by the CNSC before being submitted to the Canadian Environmental Assessment Agency (CEAA) and the federal Minister of the Environment. The report is then subject to further public comment, and CEAA makes recommendations to the Minister of Environment, who is able to accept, ignore or modify the recommendations of the report.