

ANALYSIS OF A COLD WATER RELEASE FACILITY IN THE NECHAKO RESERVOIR

by

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EXECUTIVE SUMMARY

As part of the 1997 Agreement with the British Columbia provincial government, Alcan committed up to \$50 million toward the design and construction of a Cold Water Release Facility (CWRF) at the Kenney Dam for the environmental enhancement of the Nechako River. The CWRF will become part of the Nechako Reservoir, which is located in northwestern BC.

The design and operation of the CWRF will be determined through discussions with stakeholders including the provincial government, the Department of Fisheries and Oceans (DFO), the Nechako Watershed Council (NWC) and First Nation groups. The project and its stakeholders will have direct and indirect effects on Alcan and its objective of maximising value for its shareholders.

Alternatives for Alcan include adjusting the time line of the project to complete it as soon as possible, following the proposed NWC time line or delaying the project. Alcan and the stakeholders could also bring a third party to the project. All options could include power generation to the CWRF.

In order to meet the primary goal of creating value for the shareholders, Alcan should follow the time line set out by the NWC. This will permit Alcan to build positive relations with the key stakeholders and to protect the provincially granted water rights for the continued operation of the works in Kemano and Kitimat.

This paper will in no way reflect the thoughts or intentions of Alcan. The ideas explored within the paper are those of the author only, and are not in any way binding upon Alcan, Simon Fraser University or anyone else.

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TABLE OF CONTENTS

Approval.....	ii
Executive Summary	iii
Acknowledgements.....	iv
Table of Contents	v
List of Figures	vii
Glossary.....	viii
1 Introduction.....	1
1.1 Introduction and Historical Background	1
1.2 Alcan:	4
1.3 Alcan in BC.....	6
1.3.1 The Nechako-Kitimat Project	9
1.3.2 History of the 1987 Agreement between Alcan and the Province of BC.....	14
1.3.3 History of the 1997 Agreement between Alcan and the Province of BC.....	16
1.4 Alcan’s Commitment to a Cold Water Release Facility.....	18
1.4.1 Description of CWRF	19
1.5 Key Stakeholders in the CWRF commitment	23
1.5.1 Nechako Environmental Enhancement Fund Management Committee	24
1.5.2 Nechako Watershed Council.....	24
1.5.3 Nechako River Alliance	25
1.5.4 First Nations.....	26
1.5.5 Nechako Enhancement Society.....	26
2 Key Stakeholders in the Proposed CWRF.....	27
2.1 Introduction	27
2.2 Government.....	27
2.2.1 Federal.....	27
2.2.2 Provincial:	30
2.2.3 Nechako Fisheries Conservation Program	32
2.2.4 NEEF	34
2.2.5 Governmental Environmental Review and Permitting	36
2.2.6 Local Governments	36
2.3 Committees.....	38
2.3.1 NWC	39
2.3.2 Other Associations	41
3 Impacts of the Proposed Cold Water Release Facility	43
3.1 Introduction	43
3.2 Time line for the proposed CWRF.....	43
3.3 Direct impacts of the proposed CWRF on Alcan.....	45

3.3.1	Direct Financial Cost of a CWRF to Alcan.....	45
3.3.2	Direct Financial Benefits to Alcan – Enhanced Hydroelectric Generation.....	47
3.3.3	Direct Financial Benefits to Alcan – Meeting Contractual Obligations	51
3.4	Indirect impacts of the proposed CWRF on Stakeholders and Alcan	51
3.4.1	Federal Government.....	52
3.4.2	Provincial Government	54
3.4.3	NFCP	55
3.4.4	NEEF	55
3.4.5	NWC	55
3.4.6	First Nations.....	56
4	Alcan’s Options Regarding Its Commitment to a CWRF	58
4.1	Introduction	58
4.2	Alcan Goals.....	58
4.3	Alcan’s Options.....	59
4.3.1	Adjusting the time line of the project.....	60
4.3.2	Power Generation.....	64
4.3.3	Backing Out	66
4.3.4	Third Party	68
4.4	Evaluation of Alcan’s Options	70
5	Summary and Recommendations.....	73
5.1	Summary	73
5.2	Recommendations	74
Bibliography		78
Works Cited		78
Works Consulted		79
Company documents.....		80

LIST OF FIGURES

Figure 1-1: Map of Alcan’s Operation in B.C..... 3

Figure 1-2: Alcan’s product list 4

Figure 1-3: Alcan Kitimat Value Chain 6

Figure 1-4: Key events in the History of Alcan in British Columbia..... 7

Figure 3-1: NWC time line..... 44

Figure 4-1: Evaluation of Alcan’s Options for the CWRP..... 71

GLOSSARY

APMBC	Alcan Primary Metal British Columbia
BC	British Columbia
BCEAA	BC Environmental Assessment Act
BCUC	British Columbia Utilities Commission
CEAA	Canadian Environmental Assessment Act
CSR	Corporate social responsibility
CSTC	Carrier-Sekani Tribal Council
CWRF	Cold Water Release Facility
DFO	Federal Department of Fisheries and Oceans
DOK	District of Kitimat
EHS	Environmental, Health and Safety program
ERAP	Environmental Risk Analysis Program
ESD	Environmental Services Department
FCA	Federal Court of Appeal
FCTD	Federal Court Trial Division
FEL	Front End Loading
FUF	Freed Up Flows
IPP	Independent Power Producers
INAC	Indian and Northern Affairs Canada
KCP	Kemano Completion Project
KDRF	Kenney Dam Release Facility
KPa	One thousand Pascals, a physical quantity of pressure, newton/meter ²

LTA	Long Term Average
LTEPA	long-term energy price agreement between Alcan and BC Hydro
M-C	Murray Cheslatta
MW	Megawatt, 1000 watts of energy
MWh	Megawatt hour
m ³ /s	cubic meters per second
NEEF	Nechako Environmental Enhancement Fund
NEEFMC	Nechako Environmental Enhancement Fund Management Committee
NES	Nechako Enhancement Society
NFCP	Nechako Fisheries Conservation Program
NGOs	Non-Government Organizations
NPV	Net Present Value
NRA	Nechako River Alliance
NWC	Nechako Watershed Council
SARA	Species At Risk Act
SLS	Skins Lake Spillway
STMP	Summer Temperature Management Program
TGP	Total Gas Pressure
WBS	Work Breakdown Structure

1 INTRODUCTION

1.1 Introduction and Historical Background

This paper will analyze Alcan Inc.'s (Alcan) options with respect to its commitments to partially finance and operate a Cold Water Release Facility (CWRF) at Alcan's Kenney Dam. These commitments were made as part of a 1997 Agreement with the Province of British Columbia (BC).¹ The dam is located on the Nechako Reservoir in northwestern BC (Refer to Figure 1-1). The water in the reservoir is used to generate electricity in Kemano and the electricity is transmitted to Kitimat where it is used in Alcan's 272,000 metric tonne per year aluminum smelter.

The 1997 Agreement settled litigation as a result of the provincial government's cancellation of Alcan's Kemano Completion Project (KCP) in 1995. In the agreement Alcan committed to, among other things, match provincial funds up to \$50 million toward the downstream enhancement of the Nechako River. The enhancement scope would be established through communication with various government agencies, committees and stakeholder groups. These groups would include the Federal Department of Fisheries and Oceans (DFO), First Nations groups, other business interests and Non-Government Organizations (NGOs) such as the Nechako Enhancement Society (NES), the Nechako Environmental Enhancement Fund (NEEF) and the Nechako Watershed Council (NWC).

¹ Province of BC, BC/Alcan 1997 Agreement.

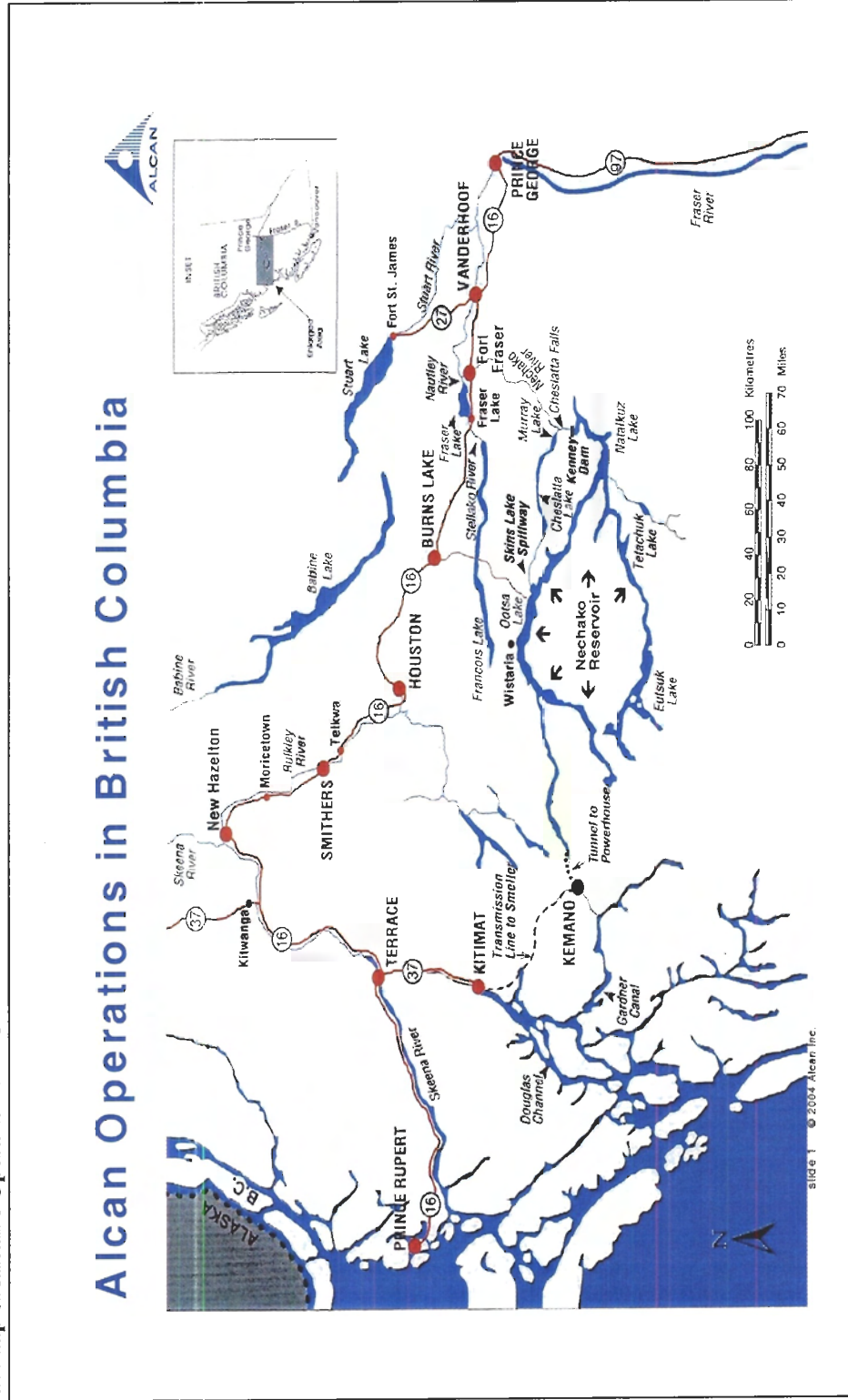
The CWRF project will have direct consequences for Alcan. These include the outlay of \$50 million and possibly more funds if Alcan chooses to participate in a hydroelectric generation station as part of the scope of the project. There will also be indirect cost and benefits for Alcan as a result of the project's effects on other key stakeholders.

The CWRF has a direct effect on Alcan in that the net present value (NPV) of the project is negative. By this calculation, completing the project will result in a destruction of value for Alcan. Considering the \$50 million 'plus' cost and 'Alcan's Maximizing Mindset' which focuses on the highest cash value options for projects, from a narrow, project evaluation standpoint the project should not continue.² But, this project will affect various stakeholders, such as the DFO and the NWC, who have the potential to affect Alcan's relationship with the provincial government, particularly Alcan's water licence that gives Alcan the right to use water in the Nechako Reservoir in order to generate electricity. The dilemma for Alcan is how to weigh the direct costs of the project against the indirect benefits of obtaining good stakeholder relationships.

The rest of the chapter will provide a detailed overview of Alcan's history in BC and the Kitimat Area, its long-term agreements with provincial governments including the commitment to the CWRF, and some of the institutions and contracts that constrain its actions.

² Alcan Inc. 2003 Annual Report, page 1 and 2.

Figure 1-1: Map of Alcan's Operation in B.C



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1.2 Alcan:

Alcan, a multilingual and multicultural organization with approximately 70,000 employees in 55 countries and regions around the globe, is the world's second largest producer of primary aluminum, and a global producer of value-added engineered products and composites for key market sectors such as aerospace, automotive and beverage cans. Alcan's ultimate goal is to maximize shareholder value. Alcan's 2004 revenues were US\$25 billion.³ Alcan's web site classifies the following as products:

Figure 1-2: Alcan's product list

<p>Mass Transportation: Vehicle-structure systems and interior fittings for rail vehicles and buses</p>	<p>Anodes: Anodes (used for the electrolysis process by which aluminum is extracted from ore)</p>
<p>Automotive: Materials delivery, design and manufacture of vehicle components and modules</p>	<p>Pharmaceutical and Personal Care Packaging: Sourcing, manufacturing, design and mass production</p>
<p>Food Packaging: Printed and coated plastics and cellulose films, papers and aluminum foil</p>	<p>Foil: Pop-up foil, heavy duty aluminum foil and containers</p>
<p>Cables: Aluminum cable, rod and strip products</p>	<p>Science and Glass: Glass and plastic containers, vials and other speciality apparatus</p>
<p>Composites: Aluminum composite material, balsa core materials and structural foam</p>	<p>Aluminum Ingot: Extrusion billet, foundry ingot, rotor ingot, remelt ingot</p>
<p>Speciality Aluminas: Fused aluminas, tabular aluminas, calcined aluminas and aluminum hydroxides</p>	<p>Aerospace: Metallurgy, plate, alloy and casting</p>

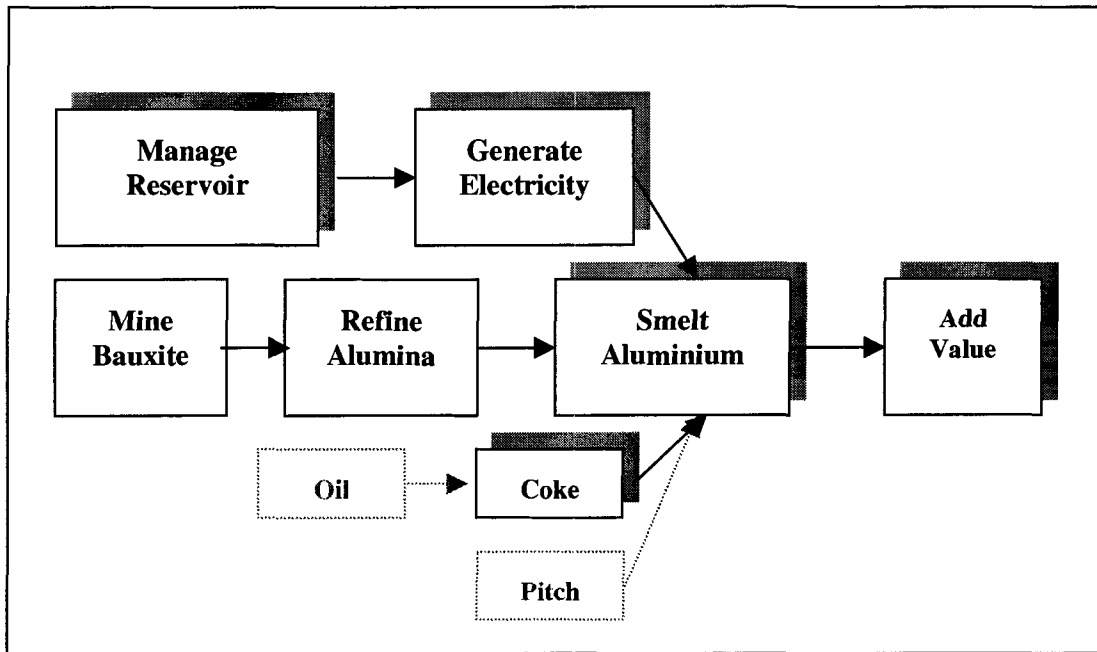
³ Alcan Inc. 2004 Annual Report, Financial section, Eleven year summary

Kitimat Works produces aluminum ingot, a commodity in a mature industry. Kitimat's ingot is marketed in the Pacific Rim in three basic forms: sheet, billet and tri-lok. Sheet is formed as a large block of metal approximately half a meter high, one and a half meters wide and eleven meters long: one sheet can weigh twenty-five tonnes. It is used for rolling stock and manufactured into such products as foil and cans. Billet is cylindrical in shape with varying diameters and lengths as determined by customer requirements. It is used mostly for extrusion: the metal is heated until near molten and pushed through a die to form various shapes such as window mouldings. Value is added to the sheet and billet products by alloying the aluminum to adjust its material properties and by adjusting its size and shape to meet each customer's needs. Tri-lok is raw aluminum that is re-melted by customers to produce other value-added forms.

Alcan owns and operates most of its own bauxite mines, alumina refineries, power generation plants, and aluminum smelters. Bauxite is mined, mostly in the southern hemisphere of the world where it is refined into alumina. The alumina is then shipped around the world for smelting (in Kitimat's case the alumina comes from Australia). Smelting is an electrolysis process that removes an electron from the alumina and converts it to aluminum. Smelting is a very large consumer of electrical energy. Locating aluminum smelters close to company-owned power sources is a cornerstone of Alcan's cost and process control, as is the case in Kitimat. On average, electricity represents approximately 25 percent of the cost of producing aluminum around the globe.⁴ Kitimat calcines coke, a by-product of the oil industry, in a rotary kiln that converts the coke into carbon. The carbon is then mixed with pitch, a by-product of the steel industry, to form briquettes that are used in the smelting process. Kitimat Works is responsible for the shaded boxes in the Alcan Kitimat Value Chain, Figure 1-3.

⁴ CRU 2000, CRU Aluminum Group are analysts of the aluminum industry.

Figure 1-3: Alcan Kitimat Value Chain



1.3 Alcan in BC

Alcan has resources throughout BC including a regional head office in Vancouver, a local office in Vanderhoof, a 272,000 tonne per year smelter in Kitimat, a hydroelectric generating plant in Kemano and the Nechako Reservoir. The foundation for Alcan's operations in BC is the water stored in the reservoir (Refer to Figure 1-1).

Figure 1-4 Key events in the History of Alcan in British Columbia⁵

1930s	Government surveys; identify hydroelectric potential of northern BC.
1943	Alcan and BC Government meet regarding regional development.
1948	BC Government invites Alcan to conduct a feasibility study of building a smelter.
1949	BC passes Industrial Development Act that allows the Government to give Alcan water rights in the Nechako and Nanika Rivers in exchange for the development of an aluminum industry in northwestern BC.
1950	Agreement granting conditional water rights to divert water from the Nechako River.
1951	Construction of Nechako-Kitimat project begins in Kemano.
1954	Kemano Powerhouse completed and Kitimat Smelter goes on line.
Late 1970s	Alcan announces intention to proceed with Kemano Completion Project (KCP) and to divert more water from the Nechako River.
1978	Environmental studies conducted by Alcan.
1980	Federal Department of Fisheries and Oceans (DFO) orders Alcan to release more water to the Nechako. Alcan refuses to comply. DFO obtains BC Supreme Court order.
1982	The Attorney General of BC takes the position that water flows are under Provincial jurisdiction and cannot be appropriated by the Federal Government.
1985	Trial date set for Alcan/Provincial Government lawsuit against DFO over jurisdiction of water flows in the Nechako.
1987	Settlement Agreement reached settling litigation started in 1985.
1988	Alcan begins the KCP construction.
1990	Save the Bulkley Society and Carrier Sekani Tribal Council file motions to quash the exemption orders and Settlement Agreement and seeking a full environmental review.
1991	1990 lawsuit goes to trial. Federal Court Trial Division (FCTD) quashes the Exemption Rule and rules that the project is subject to environmental review analysis program (ERAP).
1991	Work on KCP halted.
1992	Federal Court of Appeal (FCA) reverses the FCD decision. Appeal to Supreme Court of Canada Started.
1992	Provincial Government initiates review of government options regarding KCP.
1993	Provincial Government establishes a public review of KCP.
1993	Supreme Court of Canada refuses to hear appeal of the 1992 FCA decision.
1995	Kemano Completion Project rejected by the Province of BC.
1996	Alcan and Provincial Government release report: ' <i>Conceptual Alternatives for a Release Facility at Kenney Dam</i> '. Proposal to establish Nechako Watershed Council is made.
1997	Alcan and BC Government sign the 1997 Agreement and establish the Nechako Environment Enhancement Fund (NEEF).
1998	Nechako Watershed Council established: CWRP workshop in Vanderhoof.
1998	Alcan receives permanent water licence for the water required to operate Kemano.

⁵ Figure 1-4 is based on Chronology of Key Events in NEEF. Nechako River, Summary of Existing Data and BCUC Kemano Completion Project Review.

In the 1930s, the British Columbia provincial government identified and assessed the possibility of the development of hydroelectric power in northern BC.⁶ The evaluation acknowledged a great potential for generation but no use for the electricity in the remote areas of the province. It also noted that geographic conditions would not allow the transmission of the power to settled communities.

In the 1940s, Alcan and the BC provincial government discussed the possibility of harnessing the hydroelectric power for the establishment of an aluminum smelter in the northwest area of the province. Alcan submitted a proposal to the government for the rerouting of some of the Nechako River water into a reservoir. The water would then be diverted, east to west, through Mount Dubose, Kemano, to the Pacific Ocean. The river diversion would result in decreased flows in the Nechako River and increased flows in the Kemano River.

In 1949 the BC government passed the Industrial Development Act, which gave the Lieutenant Governor in Council authority to sell or lease Crown land and grant water licences to anyone proposing to establish or expand an aluminum industry in the province.

In 1950 an agreement between the Province and Alcan was reached, whereby the government granted Alcan, for a fee, the right and licence, to store and to use, by diversion, water of the Eutsuk and Tahtsa water systems and to occupy Crown lands pertinent to the full development of the waterpower. Water rights granted to Alcan in the 1950 Agreement were to be exercised by December 31, 1999. At that time, Alcan would be granted licence in perpetuity for the water required to operate facilities established at that date. In return, Alcan agreed to launch an aluminum industry in BC - the Nechako-Kitimat project.

⁶ Campbell, 1985, Chapter 3, and BCUC 1994, Section 4.1 historical Context.

1.3.1 The Nechako-Kitimat Project

The Nechako-Kitimat project foot print encompasses a very large geographic area. It consists of the Kenney Dam, the Skins Lake Spillway, the Nanika System, the Nechako Reservoir and a 16-kilometre tunnel to a powerhouse in Kemano. A fifty-kilometre transmission line runs from Kemano to a smelter in Kitimat. The linear distance from Kitimat to Kenney Dam is approximately 240 kilometres (Refer to Figure 1-1).

1.3.1.1 Nanika System

The Nanika system consists of a number of smaller lakes to the North of Kemano (Refer to Figure 1-1). They are part of the original 1950s water licence. The plan was to build a dam at the north end of the lake system and connect these lakes to the reservoir via a tunnel.

1.3.1.2 Kenney Dam

The Kenney Dam is vital to the entire Nechako-Kitimat project. Its construction blocks the flow of water through the Nechako canyon. The dam's task is to collect and store water. The water destined to flow east is now diverted west through the Kemano powerhouse where it is used to generate electricity. The Kenney dam was one of the first operations of the Nechako-Kitimat Project. After the dam was completed, it took over four years for the water level in the reservoir, a chain of lakes, to reach the design elevation of 835 meters above sea level. There were seven smaller saddle dams constructed in the north rim of the reservoir basin. Skins Lake Spillway (SLS) was also part of the man-made reservoir.

1.3.1.3 Skins Lake Spillway:

A spillway releases water and delivers it safely to the river channel below. The spillway, located on Skins Lake, is approximately eighty kilometres west of the Kenney Dam (Refer to

Figure 1-1). The maximum flow that can pass the gates of the spillway is nineteen hundred cubic meters per second (m³/s). The spillway releases reservoir water through the Murray-Cheslatta waterway for flood control, fisheries, recreational and commercial use in the Murray and Cheslatta lakes and in the Nechako and Fraser Rivers.

Alcan manages the spillway flow releases under a 1987 Agreement between Alcan, the BC government and the DFO.⁷ Alcan owns and maintains the spillway and the other saddle dams intrinsic to the reservoir.

1.3.1.4 Power Tunnel:

The power tunnel is sixteen kilometres long and seven and a half meters in diameter. The tunnel takes water in at the west end of Tahtsa Lake and travels through Mount Dubose to the powerhouse. The intake is eight hundred and fifty meters above the powerhouse Pelton turbines. The resulting water pressure of approximately 7584 Kilo-Pascals (KPa)⁸ in the generator manifolds is a direct result of the extreme height differential or 'head'. In comparison, Niagara Falls has fifty-seven meters of head.⁹ The head makes Kemano one of the most efficient hydro-generation stations in the world.

1.3.1.5 Powerhouse:

The powerhouse is located underground, four hundred meters inside Mount Dubose. The generators in the powerhouse convert the potential energy of the reservoir water into a more useful electrical energy. The eight generators have an engineered capacity of one hundred and twenty five megawatts each, a total of one thousand megawatts for the powerhouse. Due to the

⁷ The 1987 Agreement between Alcan, the province of BC and the DFO was to ensure that the water resources of the Nechako River are managed to an acceptable level of certainty for the conservation and protection of chinook and sockeye and at the same time, to ensure that Alcan can continue to generate hydroelectric power for industrial purposes.

⁸ KPa represents pressure in the metric system (newton/meter²). Imperial system units are PSI (pound/in²).

⁹ <[http://encarta.msn.com/encyclopedia_761578254/Niagara_Falls_\(waterfall\).html](http://encarta.msn.com/encyclopedia_761578254/Niagara_Falls_(waterfall).html)> June 2005.

design and construction methods of the power tunnel, the output from the powerhouse is 'flow restricted' (i.e., it does not get enough water to operate fully) to a maximum of approximately eight hundred and forty megawatts (MW).

After the potential energy of the water is converted into electricity, the water, originally destined for the Nechako River, is discharged through the powerhouse tailrace. The tailrace is a watercourse that is used to exhaust the spent water from the powerhouse to the lower sixteen kilometres of the Kemano River and finally, to the Pacific Ocean.

The powerhouse that was built in 1954 was half the size that was envisioned by the designers. Due to technological and financial constraints and to meet minimum generating capacity and water right requirements stipulated in Section 2, Cancellation of Licence and Permit, of the 1950 Agreement it was decided to install eight generators instead of sixteen.¹⁰

1.3.1.6 Transmission line:

The electricity generated in Kemano is distributed to Kitimat via an eighty-kilometre long transmission line. The energy is used in the industrial smelting process of making aluminum and surplus power is sold to the grid for distribution in northwest BC.

The powerhouse average production is 790 MW.¹¹ 20 MW are lost in transmission line transportation, 565 MW are used in the Kitimat Smelter, 140 MW service the long-term energy price agreement (LTEPA) with BC Hydro, and 65 MW are available for sale to the grid. Adding the 140 MW of the LTEPA and the 65 MW to the grid totals 205 MW available for power sales. In 2005, according to Alcan's LTEPA with BC Hydro, the value of a megawatt hour (MWh) of electricity is approximately \$38. Revenue from power sales equates to approximately: 205MW

¹⁰ Province of BC, The 1950 Agreement, Section 2.

¹¹ Alcan, 'Future Must Be Built On Facts'. Page 9.

times \$38/MWh times 24h/day equals \$187,000/day, or \$68 million/year.¹² The smelter's 2005 annual target for aluminum production is 250,000 metric tonnes. The price per tonne of aluminum on August 15, 2005 at the London Metal Exchange (LME) is \$2274/tonne. If the target production is met and the LME price is consistent throughout the entire year, total 2005 revenue generated from aluminum would be approximately \$569 million. Annual revenue from power sales is less than 9 percent of total revenue for the smelter.

1.3.1.7 Kitimat Smelter

The smelter location was chosen for its proximity to the head of the Douglas Channel, an ice-free deep-sea port, the ample space in the Kitimat Valley and the relatively short distance to Kemano. When Alcan and the provincial government agreed to the project and the location, there was no development in the area other than a small native village at Kitimaat and a few settlers.

The original designers envisioned twelve 'potline' buildings for a total capacity of 500,000 tonnes of aluminum per year. However, the smelter was built with only seven potlines for a capacity of 272,000 tonnes per year. (It is still one of the largest smelters in North America.) The sizing of the smelter is directly related to the sizing of the powerhouse and generation at Kemano.

1.3.1.8 Social and Environmental Impacts; Lessons Learned

From the early 1950s to this day, the Nechako-Kitimat project has had significant social and environmental impacts on the people in the area of the reservoir and on the Nechako River system resulting, at times, in poor relations between the residents and Alcan. In the 1950s when the project was starting, it was the normal practice and solely the responsibility of the provincial and federal governments to speak with and protect stakeholders in the area, including First

¹² All figures are in Canadian dollars.

Nations' people. The governments, the parties having jurisdiction, gave approval of the project. The execution of the project resulted in controversy and several long-term outstanding social and environmental issues. Some of these are:¹³

1. The Cheslatta Carrier Nation was relocated from its traditional homeland and its villages and culturally significant sites were flooded, circa 1952.
2. Other homesteaders were relocated and their property flooded.
3. Building the Kenney Dam de-watered the Nechako Canyon.
4. Diverting reservoir water through Kemano reduced flows in the Nechako River.
5. Passing large volumes of cooling water through the Skins Lake Spillway system resulted in damage to the Murray-Cheslatta watershed.

Those living and working downstream perceive that they lost the Nechako River (seventy-five percent of the headwater flow now goes to Kemano), and they have had little economic reward for the sacrifice. Residents of the reservoir have seen the water elevations rise and fall over the years. They see their shoreline eroding and extending further into the reservoir as the reservoir water level drops. Their fresh-water pumps and boat or plane docks are left dry and unusable. Alcan is blamed for these impacts.

During the 1980s and the KCP, Alcan learned an invaluable lesson regarding consistent corporate communication. During the time between Alcan's closing the project in 1991, and the provincial government's rejecting it in 1995, Alcan focussed its energy on the legal and regulatory process of keeping the project alive. On the other hand, KCP opponents took their concerns to the public and to the politicians. When the environmental review returned with options that could have made the project viable, public opinion was influenced by negative information that Alcan could not overcome and the project was killed. Alcan management learned that openness and transparency are the foundation of beneficial stakeholder relationships.

¹³ NEEF report 'Moving Ahead' June 7 2001. Page 2.

This lesson will be important for Alcan's decision of how best to proceed with the CWRF, and for its continued management of the reservoir.

1.3.2 History of the 1987 Agreement between Alcan and the Province of BC

The original 1950 Agreement that gave Alcan the exclusive water rights to the Nanika system and to the (above the dam) Nechako watersheds did not contain any conditions for the protection of fish. The subsequent 1987 Agreement between Alcan, the provincial government and the federal government, modified the 1950 Agreement to protect fish downstream of the Kenney Dam.

In 1949 and 1950, the DFO raised concerns regarding water temperature and total gas pressure (TGP) of the water at Cheslatta falls and proposed a CWRF at Kenney Dam.¹⁴ At the time, Alcan claimed that the facility would not be feasible, citing safety and engineering reasons.¹⁵

From 1958 onwards, the DFO asked for specific flows to be released for fisheries protection. Until 1980 these requests were generally met.¹⁶ In 1979 and 1980, low natural inflows to the reservoir and increased demand for electricity resulted in a reduction of release flows for fisheries. The Federal Government, through the DFO, ordered Alcan to release 28.3 cubic meters per second (m³/s). Alcan complied with a later provincial order to release 22.7 m³/s. In August 1980, the Attorney General of Canada, on behalf of the DFO, obtained a temporary injunction in the BC Supreme Court requiring that Alcan release the flows requested by the DFO. The decision included a court directive that the parties seek a long-term agreement outside the

¹⁴ TGP is a measurement of the atmospheric gasses dissolved in water. When the concentration of dissolved gasses exceeds saturation, fish may suffer from a condition similar to that when divers get the bends. TGP levels can rise when the water warms in sunlight or as a result of entrapment of air as the water plunges into a spillway pool or below a falls.

¹⁵ BCUC, Kemano Completion Project review, December 1994, Section 4.1 Page 23.

¹⁶ BCUC, Kemano Completion Project review, December 1994, Section 4.1 Page 23.

court. A task force was struck that included Alcan, the DFO, the province and an environmental consulting firm, Envirocon. The task force studied the water issues until 1985 when Alcan asked the BC Supreme Court for a permanent resolution to the jurisdictional and technical issues with respect to flows. The Provincial Government joined Alcan in the suit as a co-defendant. In April 1987 the Minister for Fisheries and Oceans and Alcan agreed to participate in out-of-court negotiations. The discussions included a flow regime for releasing reservoir water into the Nechako system, construction of a CWRF at Kenney Dam and the removal of the Nanika River flows from Alcan's water rights. On September 14, the 1987 Settlement Agreement was signed.¹⁷

The purpose of the 1987 Agreement was to ensure that the water resources of the Nechako River are managed for the conservation and protection of chinook and sockeye salmon and that Alcan can continue to generate hydroelectric power. As part of the agreement the Nechako Fisheries Conservation Program (NFCP) was established. Its mandate is to annually carry out a program of monitoring, research and remedial measures to protect and enhance chinook salmon. It is also required to carry out a temperature control program in the Nechako River for the benefit of sockeye salmon by delivering large volumes of reservoir water to cool the river in July and August.

The key features for Alcan of the 1987 Agreement include: the assembly of and the participation in the NFCP, the condition that Alcan pay for the construction of a CWRF at Kenney Dam and any remedial conservation work necessary. Additional key terms require Alcan to abandon all of its rights to the Nanika River and the Murray-Cheslatta system that were included as part of the 1950s Agreement. At the same time the provincial government issued a new water licence to the federal Crown to use reservoir water for the protection of fish in the Nechako River. These terms are important to Alcan because they reduce the autonomy that

¹⁷ Discussion points of the 1987 Agreement are derived from the BCUC, Kemano Completion Project Review, December 1994 and the 1987 Agreement, Section 4.1.

Alcan has with regard to the reservoir. They also reduce the water rights that Alcan has, jeopardizing its opportunities to sustain and grow operations in BC.

1.3.3 History of the 1997 Agreement between Alcan and the Province of BC

The announcement of the KCP in 1979 re-ignited a twenty-eight-year-old controversy regarding the original damming of the Nechako River and the diversion of its water through Kemano for power generation. The KCP proposed the use of the remaining water rights under the 1950s Agreement to complete the powerhouse by installing new generating equipment. The increased generation would be used to increase aluminum output from the Kitimat smelter. The 1997 Agreement is the result of Alcan's lawsuit against the provincial government's rejection of the KCP.

The 1979 version of the KCP included the installation of four new generators in Kemano, a second power tunnel and intake, adding 1.1 meters to the height of the Skins Lake Spillway (SLS) and the construction of the Cheslatta fan channel. The Cheslatta fan channel is the reconstruction of a flow path through an area that had been negatively modified by an 'avulsion' (erosion and breakthrough) of the Cheslatta River bank.

A notable feature of the KCP was the Kenney Dam Release Facility (KDRF). The facility would allow more efficient flow of released cooling water over the Kenney Dam than using the SLS. It would enable the rehabilitation of the Murray-Cheslatta system, re-water the Nechako Canyon, reduce erosion and sediment in the upper Nechako River, manage the TGP and improve flood control in the Nechako and Fraser Rivers. The KDRF concept would keep all of the unreleased water in the reservoir for stabilisation of the water elevation and for additional power generation at Kemano. The design and operation of the KDRF was left to Alcan and its engineers.

In 1995 the government of BC cancelled the KCP. After a period of unsuccessful discussions between Alcan and the province of BC, Alcan took the province to court to try to recover some of the \$535 million of sunk costs of the half-completed project. In August of 1997, an out-of-court settlement, the BC/Alcan 1997 Agreement was reached.¹⁸ This agreement included, among other things, a replacement electricity supply agreement, the granting of water rights to Alcan in perpetuity, the establishment of the Nechako Environmental Enhancement Fund (NEEF), the Nechako Environmental Enhancement Fund Management Committee (NEEFMC) and the Nechako Watershed Council (NWC). These committees and funds were established to provide a forum where stakeholders could openly discuss options for the enhancement of downstream conditions and the mitigation of some of the long-term social and environmental effects of the Kenney Dam installation. Alcan management has learned that even if the water licence is granted in perpetuity, it can still be challenged and eroded as the original 1950s licence has been.

The replacement electricity supply agreement was an attempt to replace the power that would have been generated in Kemano as a result of completing the KCP. The power was to be used in a new smelter at Kitimat. When and if Alcan were to build a new smelter, the power would be supplied by BC Hydro at the same rate that the KCP power was forecast to cost. To date, Alcan has not built a new smelter and has not announced plans to do so.

The 1997 Agreement commits Alcan to match provincial government funds of up to \$50 million for Alcan's total contribution to downstream enhancement of the Nechako River. Once the province contributes its money to the NEEF, Alcan has seven days to contribute an equal amount of money, up to a maximum contribution of \$50 million. Alcan can deduct from its contribution the costs incurred in the participation on the NEEFMC, to a maximum of \$10

¹⁸ Province of BC, BC/Alcan 1997 Agreement.

million.¹⁹ The 1997 Agreement also commits Alcan to the costs of operating and managing the maintenance of the facility but not to bear the cost of the hands-on maintenance.²⁰ Alcan would be responsible for the administration costs but not the tools, labour or material required to physically perform the action of the maintenance.

In summary, the 1997 Agreement sees Alcan and the province commit to future power supplies, Alcan's water rights, and spending up to \$50 million each for downstream environmental improvements to the Nechako River. The decision on how the improvements will be made and how money will be spent is left to the NEEFMC.

1.4 Alcan's Commitment to a Cold Water Release Facility.

The DFO continues to request a CWRP at the Kenney Dam. It was included in the 1987 Agreement and in Alcan's scope for the KCP. The 1997 Agreement, Schedule 4, Section 10 states that:

"The purpose of the Management Committee (NEEFMC) is to review, assess and report in options that may be available for the downstream enhancement of the Nechako watershed area. These options include, but are not limited to the development of a water release facility at or near the Kenney Dam, or the use of the Nechako Environmental Enhancement Fund for other downstream enhancement purposes."

Applicable laws of Canada and the Province of BC govern the 1997 Agreement. If one part of the Agreement is declared or held invalid, the rest of the Agreement is considered to be in full force. There are no explicit penalties for relinquishing a part or the whole of the contract.

¹⁹ Province of BC, BC/Alcan 1997 Agreement, Schedule 4, Clause 9 and 12.

²⁰ Province of BC, BC/Alcan 1997 Agreement. Schedule 4.

The NEEFMC has “decided that a Cold Water Release Facility be constructed at Kenney Dam to enable downstream enhancement of the Nechako Watershed”.²¹ Section 13 of the 1997 Agreement states “the decisions of the Management Committee will be binding on the parties”. Alcan signed the 1997 agreement in good faith and therefore is bound by its decisions and to the construction of a CWRP at Kenney Dam.

1.4.1 Description of CWRP

Since the construction of the Nechako-Kitimat Project, stakeholders located upstream of the Kenney Dam and those in the vicinity of the smelter have seen the positive results from the use of the reservoir and its water. Downstream stakeholders’ needs were considered only after the upstream users’ needs were satisfied. Downstream stakeholders are located in the Nechako River and the Murray-Cheslatta watersheds and downstream of the Kenney Dam along the Nechako and Fraser Rivers. Since the establishment of the 1987 and the 1997 Agreements, the distribution of the water in the reservoir has changed to consider both upstream and downstream concerns. Upstream, Alcan has been granted its water rights in perpetuity for power generation at Kemano and downstream, the DFO has been granted water rights for the protection of fish in the Nechako River and the NWC has been created to explore downstream enhancement prospects such as the CWRP.

The reservoir is man-made, but it relies upon nature to replenish the water drawn from it. Inflows and outflows vary from year to year. The majority of inflows are produced from melting snow. A heavy snow pack and an early spring can see the reservoir full to its brink. A light snow pack and a hot windy summer can see the snow sublimate before it turns into water, leaving the water level low in the reservoir.

²¹ NEEF Report of the NEEFMC, June 7, 2001. Page 7.

Over the years that Alcan has managed the reservoir, data has been collected showing annual snow pack, inflows and outflows from the reservoir as well as water elevation. The data has been used to create a long-term average (LTA) number used to predict the elevation and volume of the water in the reservoir at any given time in the year. The LTA prediction is getting better with the addition of more data, the use of computer modelling and the employment of hydrological experts to analyze the data. This knowledge has been freely communicated and is relied on strongly by the NWC and others.

The LTA inflow from 1930 to 1988 is 195 m³/s. The long-term minimum inflow for the period was in 1970 at 127 m³/s and the maximum inflow was in 1976 at 344 m³/s. This large range makes the management of the reservoir a challenge. Historically, the largest inflows occur during May, June and July. June inflows average 495 m³/s; March inflows are only 69 m³/s.

The current reservoir structure has two outflows, one through Kemano and the other through SLS (Refer to Figure 1-1). The flows through Kemano are used to generate electricity for the smelter in Kitimat. The flows through the SLS are used to satisfy the entire downstream requirements and to protect the reservoir from over-filling.

As part of the 1987 Agreement, the NFCP carries out a temperature control program in the Nechako River by delivering reservoir water to the river through the only source possible, the SLS. The water must travel through the Murray-Cheslatta system before reaching the temperature-recording station. This presents two challenges. The first is that reservoir surface water is used for the cooling flows. The surface water is warmer than the deeper water in the reservoir. The second challenge is that as the water makes its long journey through the Murray-Cheslatta system, it has a chance to warm even more in the slower-moving areas of the lakes before reaching the temperature-recording station in the Nechako River. The only way to deliver

the water at the desired temperature is to release massive flows and rely on the volume of water to maintain the desired temperature at the reporting station.

Releasing large volumes of water has an adverse affect on the Murray-Cheslatta system. The lake levels are artificially high and the increased flow causes scouring of the lakebeds and riverbeds, releasing sediment into the Nechako and Fraser Rivers. The sediment is not desirable for the fish because it reduces visibility, covers prime spawning sites and can get lodged in their gills, which increases their stress levels and the effort of breathing.

The NEEFMC and the NWC have concluded that the CWRF will be the best solution to settle issues over the use of the reservoir water and to meet Alcan's contractual obligations for water temperature control in the Nechako River. A CWRF will allow more efficient use of the water that must be released from the reservoir. It will draw cooler deeper water from the reservoir and release it directly to the upper Nechako River. This water will not have to travel through the Murray-Cheslatta system and will not be subject to the warming effect of doing so. The release location at Kenney Dam is much closer to the temperature-reporting station on the lower Nechako, reducing the dwell time and the opportunity for water to heat up. Scientists, biologists and engineers through the NEEFMC and the NWC have considered these factors and have calculated that the operation of the CWRF at Kenney Dam will result in less water being released from the reservoir in order to maintain the DFO desired temperature.²²

Spilling less water through the SLS will also allow the Murray-Cheslatta River system to return to a more natural state. The large volumes of water for cooling or flood control will no longer have to travel through the lake system, addressing issues of scouring and sediment in the downstream rivers. Returning to a more natural state will be beneficial to resident fish habitat and fish.

²² NWC report: Assessment of Potential Flow Regimes for the Nechako Watershed. Page ii.

The 1987 Agreement established a fisheries conservation requirement for a base flow rate of 36.8 m³/s. The base flow rate is, averaged over the entire year, the minimum water volume per second that must be released from the reservoir. The CWRF will provide another outflow location from the reservoir where most of the base flows will be released. Some flows will be maintained at the SLS through the Murray-Cheslatta system. The actual division of the flows between the SLS and the CWRF has not been determined and is currently under investigation by the NWC.

In addition to the base flow levels, water is released for the Summer Temperature Management Program (STMP) to help maintain the temperature of 20 degrees Celsius in the Nechako River during the warm summer months, July and August.²³ Through the 1987 Agreement the STMP flows have averaged 16.1 m³/s per year over the period of 1987 to 1998. The new technology of the CWRF is predicted to reduce the STMP requirement to 2 to 3 m³/s. The difference in flow requirements is known as Freed Up Flows (FUF) and is said to be about 13 m³/s. The main and current focus of the NWC is to discuss and find the best division of the FUF to satisfy the various stakeholders. Alcan has proposed that up to 10 m³/s of the FUF stay in the reservoir, depending on reservoir levels and annual inflow predictions. The case for this request is that in low water years the reservoir level would be maintained. Base flow and STMP would be maintained at the minimum levels during these conditions but other flows that are desired by downstream stakeholders represented by the NWC would not be met. Water for the Nechako River activities such as canoeing or float plane operation would not be available. Of course when the inflows are predicted to be above the LTA, releasing water for various downstream interests would be easily accommodated.

²³ NWC report: Assessment of Potential Flow Regimes for the Nechako Watershed. Page 13.

The CWRF will be designed to meet DFO requirements for water temperature profiles in the Nechako River by efficiently releasing temperature-controlled water in the correct volume at the correct time. The detailed design and the operations of the CWRF have not been completely determined. This presents challenges in developing project scope, quality and budget. A review from engineering design consultants, Klohn Crippen, put the cost estimate for the installation of the CWRF at Kenney Dam \$100 million.²⁴ This is based on the design for the facility considering the flows under the KCP scope and is made in 1995 dollars; it included a long list of caveats. A lot of ‘front end loading’ (FEL) work needs to be done before a project scope can be reliably generated.²⁵ Until all the stakeholders agree to the scope, a reliable detailed cost estimate will not be available. The cost estimate will be in the current year’s dollars. It will then have to be projected ahead for the 2010 construction date. The project schedule is discussed in section 3.2 below.

Out of the 1997 Agreement and the commitment to the CWRF came the creation of several key stakeholder groups. The next section will describe the stakeholder organizations.

1.5 Key Stakeholders in the CWRF commitment

The stakeholder groups are a mixture of people representing government, industry and academia, and citizens with environmental concerns. As a whole, the groups desire resolution of some of the long-term outstanding issues in the Nechako Valley that were created by the Nechako-Kitimat project and the installation of the Kenney Dam. These issues include the de-watering of the Nechako Canyon and the protection of fish habitat. Consensus among the

²⁴ NEEF report ‘Moving Ahead’ June 7 2001. Page 7.

²⁵ Front End Loading is a project management term for the work that must be done in the initiation and planning stages of a project such as defining the scope of the project including the needs of the users and the maintenance and operating people.

stakeholders such as the NEEFMC, the DFO and the NWC is that a CWRF will address and satisfy the majority of the stakeholder interests.^{26,27,28}

1.5.1 Nechako Environmental Enhancement Fund Management Committee

The Nechako Environmental Enhancement Fund Management Committee (NEEFMC) consisted of three members.²⁹ The federal government was invited to chair the committee but declined. In the absence of the federal government, the other two members, BC government and Alcan, appointed the President of University of Northern British Columbia to the third seat on the committee. The purpose of the committee was to “review, assess and report on options that may be available for the downstream enhancement of the Nechako watershed area. These options may include, but are not limited to, the development of a water release facility at or near the Kenney Dam, or the use of the Nechako Environmental Enhancement Fund for other downstream enhancement purposes”.³⁰

1.5.2 Nechako Watershed Council

The Nechako Watershed Council was established in 1998 to “enhance the long-term health and welfare of the Nechako Watershed with consideration for all interests, and to provide a forum to address water management and related issues in the Watershed and work to co-operative resolution of these issues”.^{31,32} Membership on the NWC is open to any organization willing to commit and participate. Representatives include communities, aboriginal interests, governments, Alcan and the general public.

²⁶ NEEF report ‘Moving Ahead’ June 7 2001. Page 6.

²⁷ BCUC, Kemano Completion Project Review, December 1994. Page 23.

²⁸ NWC Proposed Work Plan, revised March 2002. Page ii.

²⁹ NEEFMC disbanded with the completion of its mandate and the publication of the report “Report of the NEEFMC.” June 7, 2001.

³⁰ NEEF Report of the NEEFMC, June 7, 2001. Page 1.

³¹ Province of BC, BC/Alcan 1997 Agreement, Schedule 4 established the requirement for the NWC.

³² NWC Report: Assessment of Potential Flow Regimes for the Nechako Watershed. Page 1.

The following is an alphabetical list of the current twenty-four NWC-participating organizations.³³

- Alcan British Columbia
- BC Trappers Association
- City of Terrace
- City of Prince George
- Community Futures Development Corporation of Stuart Nechako
- District of Fort St. James
- District of Kitimat
- District of Vanderhoof
- Fort Fraser Chamber of Commerce
- Kitimat Chamber of Commerce
- Kitimat/Stikeen Regional District
- Lheidli T'enneh
- Nechako Valley Regional Cattlemen's Association
- Northwest Communities Coalition
- Province of British Columbia
- Regional District of Bulkley Nechako - Area 'D'
- Regional District of Bulkley Nechako - Area 'E'
- Regional District of Bulkley Nechako - Area 'F'
- Southside Economic Development Association
- Terrace and District Chamber of Commerce
- Tweedsmuir Recreation Commission
- University of Northern BC
- Vanderhoof and District Chamber of Commerce
- Vanderhoof Fish & Game
- Village of Burns Lake

Groups or individuals that did not want to join the NWC, yet had historical concerns regarding Alcan's development, formed another group called the Nechako River Alliance (NRA).

1.5.3 Nechako River Alliance

The NRA is a group of public interest and First Nations organizations committed to working together to address issues that they feel are unresolved by the 1997 agreement. This group chooses not to participate in the current watershed process because it does not consider the original 1950s agreement and water rights granted to Alcan acceptable. In more recent years the organization has not been as active as it once was.

³³ <<http://nechakowatershedcouncil.com/Participants.htm>> July 1995.

1.5.4 First Nations

There are a number of First Nations that are interested in the Nechako watershed. The Carrier-Sekani Tribal Council (CSTC) is an affiliation of eight First Nations in the region. The CSTC does not recognize the 1997 Agreement and they did not participate in the NEEF review process.

Cheslatta Carrier Nation is not part of CSTC. Its primary concern relates to the lack of recognition by all parties of the decision-making authority of the Cheslatta people. They have viewed Alcan as an adversary and have been involved in two major lawsuits over land rights.³⁴

Lheidli T'enneh is not part of CSTC; it is part of NWC.

1.5.5 Nechako Enhancement Society

The Nechako Enhancement Society (NES) was established in 2002 to administer, support and fund the planning of a CWRP at Kenney Dam. NES is a society and a legal entity. It has three directors appointed by Alcan and three appointed by the province. The society co-ordinates and oversees the implementation of the NWC's "Proposed Work Plan for the Cold Water Release Facility at Kenney Dam".³⁵

There are many stakeholders interested in working together in the development of downstream enhancement of the Nechako System, a CWRP at Kenney Dam. Chapter two will examine each of these groups in detail. Chapter three explores how the CWRP will affect Alcan. Chapter four will review Alcan's options regarding its commitment to a CWRP. Chapter five will summarize and conclude the paper.

³⁴ Engen, "A Position Paper in Recognition of the International Year of Freshwater," Alcan corporate web site, 2003. June 2005.

³⁵ NWC, Propose Work Plan, Revised March 2002.

2 KEY STAKEHOLDERS IN THE PROPOSED CWRF

2.1 Introduction

In order to understand the potential impacts of Alcan's decision on how to proceed with its commitment to a CWRF, one must understand who the key stakeholders are, what their goals are, how the CWRF will affect them and how their actions and reactions may affect Alcan.

The stakeholders involved with the CWRF issue vary in size and strength. There are relatively few stakeholders upstream of the dam compared to those downstream. Upstream stakeholders include Alcan, the district of Kitimat, the City of Terrace and a few residents along the shore of the reservoir. Downstream stakeholders include the federal government, the provincial government, local and regional governments, various First Nations, and other NGOs. Most of the NWC consists of downstream stakeholders.

2.2 Government

2.2.1 Federal

The Department of Fisheries and Oceans, Canada (DFO) is an official representative of the federal Crown and exercises jurisdiction under the Fisheries Act of Canada. The DFO is responsible for the protection and management of fish habitat in Canada and is responsible for management of marine anadromous species.³⁶

³⁶ Fish, such as salmon, which ascend fresh water streams from the sea to spawn.

Up to this point, salmon have been the principle fish of concern and the remediation actions for their benefit are in place through the 1987 Agreement. White sturgeon also inhabit the Nechako River. There is relatively little known about this species of fish, but due to declining population they may soon be added to the endangered species list. If this happens, the application of the federally sanctioned Species at Risk Act (SARA) will likely take precedence over the DFO's activities concerning salmon in the Nechako River.³⁷ Salmon are not on the endangered species list and will not have the same amount of attention as the sturgeon in the Nechako River. Sections 32 and 33 of SARA state that no one may harm an individual fish or damage the residence of the species. Considering the declining population, the DFO may claim that the weight of evidence shows that Nechako Dam and the resulting change in flows of the river, over the fully natural condition, have caused and are causing harm to the sturgeon. The federal government departments may want to change the river flow parameters and release schedules to reflect a natural condition to protect sturgeon. Salmon and sturgeon do not have the same life and breeding cycles and they require different flows at different times of the year. It is likely that the change required by the federal government would be a redistribution of existing flow requirements, not an addition to the volume already released. A case can be made that the flows released under the 1987 Agreement protect and benefit all species of fish in the river.

For the DFO both fish and fish habitat require water. The major source of water in the Nechako River is the Nechako Reservoir, where Alcan manages and stores its provincially granted water. Both Alcan and the DFO want the reservoir water for different reasons. Decisions and requirements made at the federal level could counter provincial governance; fisheries habitat is in the jurisdiction of the federal government and water licences are in the jurisdiction of the provincial government. The provincial government has granted to Alcan the Nechako Reservoir water rights to use for power generation in Kemano. The federal government has, in the past,

³⁷ Golder Associate Ltd, 'Recovery Plan for Nechako White Sturgeon', March 2004. Page 3.

made claim to some of this water for the protection of fish and fish habitat. In 1980 the DFO exercised its power by taking Alcan and the provincial government to court over the volume of water released from the reservoir.³⁸ The DFO wanted more water delivered to the Nechako River than Alcan was prepared to release. As evident in the 1987 Agreement, Alcan negotiated with and recognized the legitimacy of the DFO regarding the water releases, water temperature management in the Nechako River and the establishment of the NFCP.

Releasing water to meet the 1987 Agreement and the DFO's requirements meets Alcan's legal responsibilities, but it is a reduction in the autonomy that Alcan had in the reservoir and a forfeiture of the complete control of the primary source of energy for the smelter.

The federal government's claims, through the DFO, for Nechako Reservoir water are legitimate considering the department's goal of protecting fish and fish habitat in the Nechako River. The DFO derives its political power through federally enacted laws and the 1987 Agreement. The legitimacy and the political power could allow the DFO to be a dominant stakeholder in the CWRF issues. At this point in the project life cycle the DFO is not exercising its powers. Its requirements are being met through the 1987 Agreement and it does not have an urgent need for the facility. It is likely waiting to see what the outcomes from the various interest groups and stakeholder interactions will be before it intervenes.

The federal government can directly affect Alcan through a number of avenues. The enactment of SARA for the protection of white sturgeon could result in changing of the timing for water released from the reservoir. Also, in low inflow years the requirements of the DFO as stipulated in the 1987 agreement must be met, leaving less water available for power generation and aluminum production. It is likely that the fish would take precedence over the generation of power and the smelting of aluminum. The operation of the CWRF will allow the DFO's goals

³⁸ BCUC, Kemano Completion Project Review, December 1994. Page 24.

and needs to be met in a more efficient manor than the current method of releasing water through the SLS.

2.2.2 Provincial:

There has been a long-standing positive relationship between Alcan and the provincial government. This is evident in the 1930s and 1940s discussions that brought Alcan to BC and the subsequent 1997 granting of the Nechako Reservoir water rights in perpetuity to Alcan. In this case the Minister of Water, Land and Air Protection represents the provincial Crown and is responsible for management of water resources and freshwater fish resources.

The provincial government must show that it is protecting the environment, responding to its constituents needs and managing the provincial economy. These goals may not always be mutually compatible. Promoting industry may not necessarily be the best thing for the local environment but will likely provide jobs and economic prosperity. The CWRF will provide some short-term construction employment, provide environmental enhancement of the Nechako and the Murray-Cheslatta systems as well as satisfy the local constituents as represented by the NWC.

The provincial government is concerned with the economic well being of the province. Alcan is a major contributor to the provincial economy and the provincial government will be reluctant to harm Alcan's continued operations. Over the past 25 years, Alcan BC has spent over \$1 billion in Northwest BC, and almost \$2 billion in the entire province.³⁹ In 2003 alone, Alcan Primary Metal BC's (APMBC) 1,619 employees received \$155.6 million in payroll and benefits; another \$29 million went to retirees. The direct economic contribution to the province was over \$272 million. Personal income tax paid to the province was \$5.9 million. Looking at this

³⁹ Alcan in BC, Performance Report 2003 < <http://www.alcaninbc.com/pr/2003/economic.html>> June 2005.

another way, the Kitimat operation is responsible for a combined direct and indirect/induced employment impact of about 4,000 jobs in BC.⁴⁰

Considering the long-term relationship and the economic ties between Alcan and the province it is unlikely but possible that the provincial government would consider a wholesale revision to the water licence to balance industrial interests with environmental or other interests. In the past, the provincial government has been under pressure to re-evaluate the water licence granted to Alcan but has found no reason to do so. Governments change and water licencing agreements can be changed. In 1950 the province granted Alcan rights to the reservoir water and since then Alcan has managed the reservoir. The 1987 Agreement saw some of the original water rights transferred from Alcan to the federal government for fish protection. With the growing population in the northwest of BC and an increasing social awareness of the environment there is pressure on the provincial government and Alcan to distribute the water resource of the Nechako Reservoir to other stakeholders such as the NWC. The current water licence and the volume of water that it represents are critical to Alcan's operations in BC. Without the present water volumes used in Kemano to generate electricity, the output of aluminum in Kitimat would have to be adjusted, affecting the bottom line and the viability of the smelter.

The provincial government must be concerned with the correlation in territorial reach between itself and the federal government over water rights and water usage in the province. In 1980, when Alcan and the DFO went to court over the water and fish protection in the Nechako watershed, the province joined Alcan's case in an effort to maintain its sovereignty over the water in the province. In the resulting 1987 Agreement the province maintained its sovereignty by

⁴⁰ Alcan, Responsibility and Leadership—The Value of Relationships Notes for an address by Travis Engen, President and CEO, Alcan Inc., to Vancouver Board of Trade, Vancouver, Canada 2005/05/04. < <http://www.alcaninbc.com/pr/2003/economic.html>> June 2005.

agreeing to assign, without financial compensation, the federal government a water licence in the form of an annual allocation of reservoir water.⁴¹

The level of urgency for the provincial government to see this project completed is relatively low. Like the federal government they are allowing the process to take its course and are letting the other stakeholders establish the time line. The specific intentions of the provincial government concerning the CWRF issue are not known at this time. If and when the provincial government exercises its power and commits funding to NEEF and this project, Alcan will have seven days to make an equal contribution as defined in the 1997 Agreement.

In the past the government and Alcan worked in relative isolation from the communities influenced by their projects. The KCP is an example of this. Their current practice of using an open forum for the CWRF design, construction and operation is a more socially acceptable approach. The open process is desired by other stakeholders such as the NWC and the DFO. This gives the government and the project some legitimacy.

The 1987 and 1997 agreements established the NFCP and the NEEF. Both of these bodies allow the federal and provincial governments to interact with Alcan to discuss ongoing issues in the Nechako Reservoir.

2.2.3 Nechako Fisheries Conservation Program

The Nechako Fisheries Conservation Program (NFCP) was established as part of the 1987 Agreement between Alcan and the DFO and the province of BC. The NFCP is composed of a steering committee and a technical committee. Both committees have one member from each of the three parties to the agreement.

⁴¹ Province of BC, The 1987 Settlement Agreement. Section 2.3(d).

The steering committee provides direction and oversees the implementation of the NFCP. All decisions of the steering committee and the technical committee are intended to be unanimous. If the technical committee cannot reach a decision, an appeal to the steering committee can be made.⁴² If the steering committee cannot reach a decision, an arbitration process has been established. Both committees and the NFCP will be in effect until all remedial measures for the conservation of chinook salmon have been achieved to the satisfaction of the steering committee.

The technical committee is responsible for managing water releases from the reservoir and for designing, implementing and administering measures to comply with conservation of fish stock habitat in the Nechako River. This includes approving the plans and specifications for the CWRF.

The NFCP has the power to cause Alcan to release water from the reservoir at different times than it would like. The NFCP may call for a release of water when the water level in the reservoir is low; Alcan would not normally want to release water at this time. It is likely that when water levels are low and the NFCP requests releases of water for fish protection, power generation will be curtailed. If this situation were to occur it is likely that Alcan would appeal the decision of the committee to the point of arbitration.

The CWRF will change the scope of work for the NFCP in that it will now have to manage three outputs from the reservoir for the benefit of the upstream and downstream stakeholders: Kemano, SLS and CWRF.

The NFCP has legitimate claims for fish protection and the backing and the power of the provincial and federal governments. Alcan has given recognition of these claims through its continued association in the NFCP.

⁴² Province of BC, The 1987 Settlement Agreement. Section 3.3 (e).

2.2.4 NEEF

A provision of Schedule 4 of the 1997 Agreement was the establishment of the Nechako Environmental Enhancement Fund (NEEF) and the NEEF Management Committee (NEEFMC). The province and Alcan will deposit money for the development and construction of downstream Nechako River enhancement into the NEEF. The fund is to be managed by the NFCP.

NEEFMC were charged with the responsibility to “review, assess and report on options that may be available for the downstream enhancement of the Nechako Watershed area”.⁴³ It consisted of a three-person committee consisting of an appointee each from the provincial government, Alcan and the University of Northern BC. The management committee determined that it would make decisions as well as recommendations within its final report. Decisions of the NEEFMC were made through consensus or, if necessary, by majority vote and are binding on the parties. NEEFMC “recommendations”, which were distinguished from “decisions”, are not binding on the parties.

Schedule 4 of the 1997 Agreement required the management committee to report to the province, Alcan and other appropriate parties a plan for implementation of the selected option for environmental enhancement of the Nechako River. The management committee held over forty meetings, conducted public workshops, commissioned ten independent studies and held meetings with interested parties over a three-year period.⁴⁴ They focused on the conceptual design of the CWRF at Kenney Dam, modelling of river summer temperature and water flows, options for the Cheslatta fan, maintaining adequate flows for the Murray-Cheslatta system and estimating a budgetary cost for the CWRF project. They came to the decision that “a cold water release

⁴³ NEEF report, “Nechako River, Summary of Existing Data” October 1999. Page 3-2.

⁴⁴ NEEF report ‘Moving Ahead’ June 7 2001. Page 4.

facility be constructed at Kenney Dam to enable downstream enhancement of the Nechako Watershed”.⁴⁵

NEEFMC recommended that the Nechako River become ‘managed’ based on sound scientific knowledge and principles and that the NFCP and the NWC work together to improve the river. This recommendation is being followed. The NEEFMC also recommended that the NFCP commission an expert panel of the Royal Society of Canada to propose an optimal flow regime for the Nechako River.⁴⁶ This recommendation is not being followed, at this time. The NWC has taken the task and responsibility of optimising the flow for the Nechako River and the conceptual design parameters of the CWRP.

The mandate for NEEFMC was completed with the issuance of the report “Moving Ahead, Summary Report of the Nechako Environmental Enhancement Fund Management Committee, June 7, 2001”. The NEEF is waiting for a commitment and money to be deposited by the parties to the agreement. The decision to commit to the enhancement project was made by the provincial government in 1997. The 1997 government is different than today’s government and the two are likely to have different agendas. The time line for this project, discussed in section 3.2, calls for the majority of the funds to be available in 2008 through 2012. It would not be fiscally responsible for the government to commit the funds now and have them in holding until the year that they are required. It is possible that the government will fund the project in keeping with the NWC time line. Alcan is responsible for matching the funding supplied by the government. It is unlikely that Alcan will deposit its money until the provincial government does so.

⁴⁵ NEEF ‘Report of the NEEFMC’ June 7, 2001, Page 12.

⁴⁶ NEEF report ‘Moving Ahead’ June 7 2001. Page 9.

2.2.5 Governmental Environmental Review and Permitting

The CWRP will require reviews and approvals under the BC Environmental Assessment Act (BCEAA) and the federal Canadian Environmental Assessment Act (CEAA) before it can be constructed. The reviews open the project to all forms of economic, social and environmental scrutiny. Final approval from both government bodies is required before a project of this nature would be allowed to proceed. If the project does not comply, it will be rejected with comments, and the project proponents will have the opportunity to review, revise and go through the process again. Alternatively, the project can be rejected outright. It is likely that the federal and provincial reviews can be harmonised to gain some efficiency in time and effort.

2.2.6 Local Governments

Local governments such as the District of Kitimat (DOK) and the Village of Burns Lake are represented through the NWC. Their goals and actions with respect to the CWRP will be discussed with the rest of the NWC.

2.2.6.1 District of Kitimat

The DOK is upset with Alcan because, in their view, Alcan is selling power to the grid instead of restarting some idle aluminum production and increasing manpower at the smelter. The DOK's goal is to have the smelter at full production in order to increase employment in the area. Their view is that all of the Kemano power should be used in Kitimat for development and the long-term sustainability of the smelter through a modernization of the fifty-year-old facility. Sustaining the smelter will result in a sustainable District of Kitimat.

In 2004 The District of Kitimat (DOK) challenged Alcan in BC Supreme Court as to the interpretation of the 1950 Agreement between Alcan and the provincial government regarding the sale of power by Alcan. Clause 9 of the 1950 Agreement states:

“In order that the promotion and development of the district and other industries in the vicinity of the Works may be encouraged, Alcan may sell to others electric energy generated at the Works”.

Alcan countered the suit, questioning the DOK’s legal standing. In January of 2005 the Supreme Court denied the DOK’s challenge based on a lack of standing,⁴⁷ likely due to the fact that the DOK did not exist at the time the contract was made. Subsequently, the DOK has appealed the standing decision and has launched a separate action for interpretation of the 1950 Agreement against the provincial government.

At Alcan’s 2005 annual general meeting, the Mayor and a few council members had a fifteen-minute presentation in which they voiced objection to Alcan’s practice of selling power at the cost of aluminum smelting and jobs.⁴⁸ During the presentation, Mayor Wozney said “And if Alcan continues down the path (of selling power over making aluminum) we will be challenging their water licence”.⁴⁹ “After 50 years” said Wozney, “why then would Alcan jeopardise this licence and lose its reason for being in Kitimat? If Alcan loses its water licence the company, the stakeholders and the community of Kitimat all lose”.⁵⁰

Travis Engen, President of Alcan, responded by reminding the audience that Alcan has invested great sums of money and time into this project and community. He was quoted as saying “It’s been said over and over that we are in violation of various agreements regarding the

⁴⁷ The Northern Sentinel Newspaper, Wednesday, June 1, 2005.

⁴⁸ The Northern Sentinel Newspaper, Wednesday, June 1, 2005.

⁴⁹ The Northern Sentinel Newspaper, Wednesday, June 1, 2005.

⁵⁰ The Northern Sentinel Newspaper, Wednesday, June 1, 2005.

sale of power. That has never been true. That is something that not only do we attest to but we have had actions by government on several occasions which have made the case clear”.⁵¹

The CWRF and its operation will have no direct affect on the DOK. The facility will not improve the environment or create jobs in the District. The DOK has no claim to the water in the reservoir and is not directly influenced by its usage. The water in the reservoir and the CWRF directly affect Alcan and Alcan directly affects the DOK, therefore the DOK is interested in the water in the reservoir and the CWRF.

The DOK can, and have, taken the issue of Alcan’s water rights to the courts in an effort to gain some power and legitimacy in the discussions with Alcan and the province. They have also become boisterous and rallied for the television cameras in an effort to sway public and political opinion against Alcan. The DOK can exert political pressure on the province to review the licence, but water licences are granted and controlled by the provincial government. The provincial government has reviewed the licence in the past, reporting that Alcan is within its rights to sell excess power.⁵² The DOK itself cannot make changes to Alcan’s water licence.

2.3 Committees

Committees are an integral part of stakeholder discussions and are intrinsic to the discussions concerning the CWRF. The committees involved with this issue were generated from various agreements between Alcan and provincial and federal governments.

⁵¹ The Northern Sentinel Newspaper, Wednesday, June 1, 2005.

⁵² BCUC, Kemano Completion Project review, December 1994. Page 241.

2.3.1 NWC

The Nechako Watershed Council's (NWC) twenty-four members represent the communities in the region, aboriginal interests, government and the general public. The Terms of Reference for the NWC are:

“The purpose of the Council is to enhance the long-term health and viability of the Nechako Watershed with consideration for all interests, and to provide a forum to address water management and related issues in the Watershed and to work toward co-operative resolution of these issues”.⁵³

Currently the NWC is working to reach a consensus on the reallocation and management of FUF and other operating parameters as a result of the construction of the CWRP. The discussions include the releases from the SLS and the proposed CWRP and the mechanism of implementing and managing the releases. They do not include Alcan's primary provincially granted water rights to the reservoir.

The NWC meets every one or two months and is open to all organizations willing to participate. Initially, most of the individuals attended and contributed to the meetings on a volunteer basis; now most people have some financial remuneration for attending. The NWC spent many initial meetings developing a forum for discussion. The forum included, among other things, conflict resolution, meeting etiquette and the requirement for consensus in the decision making process. This effort helped to build the team atmosphere and bridge some of the fifty years of mistrust among some of the stakeholders.

After many sessions of team building the NWC established the following list of issues relative to the CWRP, the rehabilitation of the area and the use of the FUF:⁵⁴

- Aesthetic considerations
- Aquatic Weeds
- Canoeing

⁵³ < <http://www.nechakowatershedcouncil.com/press/June2003.htm>> June 2005.

⁵⁴ < <http://www.nechakowatershedcouncil.com>> The list is generated in alphabetical order. June 2005.

- Cattle Wandering
- Changes in the Nature of the River
- Cheslatta Fan
- Chinook salmon
- Damage to the Murray-Cheslatta System
- Diversity and Numbers of Resident Fish in the Nechako River
- Downstream Water Licensing
- Economic Development
- Fish in the Murray-Cheslatta System
- Fish in the Nechako Reservoir
- Float Plane Operations
- Flooding
- Hydro-electricity Generation at Kemano
- Hydro-electricity Generation at Kenney Dam
- Municipal Sewage Treatment
- Natural and Human-Induced Sedimentation
- Other Concerns Regarding the Nechako Reservoir
- Recreational User Safety
- Semi-aquatic Fur Bearers along the Nechako River
- Water Quality for Recreation
- Water Temperatures for Migrating Sockeye Salmon

Some of the issues such as water temperatures for migrating sockeye salmon and chinook salmon are and will be satisfied by the continued compliance with the flow requirements of the 1987 Agreement. Others issues such as flooding, the Cheslatta Fan and other damage to the Murray-Cheslatta System will be satisfied, or partially satisfied, when the NWC has agreement for distribution of the FUF and when the construction of the CWRF is completed. How and when the flows will be released is yet to be defined by the NWC, as is how much of each issue will be fully covered with the release of a set amount of water. For example, it is unclear how the NWC will divide the available water if a float plane operation requires 3 m³/s in August to cover normally low flows in the river but only 2 m³/s are available. The NWC is a well-organized group with a common interest in achieving downstream environmental enhancement of the Nechako River through the installation of a CWRF at Kenney Dam. To this end it is likely that the NWC will reach a consensus on the distribution of flows.

Rivalry within the NWC is tempered with the long history of the group and the desire to co-operate in order to achieve a common goal, the installation of the CWRF. The NWC is no

different from any other group where there are a few strong players and more weak players. Even the weak players have a voice, a vote, and influence within the group. It is likely that as time passes and the stakeholders realize that their efforts are having marginal influence on the day-to-day proceedings of the project and that in spite of their efforts progress is slow, frustrations will increase and rivalry will become more prominent.

The bargaining power of the individual stakeholders is low, but as part of the NWC their power increases. The governments and Alcan through the 1997 Agreement created the council and in the creation legitimised the NWC, its issues and its members. The power of the NWC can in turn be used to influence Alcan and the federal and provincial governments. The NWC is an alliance of many people with interests that affect the Nechako Watershed. Each member has a voice and other contacts within the community, inside and outside the NWC, which can be used to apply pressure to the other stakeholders and governments.

The NWC is striving toward the creation of the CWRF at Kenney Dam. The committee has a project schedule that they are maintaining. With the schedule and the continued support of the members they will likely be able to influence the current provincial government to commit its \$50 million toward the project. When this comes to pass Alcan will be obligated to match the contribution.

2.3.2 Other Associations

The damming the Nechako River and changing the environment of the Nechako and Murray-Cheslatta systems has been an issue in the area for many decades. It is unlikely that people have not voiced their concerns or that there are unknown stakeholders yet to come forth.

Associations such as the Nechako River Alliance (NRA) are dormant and not directly involved in the current discussions concerning the CWRF. These groups and others like them are

likely to surface if and when an issue that is dear to them is on the table. The NRA's goals with respect to the CWRP are unknown, as are the effects that they could have on Alcan.

Chapter three will discuss the direct affects of the CWRP on Alcan. It will also look at the indirect effects of the project on each of the key stakeholders, and how their resulting reactions will, in turn, affect Alcan.

3 IMPACTS OF THE PROPOSED COLD WATER RELEASE FACILITY

3.1 Introduction

This chapter will discuss how Alcan is likely to be affected by the CWRF. Direct economic impacts include the cost of the CWRF and any effects that the facility will have on Alcan's ability to generate electricity. Indirect impacts are realized through the key stakeholders and how the stakeholders in turn will react and affect Alcan economically.

3.2 Time line for the proposed CWRF

The NWC has prepared a Proposed Work Plan and a project time line.⁵⁵ The time line is a tool to communicate progress being made on the project. It describes the tasks involved, the expected duration of each task and when the tasks are scheduled to take place.

The Work Plan is broken down into three phases that describe fourteen key activities (Refer to Figure 3-1 NWC Time Line). The phases include:

Phase 1 – Planning: Based on the NEEFMC reports the CWRF will require project management structures, information systems and assessment of project benefits.

Phase 2 – Pre-Engineering and Environmental Review: FEL of the CWRF and the related infrastructure. Completing environmental review and regulatory permitting.

Phase 3 – Implementation: construction and commission the facility.

⁵⁵ NWC Proposed Work Plan, revised March 2002. June 2005.

The Proposed Work Plan document gives some details of the activities in the time line but it does not assign tasks or set dates for deliverables. It states that by 2003 the NWC is to become a legal entity but it does not state how. At the last NWC meeting, June 10, 2005, it was stated that this objective was not met. The discussion did not continue to determine if this requirement was still pertinent, who would be completing the task, how or by when. Following standard project management protocol, the work plan should be taken to the next level and be converted to a Work Breakdown Structure (WBS) with assigned names and dates for completion. The result of not meeting activities is a time delay in the overall project execution, which will have a direct negative effect on the other parameters of the project: cost and scope. A defined time line will allow the provincial government and Alcan to judge when funds are actually required for the project. Having money available before it is necessary will cost Alcan in the form of interest paid for the borrowing the \$50 million.

3.3 Direct impacts of the proposed CWRF on Alcan

Direct impacts on Alcan of the CWRF include the outlay of money, the ability to generate electricity and the ability to meet the contractual obligations of the 1987 and 1997 Agreements.

3.3.1 Direct Financial Cost of a CWRF to Alcan

The largest direct cost to Alcan is the \$50 million that has been contractually committed to the CWRF as part of the 1997 Agreement. The money is to be given to the NEEF for downstream environmental improvements to the Nechako River. When the provincial government contributes its money to the NEEF, Alcan will be compelled to do the same.

Uncertainties are a part of every project. If factors are not known or unmanaged they can have adverse effects on cost, timing, quality and stakeholder expectations. Knowing about the uncertainties is the first step toward mitigating them and their consequences.

One of the biggest uncertainties of the CWRF is whether or not the facility will actually meet requirements of the downstream stakeholders. It will take the installation of the facility to see if it actually works. DFO has established operating parameters for TGP and water temperature some ten kilometres away from the release point. If the targets are not met a complete review of the facility and its operating parameters will be required. Unplanned, costly adjustments to the design, construction or operating parameters may be needed to meet the DFO's targets. This uncertainty could be addressed by conducting a sensitivity analysis, before the detailed design process starts. The DFO and other stakeholders could establish a technically acceptable range of values for the temperature and TGP requirements.

If the CWRF does not deliver as expected or requires large post-construction modification, the facility would not be operational in the expected time frame, which would have a direct effect on the operation of the reservoir and a negative stakeholder response. It is likely that Alcan will be held responsible for the non-compliance and the modifications. However, there is no mention in the 1997 Agreement of deficiency cost distribution or mitigation of costs between the province and Alcan with respect to making modifications to the design or structure after the initial construction. At this time, if any amount of money is required to retrofit the CWRF the party financially responsible for making the modification is unknown. By the time in the project life that the changes are known, Alcan will have completed its financial contribution to the project in the order of \$50 million and as such will not be legally bound to contribute monetarily to the modifications.

In a non-binding recommendation the NEEFMC advocates that “Alcan and the government of BC create a joint venture agreement among funders to ensure the CWRF is constructed in an efficient, cost-effective and expeditious manner and that an agreement be structured so that a public-private consortium designs, builds and owns the facility leaving Alcan Inc. with the responsibility to operate the facility”.⁵⁶ Schedule 4 of the 1997 Agreement has a provision that Alcan will operate the CWRF. The details of the ownership, operations and maintenance need to be worked out. What does ‘operating the CWRF’ mean to Alcan? NEEFMC estimated that operating and routine maintenance costs are in the range of \$230,000 to \$320,000 per year.⁵⁷ These types of details and costs have not been defined. The negotiation process to define the roles and responsibilities could cause delays in the time line and add extra cost to the project, but they could be mitigated with proper FEL and stakeholder understanding and commitment.

The disadvantage for Alcan of operating the CWRF will be an increase in annual reservoir management costs as a result of carrying and operating the facility. Great care and foresight must be used in the creation of an operational and management system for the CWRF. The logic of Alcan’s operating and managing the CWRF is sound; the strategy of how this will be accomplished and who will be responsible for the costs is still to be developed.

3.3.2 Direct Financial Benefits to Alcan – Enhanced Hydroelectric Generation

The technology that the CWRF will use to satisfy downstream stakeholders will be much different than the current technology of the SLS. The installation of a CWRF will result in the creation of FUF that can be re-allocated to other beneficial uses such as fish habitat or float plane

⁵⁶ NEEF ‘Report of the NEEFMC’. Page 20.

⁵⁷ NEEF ‘Report of the NEEFMC’. Page 22.

landing sites or keeping the water in the reservoir. The reallocation of the water resource may allow increased revenue from these and other activities.

Alcan has asked the NWC to keep up to 10 m³/s of FUF in the reservoir. This would allow the reservoir to be maintained at a level where the risk of forced spilling and the risk of decreasing power generation at Kemano would be acceptable to the council. The NWC studied the proposal, using historical data, and has concluded that in 42 out of 100 years there would be an abundance of water in the reservoir.⁵⁸ In this situation all FUF could be delivered downstream, and the reservoir would be maintained at a level that would satisfy power generation at Kemano. In 18 out of 100 years, approximately 10 m³/s of FUF could remain in the reservoir to keep the reservoir within the acceptable risk range, and little or no FUF would be distributed downstream. In 27 out of 100 years, 5 m³/s of FUF could be kept in the reservoir with the remaining FUF used to satisfy the downstream requirements. The remaining 13 out of 100 years would require an average of 1.7 m³/s of FUF to be kept in the reservoir. The NWC analysis shows that a variable flow sharing formula has benefits over a fixed formula since it can address the variability of reservoir conditions and balance upstream and downstream benefits of sharing the FUF.

Keeping FUF in the reservoir is important to Alcan in low inflow years, but not for the entire year. Historically the freshet⁵⁹ starts in late June and fills the reservoir for the year. The month before the freshet is the time that Alcan would require the FUF for power generation in Kemano. Alcan engineers calculate that one m³/s stored in the reservoir results in approximately 6 MW of electricity generated at Kemano. Keeping 10 m³/s of water in the reservoir is equivalent to approximately 60 MW of electricity. Based on the LTEPA value of \$38/MWh and a month duration the 60MW is worth: 60MW times 30 days times 24h/day times \$38/MWh equals

⁵⁸ NWC report: Assessment of Potential Flow Regimes for the Nechako Watershed. Page 50.

⁵⁹ Spring precipitation and fresh snow melt coming into the reservoir.

approximately \$1.64 million dollars in 9 of 100 years. If 5 m³/s of FUF is kept in the reservoir the value is \$0.82 million in 13 of 100 years. Keeping 1.7 m³/s of FUF in the reservoir is the equivalent of 10.2 MW and \$0.28 million in 13 out of 100 years. Averaged over the 100 years the expected value of the FUF ($\$1.6(0.18) + \$0.82(0.27) + \$0.28(0.13)$) is approximately \$0.55 million per year. Even if the CWRF was infinitely lived and had no operating costs, the return of the \$0.55 million per year at a 15 percent per year cost of capital is equal to a present value of approximately \$3.66 million, versus the up-front cost of \$50 Million. The NPV is still negative.

With a normal or high inflow, it would be possible to release all of the FUF to satisfy the downstream stakeholders, but in low inflow years the FUF requirements of the downstream users may not be achievable. Retaining some or all of the FUF in a high inflow year will benefit the downstream stakeholders over the long run. During normal and high inflow years some of the water would be 'saved' for releasing in low inflow years. Reservoir management practices allow water owned by different stakeholders to be stored and released from the same reservoir.

The NWC has not concluded its discussion on the topic of FUF allocation and as such cannot provide Alcan with a firm answer regarding its request. It is likely that Alcan's request for the full 10 m³/s (more than 75% of the total FUF available) will not be agreed to by the NWC and that there will be some lively discussions over this issue in the process of reaching a consensus decision. Having any amount of FUF water in the reservoir will be directly beneficial to Alcan.

If a powerhouse at the CWRF is economically feasible and Alcan chooses to partake in this part of the project, then there may be some direct financial benefits to Alcan. The consistent base flows determined by the 1987 Agreement and the calculated head of approximately seventy meters are an opportunity for hydroelectric generation at the CWRF. Alcan has reviewed the option of including a powerhouse in the past. The KCP Kenney Dam Release Facility design 'did

not preclude the installation of generating units at some later date”.⁶⁰ The NEFFMC considered the installation of a power generating station at the CWRF as a “secondary interest” and did not include the option in the cost estimate for the project.⁶¹ The NWC includes the hydroelectric generation at Kenney Dam as one of the issues relative to the CWRF but has not included the feature in the Proposed Work Plan.

In 1996, using an industry “rule of thumb” for screening-level studies, Alcan prepared a conceptual preliminary cost for a single turbine powerhouse complete with penstock, substations and wood-pole transmission line: the estimated cost was \$38.8 million in current, 1996 dollars.⁶² The design would be capable of producing 25MW of firm energy.⁶³ Using current information on the price of electricity, \$38/MWh, 8760 h/year and a ninety-percent operational efficiency factor, the value of the energy produced at the Kenney Dam could be approximately \$7.5 million per year. Using a simple NPV calculation for the addition of power generation to the CWRF, considering an estimated annual operating cost of \$0.35 million and a 15 percent per year cost of capital, the present value of constructing a powerhouse is positive after only 13 years. This NPV calculation does not consider the cost or operational expense of installing and maintaining the CWRF.

Further studies are required to finalise factors such as the optimal scope, the firm energy available, the effect of a powerhouse on TGP in the Nechako River, the NPV and other economics of a powerhouse at the CWRF. These must be completed before an informed decision can be made regarding the inclusion or exclusion of a powerhouse in the design of the CWRF.

⁶⁰ BCUC, Kemano Completion Project Review, December 1994. Page 65.

⁶¹ NEEF ‘Report of the NEFFMC’ June 7, 2001. Page 10.

⁶² Alcan, Conceptual Alternatives for a Release Facility at Kenney Dam, an internal Alcan document 1996.

⁶³ Firm energy is defined as the minimum energy that a station would generate during a critical period of sustained small flows.

3.3.3 Direct Financial Benefits to Alcan – Meeting Contractual Obligations

The federal government's requirements through the DFO are currently being met with the water release program via the SLS. History has shown that in low inflow years the DFO's requirements have not always been met. The last time that this occurred, litigation and discussions resulted in the 1987 Agreement.

Building the CWRF and maintaining a portion of the FUF in the reservoir would allow the DFO's needs to be satisfied annually, in high inflow and low inflow years. Without the CWRF, in extremely low inflow years the DFO requirements might not be met or might be challenged by Alcan through the NFCP or the courts. If this were the case and fish or fish habitat were damaged, it is likely that the DFO would be looking to Alcan for some form of financial compensation for any loss to the fishery. The amount of the fine would depend on the conditions at the time, the damage incurred and the outcome of the negotiations regarding the compensation or a court decision, but it could be substantial, in the millions of dollars.

3.4 Indirect impacts of the proposed CWRF on Stakeholders and Alcan

Alcan management and the people in the corporate affairs department are realizing that there is a need for a change in Alcan's approach to stakeholder relations.⁶⁴ The social upheaval and the resulting cancellation of the KCP by the provincial government gave Alcan management cause for reflection. Even though Alcan had been part of the community for fifty years its image and existing relationships were insufficient to avoid major controversy over the large project. For the KCP, Alcan followed its previous path and consulted only with the authorities having jurisdiction to obtain the approval for the project. Alcan claimed to consider stakeholder interest

⁶⁴ These discussion points are summarised from: Travis Engen, 'A Position Paper in Recognition of the International Year of Freshwater.' December 2003. Page 35.

within the KCP but the considerations were made without speaking to any stakeholders to understand what their goals were or to garner community support. Any credibility of the claim was lost in the uproar from the public when the KCP was announced. The cancellation of the KCP indirectly cost Alcan more than the \$535 million of sunk costs. The negative images of Alcan that were portrayed by opponents of the KCP have remained as the company has tried to improve its relationships with stakeholders.

Since the KCP cancellation, Alcan management has made a concerted effort to build long-term relations with stakeholders. They realize that long-term interests are better served by bringing diverse stakeholders, like the members of the NWC, together to express views on subjects such as the reservoir management and the CWRP. By participating in these multi-stakeholder discussions Alcan management can better understand and respond to the concerns expressed by stakeholders and ask for or offer alternatives. The dialogue will serve as a check on proposed solutions and in the process build stakeholder consensus or at least better stakeholder relations. Having the stakeholders agree to the scope of a project before it starts can avoid project cancellation. Having the stakeholders involved will also allow Alcan to inform them on what is being proposed, what is agreed to and how things will be completed. This knowledge and communication can reduce fear and social unrest within the community. Good relationships will also make the working time of committees such as the NWC shorter and more efficient, helping the bottom line of the stakeholder groups and Alcan.

3.4.1 Federal Government

With Alcan's increasing awareness of stakeholder and community relations comes an increasing awareness of the external environment. Alcan and its personnel are committed to protecting the environment. Every capital or expense project that is considered in the annual plan for APMBC must have a person from the Environmental Services Department (ESD) on the

project team. This person's task is to review the project scope, highlight any concerns that may have environmental ramifications, help generate a remediation plan and communicate with the rest of the ESD and external environmental stakeholders such as the DFO. APMBC has been building relations with the DFO regarding the execution of environmentally sensitive projects from the Kenney Dam to the smelter, including the CWRF. Over time, communications lines have been built and a trusted quality standard for execution of environmental concerns has been established. The DFO officer is likely to approve work permits faster if he can trust that the work will be carried out with diligence and care. This will indirectly help Alcan by getting project notification through the permitting process quickly. Building solid relations with the DFO on the smaller day-to-day projects will help give credibility to Alcan in its role in a larger project such as the CWRF.

Long-term protection and increased fish habitat are goals of the DFO and an environmental benefit of the CWRF. The Nechako canyon will be re-watered giving the fish approximately ten kilometres of renewed living space. The population of Nechako white sturgeon may rebound if the river hydrograph is changed to a more natural profile through the use of the CWRF; studies are required to establish the correlation of these actions. Alcan's fish biologists are taking a leading role in the study of the sturgeon in the Nechako River in order to make the correlation.⁶⁵ The CWRF will benefit the DFO in its role of protecting fish stocks and in doing so may improve the Alcan/DFO working relationship by allowing for the needs of both parties to be realized with respect to the reservoir water. The DFO may take these positive aspects of the sturgeon studies, the CWRF and the relations with Alcan into account to offset their requests for water releases from the reservoir during low inflow years, allowing Alcan to sustain its smelting operations in Kitimat.

⁶⁵ Golder Associate Ltd, Recovery Plan for Nechako White Sturgeon, March 2004. Appendix I.

3.4.2 Provincial Government

The provincial government's objectives of protecting the environment, responding to stakeholder needs and managing the provincial economy and fresh water resources could be better met through the installation and operation of a CWRP.

A project of this size, \$100 million, in the northwestern part of the province would bolster the economies of the small towns in and around the watershed and help the provincial government to distribute some of the provincial wealth to the North. In doing this they will satisfy a long-term commitment to the constituents in the area and support the stakeholders in the project such as the NWC.

The installation of the CWRP will satisfy the federal government, DFO, and meet the requirements of their provincially granted water licence. This will reduce the disparity between the two levels of governments.

The CWRP will allow better management of the provincial asset, the water in the reservoir. Even though Alcan has been granted a water licence to use the water it still belongs to the province. The new technology will allow the provincial government to say that they are better managing the resource for the good of all the stakeholders. Working with Alcan, the NWC and other stakeholders on the design, installation and operation of the facility may allow the government to claim that long-term reservoir stewardship responsibilities are being fully realized and that there is no need to review Alcan's water licence as the DOK is requesting. The province and Alcan can move past the negative aspects of the issue onto more positive ventures which are likely to generate goodwill with stakeholders and increase shareholder confidence in Alcan in BC resulting in investment and a higher stock value.

3.4.3 NFCP

The NFCP has the responsibility of managing the water releases from the reservoir. In the long run the task will be very similar to what it is today. They will have a choice as to where to release water: Kemano, the SLS or the CWRF. Alcan's role in the NFCP is unlikely to change due to the advent of the CWRF.

3.4.4 NEEF

The 1997 Agreement determined that the parties, Alcan and the provincial government, will establish and administer the NEEF. When the funds from the parties are deposited into NEEF they will be managed and drawn down as required to meet the cash flow needs for the installation of the CWRF. The 1997 Agreement does not detail what will happen to the NEEF when the CWRF is complete. With its mandate completed it is likely that the fund will be disbanded. Alcan will not be affected by this closure.

3.4.5 NWC

The NWC supports the decision that a CWRF is the best solution to meet downstream environmental concerns. The council is striving toward a consensus of how the CWRF will operate and how the FUF created by the CWRF will be distributed. When these issues have been addressed and the CWRF built the NWC will have ultimately completed the tasks as described in the 1997 Agreement.

During the construction of the CWRF the NWC will be following and overseeing the project schedule and the financial requirements for the facility. After the CWRF is built the NWC's role will likely change into a consulting function, where the downstream stakeholders will have a continued voice in the management of the Nechako River and the water released from

the reservoir. They will likely work with the NFCP to influence the ongoing management of flows and the reservoir levels.

The meeting minutes of the NWC show that they are aware of the white sturgeon situation in the Nechako River, but they have not adopted the concern as an issue relative to the CWRP. It is likely that SARA will be enacted to protect the fish before the CWRP is built, which may affect the operating parameters of the facility and the work of the NWC.

As a member of the NWC, Alcan will have a voice in the discussions and hear concerns directly from the other stakeholders. The ongoing relations and open discussions will help the NWC manage the expectation of its members by continuously educating them with respect to issues and resources in the reservoir. Alcan may be able to influence the NWC to keep some of the FUF in the reservoir on an ongoing basis. Keeping any amount of FUF in the reservoir will help Alcan's bottom line by allowing more efficient power generation in Kemano.

3.4.6 First Nations

Relations with the Cheslatta Nation have been difficult and strained and have concluded in lawsuits. In the past Alcan was viewed as the source of most of its problems. The construction of the CWRP will likely improve relations between the Cheslatta Nation and Alcan. Socially, there will be a high probability that demands will be made to hire local First Nations people to work on the project. The income that is earned will benefit the entire community.

The Cheslatta First Nation will see the benefits of the CWRP through a reduction in the cooling water flows through the SLS allowing habitat restoration of the Murray-Cheslatta system and a return to a more natural state. Long-term recreational and tourism in the area is also expected to increase and provide some economic activity.⁶⁶ It is probable that the installation will

⁶⁶ BCUC, Kemano Completion Project Review, December 1994. Page xiv.

satisfy some of the outstanding legal issues between the Nation and Alcan such as the displacement of the Cheslatta people when the reservoir was built.⁶⁷ This would eliminate the legal battles and the need for court sessions and lawyers.

Long-term community relations with Alcan may be improved with the greater economic activity in the area as a result of the CWRF. More positive relations are likely to result in less negative publicity regarding Alcan. Improving Alcan's public image will have a positive effect on investors and therefore improve the share value of the corporation.

Chapter 4 will discuss Alcan's goals and the strategic alternatives with respect to the CWRF.

⁶⁷ Engen 'A position Paper in Recognition of the International Year of Freshwater.' Dec. 2003. Page 35.

4 ALCAN'S OPTIONS REGARDING ITS COMMITMENT TO A CWRF

4.1 Introduction

This chapter will analyze Alcan's goals and options for its commitment to a CWRF. As discussed in Section 1.4, Alcan has committed to partially financing the downstream environmental enhancement of the Nechako River. The NEEFMC has determined that the funding will be used to build a CWRF at Kenney Dam. Alcan's options concerning the execution of its commitment will be presented and evaluated against its goals.

4.2 Alcan Goals

The ultimate corporate goal of maximizing shareholder value is the prime objective for all of Alcan's endeavours. Building good stakeholder relations by fulfilling social and environmental responsibilities can lead to Alcan safeguarding its water licence at a minimum of cost, directly with the reduction in the probability of law suits, lawyer and court costs and indirectly through positive publicity and its influence on government. Thus, improving stakeholder relations will facilitate the achievement of Alcan's ultimate goal.

The direct impacts on Alcan of the CWRF are financial. Without power generation the operation of the CWRF will not generate revenue. As established in Chapter 3, Section 3.3.2, even with the retention and usage of the FUF and the addition of power generation to the CWRF, the NPV of the entire project is still negative. Including one or both of these factors would make the NPV less negative and therefore reduce the burden of the project on Alcan shareholders.

In spite of the negative direct financial impact of the project on Alcan, it can help to build and maintain long-term value for Alcan and APMBC in the form of positive stakeholder relations, which in turn will help Alcan to maintain its current water rights. The CWRF will allow more efficient management of the water resource in the reservoir and the satisfaction of issues that are important to stakeholders such as the NWC and the DFO. Keeping the stakeholders happy will reduce the probability that they would pressure the provincial government to revisit the water licence or take direct legal action, as the DFO has done in the past.

Alcan is involved in the various programs such as the NWC and the NEEFMC. It has shown openness to the process and demonstrated a level of trust and understanding toward the other stakeholders and their needs. This team-building effort will likely be reciprocated in a reduction in cost and time associated with the establishment of the project scope definition, start-up delays and acceptance of the project. Trust expressed now will mean a degree of operational stability when the project comes on line and afterwards.

APMBC's operational goals that will be used to evaluate the various options for the CWRF project will therefore be: the direct financial impact, measured quantitatively by the NPV; and the indirect effects on Alcan's water license, measured qualitatively by the impact on stakeholder relations.

4.3 Alcan's Options

Alcan has a number of options with respect to the funding and implementation of the CWRF. These include: adjusting the time line; adding power generation; and selling the project to a third party to carry out and manage the design, construction and operation of the CWRF. These options are presented in more detail below. The likely effects of each of the options on the

key stakeholders and on Alcan will be presented and the options will be evaluated according to their impacts on the two operational goals: maximizing the NPV and improving stakeholder relations.

4.3.1 Adjusting the time line of the project

Adjusting the time line can have different effects on the stakeholders and on Alcan. Options include crashing the schedule (building the facility as soon as possible), following the time line and delaying the process. These options are discussed and evaluated below.

4.3.1.1 Crashing the time line

Crashing the time line is a project management term for completing the project as soon as possible, in this case, within the next two years. It might mean pulling all the stakeholders together to concentrate on this one project, at the expense of everything else. A great effort and a large amount of resources from all the stakeholders would be required to accelerate the schedule and still complete the project tasks as necessary.

It is unlikely that the NWC could be persuaded to make the type of commitment required to fully realize the construction of the facility in a very short time. The CWRF would become a full time occupation for the members of the NWC. Most of the stakeholders are representatives of organisations that require them for their daily operations and would likely not be willing to sacrifice their operations for the quick completion of the CWRF. Alcan would be hard pressed to dedicate its highly utilized personnel to this task.

The DFO would likely appreciate the installation of the facility as soon as possible. But their resources are stretched throughout the province and they would likely not be able to dedicate themselves to this one task. There are still a great number of environmental and engineering

studies required before the detailed design of the CWRF can be finalised and submitted for government review. These studies take time to conduct, review and report. Fast tracking then could lead to errors in evaluation and conclusions.

The provincial government and Alcan management would have to generate their \$50 million sooner than planned. This money would not be in either party's current fiscal budget. There would be a lot of questions asked of the government and Alcan management regarding the spending of money before all environmental and engineering reviews were completed. The government may be seen as not meeting its commitment to protect the environment or to serve its constituents. Alcan management would be culpable of not meeting the prime objective of maximizing value through sound fiscal management.

In addition to time, there are two other factors in every project: cost and quality. These would have to be adjusted to make up for the condensed time line. It is likely that overall costs of the project would increase and quality of the design and installation would suffer. Just as delays of construction can generally lead to increased cost, crashing the time line can also lead to increase costs through poor planning and through the necessary acquisition of scarce resources. Moving the completion date forward will result in an increase in the present value of the \$50 million, relative to following the time line, because its expenditure will be advanced. The poor design and installation of the facility would affect Alcan in the long-term. This is because the life cycle cost for the management of maintenance and operation of the CWRF would be higher as a result of a hurried initial installation where quality is lower.

It is likely that Alcan and the other stakeholders would not support crashing the time line for this project once they understand the requirements of doing so.

4.3.1.2 Following the time line

Following the time line and participating with the NWC and other stakeholders toward completing the CWRP in 2012 as planned is another option for Alcan to consider.

Following the time line will allow for the generation of complete answers to environmental, financial and engineering questions. The time line also allows for discussion, understanding and a consensus with the stakeholders of the NWC regarding the requirements of the CWRP and the allocation of FUF. The current time line also gives all the stakeholders the opportunity to discuss the narrow targets that have been made by the DFO and possibly negotiate some variance in the numbers.

The current DFO's requirements under the 1987 Agreement are being met through the SLS and there is no pressure from the department to proceed with the CWRP any faster.

Staying the course and following through with the established time line is an investment in the long-term relationship building and supports the operational goals and corporate social responsibility objectives of Alcan. It also gives Alcan time to continue to consult and work with the Murray Cheslatta Nation to heal some of their outstanding issues.

Following the time line will allow the stakeholders to explore the details of ownership of the facility and work out the roles and responsibilities and costs of operating and managing the facility. It will also allow Alcan the time to evaluate the feasibility of including a small powerhouse in the overall project.

Alcan is aware that the requirement for its financial contribution to the CWRP project is pending and based on the time line that has been established plans for generating the funds are likely being formulated. As time goes by, the \$50 million will be worth less, in current dollars when compared to 1997 dollars. Staying the course will result in a reduction in the present value

of Alcan's constant dollar capital expenditure. There are no clauses in the 1997 Agreement that says that Alcan or any other stakeholder cannot contribute more to the NEEF than the \$50 million if desired. Considering the escalating cost of major projects, it is prudent that Alcan consider the possibility that the project will go over the \$100 million mark and the fact that they may be asked to contribute more funds than agreed to in the 1997 Agreement.

4.3.1.3 Delaying the timeline

Completing the existing tasks as stipulated in the NWC schedule but dragging the duration of each task to cause delays in the overall project is another option for consideration.

This option would strain relations between the NWC and Alcan. The NWC has established a time line for the project and as part of the council Alcan has agreed to this course. All of the stakeholders have needs with respect to the water in the reservoir and they are relying on each other to help satisfy these needs through the completion of the CWRF. If Alcan, a major player in the process, delays the agreed to schedule, it may be seen as untrustworthy or as having a hidden agenda. The trust that has been established with the discussions concerning the CWRF would quickly be overwhelmed by the long history of mistrust between Alcan and the stakeholders. The repercussions of the negative publicity would directly affect shareholder value.

Dragging out the project saves Alcan money in the short-term. The \$50 million would not be required immediately, reducing the real NPV of its eventual expenditure. However, this saving will be quickly overwhelmed by the cost of damaging long-term stakeholder relations that have taken so much effort to build and sustain; countering the operational goal of improving stakeholder relations and the ultimate goal of improving shareholder value.

4.3.2 Power Generation

Adding a power generation station to the discharge of the CWRF could be combined with each of the options detailed above. The installation and detailed design of the powerhouse needs to be considered in conjunction with the detailed design of the CWRF in order that both functions will be able to work together to satisfy the parameters of water temperature, TGP and other requirements of the stakeholders. This opportunity will be considered separately from the other options because it requires considerable further study and it can be undertaken in conjunction with any of the other options.

The base annual flows of water through the CWRF would be turning the turbines in the generating station. This water is primarily released for fisheries purposes, and flow must be maintained through the CWRF at all times. The Kenney Dam powerhouse would be a relatively small power plant when compared to Kemano. The same amount of water would generate ten times the electricity in Kemano than it would at the CWRF, but the constant flows and the head of the CWRF deserve a detailed hydro generation study.⁶⁸ The power would be put onto the grid close to Vanderhoof or Burns Lake (Refer to Figure 1-1).

4.3.2.1 Power Generation - Alcan

The opportunity for power generation at the Kenney Dam could provide Alcan with some revenue that would offset the direct expenditure of the \$50 million and increase the NPV of the total CWRF project.

⁶⁸ BCUC, Kemano Completion Project Review, December 1994. Page 65.

Alcan's existing water rights to the Nechako Reservoir are specific to the works in Kemano.⁶⁹ An additional provincially granted water licence or an addendum to the existing licence would be required to operate the Kenney Dam powerhouse.

The water through the CWRF must flow continuously. If Alcan were to capture the potential energy and put it on the grid it could be used in various applications such as helping to stabilize the grid in the Vanderhoof region. This would reduce uncontrolled outages and disturbances in the grid that affect the overall stability of aluminum production in Kitimat. It could also be used to offset the amount of power placed on the grid at Kitimat in the event that generation in Kemano is reduced to meet the DFO water requirements in the Nechako River in low inflow years. In this way it would help secure and stabilize the power that Alcan requires for the production of aluminum. The direct economic effects of these conditions to Alcan would be small and would have a very marginal influence on the NPV calculations.

4.3.2.2 Power Generation – An Independent Power Producer

If Alcan is not interested in the installation and ownership of generation and distribution equipment at Kenney Dam, this portion of the project could be subcontracted to an interested independent power producer (IPP). They would have to work with the designers of the CWRF to ensure that their process would not interfere with the CWRF's operation. The IPP would have to be self-sustaining with its own water licence, operating principles and maintenance practices. Local communities or other interested parties could form together to establish and operate the facility. Funds generated for the operation could be ploughed back into the communities or into environmental improvements in the watershed. The economics and logistics of working with all the stakeholders involved with the Nechako Reservoir for such a venture require further study.

⁶⁹ Province of BC, The 1987 Settlement Agreement, Final Water Licence, Schedule 3B.

4.3.3 Backing Out

Completely backing out of Alcan's commitments to the funding, construction and management of the CWRF is an unlikely option. At no time has Alcan ever hinted at the possibility that it would consider this as an option.

In the business and government worlds there is always a possibility that if an agreement does not fit with current core values, the agreement may be changed or cancelled. In this case the action would have serious consequences for Alcan, including legal ramifications. If Alcan reduces or eliminates its commitment to the CWRF, it would be reneging on a contract with the government of BC, the 1997 Agreement. The Agreement does not have explicit penalties for non-compliance with any part of the agreement. It is, however, very likely that Alcan's withdrawal from the project would result in lawsuits from the other stakeholders such as the DFO, First Nations and the NWC. Based on good faith they have worked with Alcan investing many hours and dollars into the project. Alcan backing out would cause them hardship and give them grounds for a suit. Lawyers and court costs to defend the decision to back out of the project would likely cost more than the \$50 million of staying in the project.

If Alcan were to back out of the project the other stakeholders such as the federal government, First Nations and the provincial government might pool their financial resources to complete the project. The NWC does not have any funds to contribute. This would leave Alcan out of the loop as far as keeping any FUF in the reservoir or in having much influence in the daily operation of the facility and the reservoir resulting in a threat to the stability of the water supply to Kemano.

Alcan would lose all credibility, community belonging and general public trust that it has worked so hard to build since the cancellation of the KCP. The openness and transparency that

Alcan is proclaiming regarding all its stakeholder interactions would be seriously questioned by all the stakeholders, the general public and Alcan's shareholders.

It is also probable that the long-term relationship of trust and commitment with the province would become tenuous. It is conceivable that the feedback from the current stakeholders would be vocal and agitate the now dormant groups such as the NRA or other First Nations who would join the unhappy key stakeholders. It is likely that all of these stakeholders would join the DOK in its request that the water licence be reviewed. The province could then claim that Alcan is not living up to its commitment of long-term stewardship of the public resource and change the terms of the water licence.

The DFO requirements for salmon are being met with the release program from the SLS. Alcan backing out of the CWRF would in essence be ignoring, again, the DFO's request for a release facility at the Kenney Dam. While the DFO would not appreciate Alcan's position they could not directly affect the outcome. They could, however, cause Alcan grief in any future day-to-day projects at the smelter, and increase the occurrence and scope of remediation fines for projects not completed to the departments liking. The DFO could also use SARA to further inconvenience Alcan with demands for water releases from the reservoir for sturgeon protection.

Social and cultural issues with the Murray Cheslatta Nation would be unanswered if Alcan backed out of the project. The issues would likely wind up back in court, causing Alcan to spend money defending its decision. The operational goal of improving stakeholder relations would be forfeited resulting in a direct negative impact on shareholder value through world wide bad publicity and a devaluing of the share price.

There would not be "peace in the valley" for many years to come.

4.3.4 Third Party

As part of the 1997 Agreement the provincial government and Alcan agreed to fund the project. The agreement does not state that Alcan or the provincial government must build the facility. The responsibility for the detailed design, construction and operation of the facility could be released to a third party, possibly an independent power producer (IPP). The key difference for Alcan is that it would become a key stakeholder as opposed to being an operator and a maintainer of the CWRF.

In this scenario both funders would contribute their financial contributions, up to \$100 million. The key stakeholders including Alcan, the DFO, NWC, First Nations and the provincial government would then set the project scope for the CWRF including parameters for flow, temperature and TGP and any other important aspects of the facility such as maintenance requirements. The scope and project description could then be sold to an IPP (the highest bidder) for construction and ownership of the CWRF. The IPP could add power generation to the facility under the stipulation that the specifications for the input to and output from the total complex satisfy all the stakeholder specifications. The IPP would own the facility and be responsible for the design, the building and the day-to-day operation and maintenance of the entire complex, all of which would be monitored and controlled by the NFCP and the other key stakeholders within the scope of the project.

Selling the project at an attractive return on investment would generate interest in the project from an IPP. Considering the “seed” money from Alcan and the provincial government, \$100 million, the IPP would be given enough funds to cover the majority of the capital costs for the project. Any risk associated with the design or unforeseen construction costs of the CWRF would be born by the IPP. This would be an incentive to keep the construction and maintenance as efficient as possible.

This option would certainly include a powerhouse as part of the overall project. In section 3.3.2 it was suggested that a powerhouse at the Kenney Dam would have an estimated annual earning of \$7.5 million, annual maintenance cost of \$0.3 million and a design and installed price of \$39 million. Assuming that the project will exist in perpetuity, the IPP could expect a return of approximately: $(7.5 \text{ minus } 0.3) \text{ divided by } 39 \text{ equals } 18.5 \text{ percent}$. This would depend on the actual construction costs of the facility and the actual cost and value of the output from the powerhouse. The details of this proposal and the CWRF workings would require further study.

Designing and building a CWRF is not a core business of Alcan. As such, Alcan could make a case for transferring the responsibilities of the project to a third party more suited to the task. The transition would have to be handled openly and with full stakeholder support. Otherwise the stakeholders might see this as a revision to the past and yet another way that Alcan is not living up to its social responsibilities to the stakeholders involved with the CWRF and in the area of the reservoir. The openness could alleviate stakeholder concerns and increase their confidence that the design and construction of the CWRF will satisfy their requirements.

With this option, and all the others, the DFO would have its parameters for fish protection met and the Nechako Canyon would be re-watered enhancing fish habitat.

The NWC would be instrumental in the establishing of the project scope and the design parameters of the CWRF. They would be able to realize their requirements for downstream flow including the distribution of FUF. The NWC could be involved in the continued management of the facility and the Nechako River once the CWRF is completed.

The provincial government would be seen as satisfying the needs of its constituents for proper management and stewardship of the water resource in the reservoir and the Nechako and Fraser Rivers. They could also exploit the fact that they are creating a new business opportunity and jobs in the north of the province. The IPP would have to obtain its own water licence for

which the provincial government would collect a water rental fee, helping the provincial economy on an ongoing basis.

Considering that the scope and description of the requirements for the CWRF would have to be very detailed and that there is still a lot of research to be conducted, it is likely that it would take some time for the NWC to agree to the project parameters. Based on the current progress and position in the time line it is likely that the NWC would not be ready to take the process to tender for IPP review before the existing scheduled time for detailed engineering in 2008.

4.4 Evaluation of Alcan's Options

Figure 4-1 presents the evaluation of the options discussed above against APMBC's two operational goals.

The goals are weighted: "NPV" has a weight of 1; "stakeholder relations" is weighted at 2. Maintaining and improving stakeholder relationships is a key operation goal of APMBC with respect to the CWRF and as such is weighted higher than the NPV.

The options are ranked against each other with respect to their impact on each goal. The option that produces the least negative value of the NPV was given the highest score; the option with the most negative NPV was given the lowest value. "Backing out" could see Alcan not make any capital expenditure on the project. The NPV of this option is more positive than the other options of paying the \$50 million. "Delaying the time line" would allow Alcan to postpone the \$50 million payment and realize a better NPV than the options of paying sooner. "Follow the time line" and "Third Party" would achieve the same present value of the \$50 million, since both events would take the roughly the same amount of time to acquire the funds. However, the "Third party" option would see Alcan contribute only to a maximum of its contractual obligations. "Following the time line" could potentially see Alcan contributing more capital to

the project, as it would bear the risk of any cost increases; therefore it is awarded a lower value than the ‘Third party’.

The options affecting stakeholder relations are also ranked against each other. The option most detrimental to stakeholder relations, “Backing out”, was valued with the lowest score, 1. “Following the time line” and keeping the stakeholders happy was given the highest value, 5.

Figure 4-1: Evaluation of Alcan’s Options for the CWRP

Evaluation of Options for Alcan					
Option \ Goal	NPV	W x V = Score	Stakeholder Relations	W x V = Score	Total
Crash the time line	NPV is Negative. Base cost \$50 million current dollars. Extra cost are possible	1 x 1 = 1	Stakeholders stressed. Option presents difficulties.	2 x 3 = 6	7
Follow the time line	NPV is Negative. Base cost \$50 million in three years. Extra cost are possible	1 x 2 = 2	Stakeholders are satisfied.	2 x 5 = 10	12
Delay the time line	NPV is Negative. Base cost \$50 million in future years. Extra cost are possible	1 x 4 = 4	Stakeholders unhappy.	2 x 2 = 4	8
Backing out	Zero capital outlay.	1 x 5 = 5	Stakeholders very unhappy. Cost for legal ramifications likely > \$50 million. Cost for damage to stakeholder relations and not meeting ult	2 x 1 = 2	7
Third Party	NPV is negative. Requires Alcan to submit up to \$50 million.	1 x 3 = 3	Good relations with other stakeholders likely. Alcan becomes a stakeholder.	2 x 4 = 8	11

“Crashing the time line” and “Backing out” received the lowest score, 7. “Crashing the time line” has a low evaluation of NPV and a medium effect on Stakeholder relations. Backing out has the highest NPV when compared to all the negative NPV options, but it has a very negative effect on the stakeholders.

“Following the time line” scored the highest with a value of 12. Its NPV score is affected by the possibility of additional funds being required from Alcan. The “Third party” option did not have this extra cost therefore it scored a slightly higher NPV evaluation. The known ability of ‘Following the time line’ to satisfy the stakeholders outweighed the likely good relations of the “Third party”. This resulted in a slightly higher total score for “Following the time line”. This option would best support the operational goal of maintaining good stakeholder relations and securing the water licence at a reasonable cost to NPV.

The option of selling the facility to a third party, IPP, has a close second score. This option could result in achieving reasonably good stakeholder agreement and the protection of the water licence with less financial risk to Alcan.

Using this evaluation “Following the time line” will best achieve Alcan’s operational goals of minimising the effects of a negative NPV and maximizing the impacts of good stakeholder relation in an effort to protect the water licence and thereby achieve the ultimate goal of maximizing stockholder value.

Chapter 5 summarizes the preceding chapters and makes recommendations for Alcan to follow.

5 SUMMARY AND RECOMMENDATIONS

The final chapter will summarize the previous chapters and make a final recommendation for Alcan.

5.1 Summary

The Cold Water Release Facility (CWRF) is a concept that Alcan and the key stakeholders: the Department of Fisheries and Oceans (DFO), the Nechako Watershed Council (NWC), the provincial government and First Nations, recognise as the best solution for the enhancement of the Nechako River. The CWRF will address and satisfy the majority of the stakeholder interests and benefit the long-term health of the watershed.^{70,71,72}

The virtues of the CWRF include improved flood control in the reservoir and in the Murray Cheslatta system through increased capacity for releasing flow directly to the Nechako River. Allowing faster response to inflow spikes and a third water release point (in addition to Kemano and SLS) will enhance the safety of the reservoir.

Fish and wildlife will benefit as a result of increased habitat, the re-watering of the Nechako Canyon and the return of the Murray Cheslatta system to a more natural state. Further studies will be required to determine if sturgeon in the Nechako River will benefit from a more natural flow regime realized through the operation of the CWRF.

⁷⁰ NEEF report 'Moving Ahead' June 7 2001. Page 6.

⁷¹ BCUC, Kemano Completion Project Review, December 1994. Page 23.

⁷² NWC Proposed Work Plan, revised March 2002. Page ii.

Returning the Nechako Canyon and the Murray Cheslatta system to a more natural state will likely increase recreational opportunities and aesthetic values of the area. In turn, these will support the local economies of the First Nations and other local people.

Hydro generation is a possible output of the CWRF. The consistent output of power would help stabilize the grid in the Burns Lake and Vanderhoof areas. The use of the water could provide the province with revenue through the water rental agreement with the producer of the electricity. Building the CWRF could also result in job creation for the construction and the maintenance of the facility.

At this point the two stakeholders that have agreed to fund the project, the province and Alcan, have not contributed large funds to the Nechako Environmental Enhancement Fund (NEEF). According to the time line established by the NWC, larger sums of money are not required until 2008 or 2009 when detailed engineering and environmental reviews are scheduled. It is likely that neither Alcan nor the provincial government has any great interest in going ahead with the payment of the project as soon as possible.

5.2 Recommendations

Alcan should follow the time line of the project as set out by the NWC. Following the time line will allow Alcan the opportunity to meet its prime goal of maximizing value for its shareholders through protecting its water rights in the reservoir and building goodwill with the key stakeholders involved with the reservoir in order to have “peace in the valley”.

Following the time line can allow all the stakeholders time to dialogue, evaluate their objectives and discuss alternatives. Alcan can continue to work with the DFO for the protection of fish and fish habitat, salmon as well as sturgeon, in the Nechako River. There should be time and resources available to negotiate allowances for the final water quality released from the

CWRF with the stakeholders in the project. Discussing some deviation in the stakeholder criteria before the facility is built will be more efficient and possibly less expensive than trying to mitigate, compensate or redesign and rebuild the CWRF if it fails meet all the stakeholder requirements exactly.

Alcan can be involved with the other stakeholders including the NWC to build on the good relations already created and be included in the decision-making process regarding the ownership, detailed design and maintenance of the CWRF and the use of Freed up Flows (FUF). Keeping any amount of FUF in the reservoir will be a benefit to Alcan through increased water elevation (head) and therefore increased efficiencies of power generation in Kemano.

This course will also allow the provincial government and Alcan to plan for and find the required funds for the project. Following the time line will permitting the financial contributors the time to ask and answer questions such that the funds can be turned over to the NEEF with confidence that the shareholders will be assured of some direct or indirect value for their investment.

The option of involving a “Third party” could be something to think about. For Alcan, the main difference between this option and “Following the time line” is the addition of risk involved with working with another party. Alcan could lose control of a portion of the reservoir and risk the positive aspects of stakeholder relations involving the reservoir and the restoration of the Nechako Canyon. These risks could be offset through the removal of the day-to-day operation and maintenance of the facility as well as any construction unknowns and their costs. Changes in circumstances regarding the NPV or the stakeholder relations might make this the preferred option.

The proposed addition of a powerhouse should be considered at an early stage in the design process. The inclusion of a powerhouse will require detailed and reliable estimates

regarding quality, time and costs for such an option before the CWRF design progresses too far. Adding this feature after the fact or after an environmental review would likely cause delays and increase the costs of the entire project. The powerhouse and the output of electricity are likely to help improve the net present value (NPV) results and make the entire project more economically viable for Alcan shareholders.

Federal and provincial environmental assessments must be completed. These processes require a great deal of time and resources to complete. Paralleling the tasks with both governmental bodies may be a challenge, but the time to complete the reviews could be streamlined allowing for a faster throughput of the reviews and meeting the project time line. Both governments are stakeholders in the CWRF project and are familiar with the project, the work completed to date and what is required to complete the facility.

Apply project management principles to all stages of the facility. Front end loading (FEL) and a work breakdown structure (WBS) will help all the stakeholders realize their roles and responsibilities within the project and help insure that the tasks are completed and communicated to all the stakeholders as the time line stipulates. It will allow for stakeholder requirements to be added to the schedule. Critical end user issues for any project are better discovered in the conceptual stages rather than later in the project: if Alcan is going to manage or maintain the facility then Alcan maintenance methodology should be considered in the design scope. The requirements necessary for maintenance of the facility will have a direct influence on the long-term operability of the facility and the overall cost of the project. These requirements will likely affect the overall cost of the project and the stakeholders, especially the provincial government and possibly Alcan.

The white sturgeon research in and around Vanderhoof should be maintained. Alcan's presence in this endeavour is a sign to the DFO and the other stakeholders such as First

Nations that the environment, the fish and their protection are important to Alcan. Knowledge of the area and the sturgeon could be beneficial to the fish, the DFO and other stakeholders if and when the species is placed on the endangered list and falls under the protection of Species At Risk Act (SARA). This knowledge can be incorporated into the details of the design and operation of the CWRF to mitigate further changes when the facility is built, thereby reducing costs and time delays in the facility's commissioning.

There are still a number of issues to be finalised with respect to the building and operating a CWRF at Kenney Dam. Through continued commitment and open discussions with key stakeholders these issues will be addressed. Alcan has invested many years and billions of dollars in the Nechako-Kitimat project. The project has brought changes to the environment and social impacts on the people in the area. Following through on commitments for the establishing of a CWRF will likely allow Alcan to realize its prime goal of increasing shareholder value through indirect benefits to its bottom line and the maintenance of its water licence in the Nechako Reservoir.

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