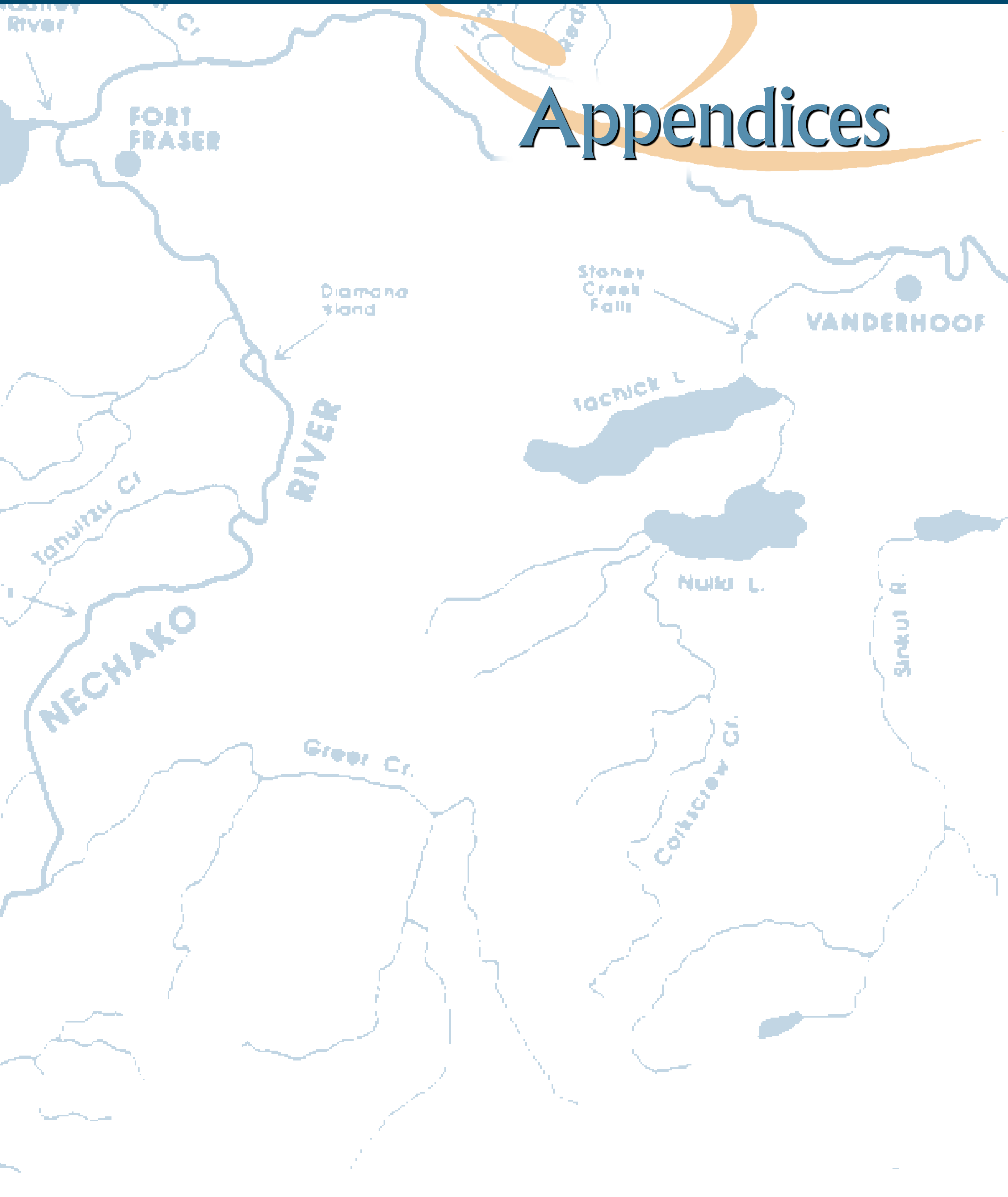
Appendices


FORT FRASER
Stoney Creek Falls
VANDERHOOF
Tachick L.
RIVER
NECHAKO
Nulki L.
Greer Cr.

APPENDIX I: LIST OF NFCP REPORTS

1988	M88-1	Nechako River Physical Data Summary 1986
1988	M88-2	Nechako River Physical Data Summary 1987
1988	M88-3	Nechako and Stuart Rivers Chinook Spawner Enumeration 1988
1988	M88-4	Nechako and Stuart Rivers Chinook Carcass Recovery 1988
1988	M88-6	Winter Conditions 87/88 (DFO)
1988	M88-7	Nechako River Physical Data Summary 1988
1988	M88-8	Winter Conditions 88/89
1988	M88-9	Incubation Environment: Testing of Redd Capping
1988	RM88-1	Nechako River Secondary Channel Geomorphology Studies Phase II
1988	RM88-2	Investigations into the Use of Instream Cover Structures by Juvenile Chinook Salmon
1988	RM88-3	Pilot Fertilization of the Nechako River: A Test of Nutrient Deficiency and Periphyton Response to Nutrient Addition
1988	RM88-5	The 1988 Summer Water Temperature and Flow Management Project
1988	RM88-6	Nechako River Flow Control Report 1988/1989
1989	M89-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 1989
1989	M89-2	Nechako and Stuart Rivers Carcass Recovery 1989
1989	M89-3	Juvenile Outmigration Nechako River 1989
1989	M89-5	Nechako River Physical Data Summary 1989
1989	M89-6	1990 Fry Emergence
1989	M89-7	Nechako River Substrate Qualities and Composition
1989	M89-8	“Nechako River Chinook Residence Time, 1989”
1989	RM89-2	The 1989 Summer Water Temperature and Flow Management Project
1989	RM89-4	Pilot Fertilization of the Nechako River II: Nitrogen-Limited Periphyton Production and Water Quality Studies during Treatment of the Upper River
1989	RM89-5	Biological Assessment of Habitat Complexing and Stream Fertilization
1989	RM89-6	Preliminary Inventory of Habitat Cover/Cover Opportunities Nechako River 1989

1989	RM89-7	Identification and Ranking of Sources Contributing Sediment to the Upper Nechako River
1989	RM89-8	Nechako River Flow Control 1989/1990
1990	M90-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 1990 Data Report
1990	M90-2	Nechako and Stuart Rivers Chinook Carcass Recovery 1990
1990	M90-3	"Juvenile Outmigration, 1990"
1990	M90-4	Winter Physical Conditions
1990	M90-5	Nechako River Physical Data Summary 1990
1990	M90-6	1991 Fry Emergence
1990	RM90-10	Winter Remedial Measures
1990	RM90-2	The 1990 Summer Water Temperature and Flow Management Project
1990	RM90-3	In-Stream Habitat Complexing 1989-1990 Pilot Testing
1990	RM90-3.1	A Literature Review of Riparian Revegetation Techniques
1990	RM90-3.2	Cattle Ranching Activities in Riparian Zones along the Upper Nechako River and Its Tributaries. Identifying Erosion at Potential Problem Areas
1990	RM90-4	Pilot Fertilization of the Nechako River III: Factors Determining Production of Fish Food Organisms
1990	RM90-5	"Pre-Fertilization Assessment: Baseline Fisheries Studies of Reach 1 of the Upper Nechako River, 1990"
1990	RM90-6	"Biological Assessment of Habitat Complexing, Nechako River 1990"
1990	RM90-7	Inferred Changes in Chinook Cover Habitat Suitability in Nechako River (Reaches 5-7) due to Flow Reduction
1990	RM90-8	River Bed Survey/HEC-2 Numerical Model of Nechako River: Volume I and II
1990	RM90-8.1	Nechako River Sand Mapping
1990	RM90-9	Nechako River Flow Control 1990/1991
1991	M91-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 1991
1991	M91-2	Nechako and Stuart Rivers Chinook Carcass Recovery 1991
1991	M91-3	"Juvenile Outmigration, 1991"

1991	M91-4	Winter Physical Conditions
1991	M91-5	Nechako River Physical Data Summary 1991
1991	M91-6	1992 Fry Emergence
1991	RM91-2	The 1991 Summer Water Temperature and Flow Management Project
1991	RM91-3	Instream Habitat Complexing Pilot Testing
1991	RM91-4	Pilot Fertilization of the Nechako River IV: Monitoring to Improve Precision
1991	RM91-5	"Pre-Fertilization Assessment: Baseline Fisheries Studies of Reach 1 of the Upper Nechako River, 1991"
1991	RM91-6	Biological Assessment of Habitat Complexing in the Nechako River 1991
1991	RM91-7	Riparian Vegetation Pilot Testing
1991	RM91-8	Nechako River Flow Control 1991/1992
1992	M92-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 1992
1992	M92-2	Nechako and Stuart Rivers Chinook Carcass Recovery 1992
1992	M92-3	Juvenile Outmigration 1992
1992	M92-4	Winter Physical Conditions
1992	M92-5	Nechako River Physical Data Summary - Database
1992	M92-6	1993 Fry Emergence
1992	M92-8	Evaluation Framework and Trend Analysis
1992	RM92-2	The 1992 Summer Water Temperature and Flow Management Project
1992	RM92-3	1992 Instream Habitat Complexing Pilot Testing
1992	RM92-5	Assessment of Fertilization
1992	RM92-6	Biological Assessment of Habitat Complexing in the Nechako River 1992
1992	RM92-7	Riparian Vegetation Pilot Testing
1992	RM92-8	Nechako River Flow Control 1992/1993
1993	M93-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 1993
1993	M93-2	Nechako and Stuart Rivers Chinook Carcass Recovery 1993
1993	M93-3	Juvenile Outmigration 1993

1993	M93-4	Winter Physical Conditions
1993	M93-5	Nechako River Physical Data Summary - Database
1993	M93-6	1994 Fry Emergence
1993	M93-8	Evaluation Framework and Trend Analysis
1993	RM93-1	Cheslatta/Murray Hydrological Data Collection Project - Summary Report 1989-1993 (Volumes 1 & 2)
1993	RM93-2	The 1993 Summer Water Temperature and Flow Management Project
1993	RM93-4	Biological Assessment of Habitat Complexing in the Nechako River 1993
1993	RM93-6	Nechako River Flow Control 1993/1994
1993	RM93-7	1993 Riparian Vegetation Monitoring Program
1994	M94-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 1994
1994	M94-2	Nechako and Stuart Rivers Chinook Carcass Recovery 1994
1994	M94-3	"Size, Distribution and Abundance of Juvenile Chinook Salmon of the Nechako River 1994"
1994	M94-4	Winter Physical Conditions
1994	M94-5	Nechako River Physical Data Summary - Database
1994	M94-6	1995 Fry Emergence
1994	M94-8	Evaluation Framework
1994	RM94-1	The 1994 Summer Water Temperature and Flow Management Project
1994	RM94-3	"Biological Assessment of Habitat Complexing in the Nechako River, 1994"
1994	RM94-4	Nechako River Flow Control 1994/1995
1995	M95-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 1995
1995	M95-2	Nechako and Stuart Rivers Chinook Carcass Recovery 1995
1995	M95-3	Juvenile Outmigration 1995
1995	M95-4	Winter Physical Conditions
1995	M95-5	Nechako River Physical Data Summary - Database
1995	M95-6	1996 Fry Emergence

Appendix I (continued)

1995	M95-8	Evaluation Framework and Trend Analysis
1995	RM95-1	Cheslatta/Murray Lakes Inflow and Forecast Procedure
1995	RM95-2	1995 Summer Water Temperature and Flow Management Project
1995	RM95-3	Instream habitat complexing 1993 - 1995
1995	RM95-4	"Biological Assessment of Habitat Complexing in the Nechako River, 1995"
1995	RM95-5	Nechako River Flow Control 1995/1996
1996	1995/96	1995/96 Annual Report
1996	M96-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 1996
1996	M96-2	Nechako and Stuart Rivers Chinook Carcass Recovery 1996
1996	M96-3	Juvenile Outmigration 1996
1996	M96-4	Winter Physical Conditions
1996	M96-5	Nechako River Physical Data Summary - Database
1996	M96-6	1997 Fry Emergence
1996	M96-8	Evaluation Framework and Trend Analysis
1996	RM96-1	1996 Summer Water Temperature and Flow Management Project
1996	RM96-2	1996 Instream habitat complexing
1996	RM96-3	"Biological Assessment of Habitat Complexing in the Nechako River, 1996"
1996	RM96-4	Nechako River Flow Control 1996/1997
1997	1996/97	1996/97 Annual Report
1997	M97-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 1997
1997	M97-2	Nechako and Stuart Rivers Chinook Carcass Recovery 1997
1997	M97-3	Juvenile Outmigration 1997
1997	M97-4	Winter Physical Conditions
1997	M97-5	Nechako River Physical Data Summary - Database
1997	M97-6	1998 Fry Emergence
1997	M97-7	Dissolved Oxygen Monitoring
1997	M97-8	Evaluation Framework and Trend Analysis

1997	RM97-1	1997 Summer Water Temperature and Flow Management Project
1997	RM97-2	1997 Instream habitat complexing
1997	RM97-3	"Biological Assessment of Habitat Complexing in the Nechako River, 1997"
1997	RM97-4	Nechako River Flow Control 1997/1998
1998	M98-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 1998
1998	M98-2	Nechako and Stuart Rivers Chinook Carcass Recovery 1998
1998	M98-3	Juvenile Outmigration 1998
1998	M98-5	Nechako River Physical Data Summary - Database
1998	M98-6	1999 Fry Emergence
1998	M98-8	Evaluation Framework and Trend Analysis
1998	RM98-1	1998 Summer Water Temperature and Flow Management Project
1998	RM98-4	Nechako River Flow Control 1998/1999
1998	M98-7	NFCP - The Last 10 Years and the Next 10 Years
1999	M99-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 1999
1999	M99-2	Nechako and Stuart Rivers Chinook Carcass Recovery 1999
1999	M99-3	Juvenile Outmigration 1999
1999	M99-4	Nechako River Physical Data Summary - Database
1999	M99-5	2000 Fry Emergenc
1999	M99-8	Evaluation Framework and Trend Analysis
1999	RM99-1	1999 Summer Water Temperature and Flow Management Project
1999	RM99-3	Nechako River Flow Control 1999/2000
2000	M00-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 2000
2000	M00-2	Nechako and Stuart Rivers Chinook Carcass Recovery 2000
2000	M00-3	Juvenile Outmigration 2000
2000	M00-4	Physical Data Collection
2000	M00-5	2001 Fry Emergence
2000	M00-8	Data Review

2000	RM00-1	2000 Summer Water Temperature and Flow Management Project
2000	RM00-2	Instream Habitat Modifications
2000	RM00-3	Nechako River Flow Control 2000/2001
2001	M01-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 2001
2001	M01-2	Nechako and Stuart Rivers Chinook Carcass Recovery 2001
2001	M01-3	Juvenile Outmigration 2001
2000	M01-4	Physical Data Collection
2001	M01-5	2002 Fry Emergence
2001	RM01-1	2001 Summer Water Temperature and Flow Management Project
2001	RM01-2	Instream Habitat Modifications
2001	RM01-3	Nechako River Flow Control 2001/2002
2001	RM00-7	Nechako River Substrate Quality/Composition
2002	M02-1	Nechako and Stuart Rivers Chinook Spawner Enumeration 2002
2002	M02-2	Nechako and Stuart Rivers Chinook Carcass Recovery 2002
2002	M02-3	Juvenile Outmigration 2002
2002	M02-4	Physical Data Collection
2002	M02-5	2003 Fry Emergence
2002	RM02-1	2002 Summer Water Temperature and Flow Management Project
2002	RM02-2	Instream Habitat Modifications
2003	RM03-1	2003 Summer Water Temperature and Flow Management Project
2003	*	Supplemental Sampling of Emergent Fry Habitat in the Nechako River
2005	*	NFCP Technical Data Review

* currently being printed for distribution

APPENDIX II: 1987 SETTLEMENT AGREEMENT

SETTLEMENT AGREEMENT

This Agreement is made this 14th day of September, 1987,

BETWEEN:

ALCAN ALUMINIUM LIMITED, a Canada corporation (formerly named "Aluminum Company of Canada, Limited")

(hereinafter called "Alcan")

OF THE FIRST PART,

AND:

HER MAJESTY THE QUEEN IN RIGHT OF CANADA, represented by THE MINISTER OF FISHERIES AND OCEANS

(hereinafter called the "Federal Crown")

OF THE SECOND PART,

AND:

HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF BRITISH COLUMBIA, represented by THE MINISTER OF ENERGY, MINES AND PETROLEUM RESOURCES

(hereinafter called the "Provincial Crown")

OF THE THIRD PART.

WHEREAS:

A. Pursuant to the 1950 Agreement, the Provincial Crown granted Alcan rights to use certain water resources in British Columbia, including water from the Nechako River, to produce hydroelectric power for industrial purposes;

B. Relying upon its ownership of these rights, Alcan has developed hydroelectric facilities and a major aluminum smelter, as well as townsites and related facilities at Kitimat and Kemano, all in British Columbia;

C. Alcan's ability to generate hydroelectric power for its smelter and other industrial purposes depends upon the continuation of its rights to use such water resources;

D. As provided in the 1950 Agreement, Alcan is considering completion of its hydroelectric facilities in British Columbia;

E. The Minister of Fisheries and Oceans, Canada (hereinafter called the "Minister") exercises jurisdiction under the Fisheries Act (Canada) in respect of the protection and management of fish resources in accordance with, inter alia, the Habitat Policy;

F. The Minister has issued an opinion, dated concurrently herewith, under subsection 20(10) of the Fisheries Act (Canada) in respect of the Nechako River, a copy of which is attached as Schedule "A" to this Agreement; and

G. The Parties, in order (a) to achieve an acceptable level of certainty that such water resources will be managed so as to conserve and protect the chinook and sockeye salmon resources of the Nechako River; and (b) to ensure Alcan's continuing ability to generate hydroelectric power for industrial purposes, wish to enter into this Agreement;

THIS AGREEMENT WITNESSES that in consideration of the premises and the covenants and agreements hereinafter set forth (the sufficiency of which is hereby acknowledged), the Parties hereby covenant and agree, as follows:

Section 1 - Definitions

In this Agreement:

a. "1950 Agreement" means the Agreement made the 29th day of December, 1950 between the Provincial Crown and Alcan under the authority of the Industrial Development Act (British Columbia);

b. "Action" means the legal action commenced by the Attorney General of Canada against Alcan in the Supreme Court of British Columbia, Vancouver Registry, under no. C803064;

c. "Alcan's Licence" means any water licence, conditional water licence or permit issued pursuant to the 1950 Agreement including conditional water licence no. 19847 and permit to occupy lands no. 3449, both dated 29 December, 1950;

d. "Alcan's Storage Facilities" means the Kenney Dam (and ancillary saddle dams), the Nechako Reservoir and the Skins Lake Spillway, and includes the Kenney Dam Release Facility;

e. "Annual Water Allocation" means the quantity of water required to be released in accordance with the provisions of this Agreement during each twelve month period commencing on the first day of April in each and every year during such period of time as this Agreement will remain in force and continuing up to and including the next following thirty-first day of March;

f. "Annual Water Year" means a twelve month period commencing on the first day of April and continuing up to and including the next following thirty-first day of March;

g. "Computer Models" means the computer models which have been used since 1983 for the purposes of temperature maintenance and

control in the Nechako River and which are outlined in the Envirocon Limited Technical Memorandum 1957/2 "Documentation of the Nechako River Unsteady State Water Temperature Model", Technical Memorandum 1957/1 "Documentation of the Nechako River Unsteady State Flow Model", and Technical Memorandum 1957/3 "Documentation of the Users Guide to the 1984 Nechako River Thermal Model", copies of which have been delivered to the Parties concurrently with the execution of this Agreement, together with such modifications as may be necessary as a result of operation of the Kenney Dam Release Facility;

h. "Conservation Goal" means the conservation on a sustained basis of the target population of Nechako River chinook salmon including both the spawning escapement and the harvest as referred to in paragraph 3)1. of the Summary Report;

i. "Habitat Policy" means the "Policy for the Management of Fish Habitat" published by the Department of Fisheries and Oceans (Canada) in 1986;

j. "Kenney Dam" means the rock filled dam in the Grand Canyon of the Nechako River, constructed, owned, occupied and operated by Alcan;

k. "Kenney Dam Release Facility" means the water release facility to be designed and constructed at or near Kenney Dam by Alcan;

l. "Monitoring" includes the set of measurements and the structures necessary to make those measurements which are required to determine whether the Remedial Measures implemented pursuant to this Agreement have achieved the Conservation Goal and to provide information to the Technical Committee on water releases from the Nechako Reservoir and discharges of water and temperatures of the water in the Nechako River and the act of making such measurements;

m. "Murray-Cheslatta System" means those bodies of water between the Skins Lake Spillway and Cheslatta Falls, and all streams and lakes tributary thereto;

n. "Nanika River" means the Nanika River in British Columbia and all streams and lakes tributary thereto;

o. "Nechako River" means the Nechako River in British Columbia below the Kenney Dam and all streams and lakes tributary thereto;

p. "Nechako Reservoir" means the reservoir established and operated by Alcan on the Nechako River above Kenney Dam;

q. "Parties" means Alcan, the Federal Crown, the Provincial Crown, each of whom is a party to this Agreement;

r. "Physical Work" includes any instream or off-channel modification, activity or structure, for the purpose of conserving the target population of chinook salmon as contemplated in paragraph 4 of the Summary Report;

s. "Protocol" means the protocol employed for determining flow adjustments as set out in chapter 2.0 "Methods" of Envirocon Limited Technical Memorandum 1941/C

"Review of the 1984 Nechako River Hydrothermal Monitoring and Control Program", copies of which have been delivered to the Parties concurrently with the execution of this Agreement;

t. "Release Sites" means any site at which water is released from the Nechako Reservoir into the Nechako River, including, without restricting the generality of the foregoing, the Skins Lake Spillway and the Kenney Dam Release Facility;

u. "Remedial Measures" means any Physical Work, management of water allocation, or other action determined pursuant to this Agreement to be needed for the achievement of the Conservation Goal;

v. "Skins Lake Spillway" means the spillway facilities constructed, owned and operated by Alcan in the vicinity of Skins Lake, British Columbia;

w. "Steering Committee" means the Steering Committee referred to in section 3 of this Agreement;

x. "Summary Report" means the Summary Report of the Nechako River Working Group dated August 24, 1987, a copy of which is attached as Schedule "B" to this Agreement;

y. "Technical Committee" means the Technical Committee referred to in section 3 of this Agreement; and

z. "Water Comptroller" means the comptroller as defined in the Water Act (British Columbia).

Section 2 - Obligations of the Parties

2.1 Alcan's Obligations:

So long as Alcan performs the covenants and agreements on its part contained in this Agreement, as required hereunder, Alcan's obligations to release water subject to Alcan's Licence at any Release Site will be satisfied hereunder as follows:

A. Short Term Flow Obligation:

(a) Commencing immediately upon the execution of this Agreement by the Parties, and continuing until the 31st day of March, 1988, Alcan will permit to escape through the Skins Lake Spillway into the Murray-Cheslatta System and the Nechako River, a quantity of water sufficient to achieve the flows in the Nechako River at Cheslatta Falls (measured at hydro-metric station no. 08JA017) set out in Column II of Schedule "C" to this Agreement, at the times specified in such Schedule;

(b) Commencing on the first day of April, 1988, and continuing until such time as the Kenney Dam Release Facility is operating, Alcan will permit to escape through the Skins Lake Spillway into the Murray-Cheslatta System and the Nechako River an Annual Water Allocation equivalent to a mean annual water flow measured at Skins Lake Spillway of at least 36.8 cubic metres per second plus such additional flows as are determined to be required for cooling purposes by the

Computer Models and Protocol (hereinafter referred to as the "Short Term Annual Water Allocation"); and

(c) Alcan will permit Alcan's Storage Facilities to be used for the purpose of releasing the Short Term Annual Water Allocation in accordance with the following:

i. The Technical Committee will manage the Short Term Annual Water Allocation with the object of achieving the flows set out in Column II of Schedule "C" to this Agreement or as the Technical Committee may otherwise determine in accordance with this Agreement, and will direct Alcan accordingly;

ii. Alcan will release the Short Term Annual Water Allocation in accordance with such directions, or failing any such directions, in accordance with Column I of Schedule "C" to this Agreement;

iii. Alcan will be responsible for and have complete control over the operation of Alcan's Storage Facilities;

iv. in the event that Alcan proposes to release flows in excess of the Short Term Annual Water Allocation, Alcan will so notify the Technical Committee and comply with the directions of the Technical Committee regarding the timing of such releases, unless otherwise directed by the Water Comptroller;

v. in the event that Alcan releases flows pursuant to clause 2.1 A. (c) iv of this Agreement, the quantity of water so released will be deemed not to be included as a part of the water required to be released pursuant to clauses 2.1 A. (a) or (b);

vi. any measurement in connection with the release of the Short Term Annual Water Allocation will be made at the Skins Lake Spillway and in the event of dispute will be determined by the Technical Committee;

vii. Alcan will not be obligated to store any portion of an Annual Water Allocation beyond the applicable Annual Water Year; and

viii. Alcan will continue to maintain and operate the Computer Models and Protocol necessary to maintain temperature control in the Nechako River in accordance with this Agreement.

B. Long Term Flow Obligation:

(a) At such time as the Kenney Dam Release Facility is operating, Alcan will permit to escape through the Kenney

Dam Release Facility and/or the Skins Lake Spillway as may be specified, from time to time by the Technical Committee, into the Nechako River, an Annual Water Allocation equivalent to a mean annual water flow measured at the Kenney Dam Release Facility and/or the Skins Lake Spillway of at least 19.6 cubic metres per second plus such additional flows as are determined to be required for cooling purposes by the Computer Models and Protocol (hereinafter referred to as the "Long Term Annual Water Allocation");

(b) Alcan will permit Alcan's storage facilities to be used for the purpose of releasing the Long Term Annual Water Allocation in accordance with the following:

i. The Technical Committee will manage the Long Term Annual Water Allocation with the object of achieving the flows set out in Column II of Schedule "D" to this Agreement or as the Technical Committee may otherwise determine in accordance with this Agreement, and will direct Alcan accordingly;

ii. Alcan will release the Long Term Annual Water Allocation in accordance with such directions, or failing any such directions, in accordance with Column I of Schedule "D" to this Agreement;

iii. Alcan will be responsible for and have complete control over the operation of Alcan's Storage Facilities;

iv. in the event that Alcan proposes to release flows in excess of the Long Term Annual Water Allocation, Alcan will so notify the Technical Committee and comply with the directions of the Technical Committee regarding the timing of such releases, unless otherwise directed by the Water Comptroller;

v. in the event that Alcan releases flows pursuant to clause 2.1 B. (b) iv of this Agreement, the quantity of water so released will be deemed not to be included as a part of the water required to be released pursuant to clause 2.1 B. (a);

vi. any measurement in connection with the release of the Long Term Annual Water Allocation will be made at the Kenney Dam Release Facility and/or the Skins Lake Spillway and in the event of dispute will be determined by the Technical Committee; and

vii. Alcan will not be obligated to store any portion of an Annual Water Allocation beyond the applicable Annual Water Year; and

(c) If for any reason Alcan is unable to permit to escape through the Kenney Dam Release Facility the Long Term Annual Water Allocation, Alcan will, during such period of time as it is so unable, permit to escape through the Skins Lake Spillway such quantity of water as is necessary to provide flows measured at Cheslatta Falls (measured at hydro-metric station no. 08JA017) equivalent to those specified in Column II of Schedule "D".

C. Construction of Kenney Dam Release Facility:

(a) In the event that Alcan proceeds to construct the Kenney Dam Release Facility, it will do so at its own expense and in accordance with plans and specifications approved by the Technical Committee. The Kenney Dam Release Facility together with the Computer Models and Protocol will be operated and maintained at the sole expense of Alcan.

(b) The Kenney Dam Release Facility will not be put into operation until at least the expiration of 12 months from the cessation of flows which are in excess of 283.2 cubic metres per second and which are the result of the construction of a new tunnel or modifications to the existing tunnel to the power house at Kemano.

D. Implementation of Summary Report:

(a) Physical Work:

i. Alcan will construct and install any Physical Work determined pursuant to this Agreement to be needed for the achievement of the Conservation Goal in accordance with plans and specifications approved by the Technical Committee;

ii. The implementation of any Physical Work will be consistent with the recommendations contained in the Summary Report and in accordance with the directions of the Technical Committee; and

iii. Alcan will during such period of time as this Agreement will remain in force pay and be responsible for all the construction, installation, maintenance, and operating costs of any Physical Work.

(b) Monitoring:

i. Alcan will pay half the costs of Monitoring.

(c) Technical and Steering Committees:

i. Alcan will pay half the costs of participation by the external expert on the Technical Committee.

E. Amended Water Licence:

(a) Alcan hereby abandons in perpetuity all of its rights to store, divert and use water and to construct, maintain and operate works of any nature on the Nanika River, including those granted by or pursuant to the 1950 Agreement, Alcan's Licence, Order-in-Council 2883/1950, the Industrial Development Act (British Columbia) or Water Act (British Columbia).

(b) Alcan will apply to the Provincial Crown, contemporaneously with the execution of this Agreement by the Parties, to amend Alcan's Licence and the 1950 Agreement, as necessary, and take all such other steps as may be required to reflect such abandonment.

(c) Alcan will not seek compensation from the Federal Crown in respect of any water foregone by reason of any action by the Minister prior to the execution of, or pursuant to, this Agreement, and hereby releases the Federal Crown from all claims or demands in respect of such compensation.

(d) Alcan will not seek compensation from the Provincial Crown under the 1950 Agreement in respect of any water foregone pursuant to this Agreement, and hereby releases the Provincial Crown from all claims or demands in respect of such compensation.

(e) Alcan hereby abandons in perpetuity all of its rights to store water in the Cheslatta Lake and the Murray Lake, and to build water storage facilities at the outlet of the Murray Lake, arising under conditional water licence no. 20779; provided that Alcan reserves to itself all rights to release water through the Skins Lake Spillway as contemplated in this Agreement.

F. Provision of Information:

Alcan will provide the Technical Committee, on an ongoing basis, with the required technical information in the possession or control of Alcan in any way relating to the quantity of water inflowing into the Nechako Reservoir and Murray-Cheslatta System, the Computer Models and Protocol, and the water temperature at Cheslatta Falls and the confluence of the Stuart River and Nechako River.

2.2 Federal Crown's Obligations:

A. Implementation of Summary Report:

(a) Monitoring:

i. The Federal Crown will pay half the costs of Monitoring.

(b) Research Obligation:

i. The Federal Crown will pay all costs of the applied research programs

referred to in the Summary Report.

(c) Technical and Steering Committees:

i. The Federal Crown will pay half the costs of participation by the external expert on the Technical Committee.

B. Amended Water Licence:

The Federal Crown will not challenge the legal validity of the 1950 Agreement, or any licence, permit, interest, entitlement, or right in favour of Alcan issued thereunder.

C. Federal Authorization:

(a) The Minister, on behalf of the Federal Crown, will use his best efforts to have the Governor-in-Council make regulations pursuant to subsection (3)(b) of section 33.1 of the Fisheries Act (Canada) prescribing that the only circumstances in which the Minister or a person designated by the Minister may make orders under subsection (2) of section 33.1 in relation to the operation of the Kenney Dam and Skins Lake Spillway which are inconsistent with the terms and conditions of this Agreement, are as follows:

i. in the event Alcan fails, neglects or refuses, after reasonable notice from the Minister, to permit to escape into the Nechako River and/or the Murray-Cheslatta System the Short Term Annual Water Allocation or Long Term Annual Water Allocation as provided for in this Agreement; or

ii. in the event Alcan fails, neglects or refuses, after reasonable notice from the Minister, to operate or maintain at its sole expense the Kenney Dam Release Facility, if constructed, or to construct, install, operate or maintain any Physical Work, or the Computer Models and Protocol, in accordance with this Agreement.

2.3 Provincial Crown Obligations:

A. Remedial Program:

(a) The Provincial Crown will implement the freshwater fishery management strategy outlined in the letter dated August 28, 1987, to the Minister as attached as Schedule "E" to this Agreement, in a manner consistent with the Conservation Goal.

(b) To maintain the annual inflow from the Murray-Cheslatta System into the Nechako River, estimated to be 5.0 cubic metres per second, the Provincial Crown will:

i. place a Water Reserve, as defined in the Water Act (British Columbia), on the natural flow in the Murray-Cheslatta

System for fisheries and instream purposes; and

ii. not authorize the diversion of any water in the Murray-Cheslatta System to lands outside the Murray-Cheslatta System.

(c) In the event that a water storage dam is authorized in the Murray-Cheslatta System, the Water Comptroller will require that a water management plan be prepared jointly by the Federal Crown and the Provincial Crown to co-ordinate the releases of water from the Nechako Reservoir and such water storage dam, so as best to manage the Long Term Annual Water Allocation, while meeting other downstream needs.

B. Amended Water Licence:

(a) The Provincial Crown will amend Alcan's Licence and the 1950 Agreement and take all such other steps, as may be necessary to accomplish the abandonment by Alcan of all its rights to store, divert and use water and to construct maintain and operate works of any nature on the Nanika River, including those granted by or pursuant to the 1950 Agreement, Alcan's Licence, Order-in-Council 2883/1950, the Industrial Development Act (British Columbia) or Water Act (British Columbia), and covenants and agrees not to reinstate such rights at any time in the future.

(b) The Provincial Crown will assign or licence to the Federal Crown, during such period of time as this Agreement will remain in force, without compensation, an amount of water in each Annual Water Year equivalent to the Short Term Annual Water Allocation for that year or the Long Term Annual Water Allocation for that year, as the case may be, in accordance with this Agreement and by means of an appropriate authorization under the Industrial Development Act (British Columbia) or the Water Act (British Columbia).

(c) The Provincial Crown acknowledges that neither the acceptance by the Federal Crown of the assignment and licence referred to in clause 2.3 B(b) of this Agreement, nor the payment of any fee, rental or charge in respect of any such assignment or licence, constitutes any acknowledgement on the part of the Federal Crown that Canada requires any leave or licence of the Province of British Columbia for the use of any water in British Columbia for the safety of fish.

2.4 Joint Obligations:

A. The Parties unconditionally accept the spirit and principles of the Summary Report and will implement the Summary Report as provided in this Agreement.

B. Each of the Parties will pay and be responsible for all costs of and incidental to the participation by its own representatives on the Technical and Steering Committees.

C. Each of the Parties will use its best efforts to execute and deliver all such further documents and agreements, do and complete all such acts, deeds and things (including the obtaining of necessary approvals or authorizations and providing official copies of such approvals or authorizations) and provide all such reasonable assurances as may be necessary to carry out and implement the full intent and meaning of this Agreement.

D. Each of the Parties will provide such supplemental licences, permits and other authorizations, and amendments thereto as may be necessary or advisable in consequence of this Agreement and to implement the matters contemplated by this Agreement, including without limitation construction of the Kenney Dam Release Facility and any dredging of the Tahtsa Narrows by Alcan in the Nechako Reservoir.

2.5 Limitation

After the date of this Agreement, and unless expressly required herein, neither the Federal Crown nor the Provincial Crown will require Alcan to bear any obligation, liability or expense, not mandatory under any applicable statute in effect at the date of this Agreement, in connection with or as a result of (i) any public hearing or regulatory process, or (ii) any mitigation or compensation measure whatsoever relating to the subject matter or implementation of this Agreement, insofar as it applies to the Nechako Reservoir, the Nechako River or the Murray-Cheslatta System, if such obligations, liabilities or expenses are not expressly required by the 1950 Agreement, Alcan's Licence, the Industrial Development Act (British Columbia), Order-in-Council 2883/1950, or this Agreement.

Section 3 - Establishment of Committees

3.1 Establishment of Committees

The Parties will establish the Steering Committee and the Technical Committee in accordance with the Summary Report and this Agreement.

3.2 Steering Committee

The membership, responsibilities and proceedings of the Steering Committee will be determined as follows:

(a) The Steering Committee will consist of three members. Each of the Parties will appoint from time to time one senior representative, who will be empowered by the Party appointing him/her to bind such Party to a decision made by the Steering Committee;

(b) The Steering Committee will establish a schedule for its regular meetings which will be held at least annually. Any member may call for a meeting of the Steering Committee by giving reasonable notice of such meeting to the other members including a statement

of the issues to be discussed. Meetings of the Steering Committee will be held in Vancouver, British Columbia unless the members otherwise agree;

(c) In the event any Party fails or refuses to appoint such member, or such member being appointed fails or refuses to act, the remaining member or members may exercise the powers or function of the Steering Committee;

(d) The Steering Committee, among other things, will:

i. oversee the implementation of this Agreement;

ii. determine any matter referred to it by the Technical Committee;

iii. approve and publish annual reports on program activities and effectiveness; and

iv. approve the annual program of activities relating to the achievement of the Conservation Goal submitted by the Technical Committee; and

(e) Decisions of the Steering Committee will be unanimous. Failing unanimity on any matter to be determined by the Steering Committee under this Agreement, any member of the Steering Committee, may, in writing, request the matter to be determined by arbitration by a single arbitrator in accordance with the applicable provisions of the Commercial Arbitration Act (Canada) and/or Commercial Arbitration Act (British Columbia) in which event the matter will be referred to an arbitrator for decision in accordance with said Acts as may be applicable.

3.3 Technical Committee

The membership, responsibilities and proceedings of the Technical Committee will be determined as follows:

(a) The Technical Committee will consist of four members. Each Party will appoint from time to time one member plus an alternate member. The fourth member will be an independent expert selected for his technical expertise by the members appointed by the Parties;

(b) Each Party's representative will be an employee or consultant retained for the purpose by that Party with relevant scientific/engineering expertise in salmonid habitat improvement methodologies. For as long as is reasonably practical, each Party will attempt to designate its member from the membership of the Nechako River Working Group referred to in the Summary Report;

(c) The Technical Committee will establish a schedule for regular meetings. Any member may call for a meeting of the Technical Committee by giving reasonable notice of such meeting to the other members including a statement of the issues to be discussed. Meetings of the Technical Committee will be held in Vancouver, British Columbia

unless the members otherwise agree;

(d) In the event any Party fails or refuses to appoint such member, or such member being appointed fails or refuses to act, the remaining member or members may exercise the powers or function of the Technical Committee;

(e) The Technical Committee will be responsible for the implementation and ongoing administration of the program of remedial measures, monitoring, and applied research outlined in the Summary Report, to achieve the Conservation Goal. The Technical Committee, among other things, will:

i. determine any matter specified in this Agreement to be for decision or determination by the Technical Committee including, without limitation, managing releases of the Annual Water Allocation in the applicable Annual Water Year;

ii. determine, design, implement and administer a program of feasibility, pilot testing and Remedial Measures to ensure achievement of the Conservation Goal;

iii. determine, design, implement and administer a program of monitoring to evaluate the effectiveness of Remedial Measures including monitoring of stock status, habitat performance, and specific measures performance;

iv. recommend to the Steering Committee a program of applied research to be conducted on the Nechako River to elucidate areas of technical uncertainty as indicated by the Summary Report, and administer any such program which the Steering Committee decides to implement;

v. determine criteria for decision-making in accordance with clause 3.4 with respect to, among other things, Remedial Measures implementation, Remedial Measures success and stock status consistent with the Summary Report;

vi. prepare and submit to the Steering Committee annually a report on activities and program effectiveness; and

vii. prepare and submit an annual program of activities relating to the achievement of the Conservation Goal for approval by the Steering Committee; and

(d) The Technical Committee will report to the Steering Committee; and

(e) Decisions of the Technical Committee will be unanimous. Failing unanimity on any matter to be decided by the

Technical Committee under this Agreement, any member of the Technical Committee may, in writing, request the matter be referred to the Steering Committee for determination.

3.4 Decision Making Criteria

A. The Technical Committee will be directed by the Parties to establish a comprehensive body of decision making criteria by November 1, 1987.

B. In the event that the Technical Committee (or the Steering Committee or arbitration, in the case of dispute) has not determined such criteria by January 1, 1988, the following general criteria will apply until such determination is made:

(a) In deciding:

i. whether to implement a specific Remedial Measure;

ii. the design of such Remedial Measure;

iii. when such Remedial Measure should be implemented; and

iv. the extent to which such Remedial Measure is implemented;

the Technical Committee shall base its decisions upon the following considerations:

(1) the Remedial Measure is biologically sound;

(2) the Remedial Measure is reasonable and based upon practical and proven techniques;

(3) the Remedial Measure is cost effective, compared to alternative means of achieving the same biological objective within the same stage; and

(4) implementation of the Remedial Measure is in accordance with the Habitat Policy.

(b) In deciding whether to progress from one stage to the next stage, as contemplated in the Summary Report, the Technical Committee shall base its decision on the following considerations:

i. transition to the next stage is necessary to achieve the Conservation Goal; and

ii. all reasonable efforts to achieve the Conservation Goal under the current stage have been demonstrated to be inadequate.

C. The Technical Committee may from time to time amend the decision making criteria in order to adjust its relevancy to current conditions.

3.5 Duration of Programs

The Steering Committee and Technical Committee will remain in existence and the Remedial Measures will continue until such time as sustained achievement of the Conservation Goal can be demonstrated to the satisfaction of the Steering Committee or the Technical Committee.

Section 4 - Conditions

4.1 This Agreement will be of no force or effect at the option of Alcan if:

(a) All further documents required by this Agreement to be negotiated, executed and delivered by the Federal Crown or Provincial Crown are not negotiated, executed and delivered by January 1, 1988, or such other date as may be mutually agreed upon in writing by the Parties; or

(b) The regulations referred to in clause 2.2 C are not made or delivered to Alcan, as the case may be, by January 1, 1988 or such other date as may be mutually agreed upon in writing by the Parties.

4.2 This Agreement will be of no force or effect at the option of the Federal Crown if all licences and licence modifications described in clauses 2.1 E(b) and 2.3 B(a) and (b) have not been obtained by January 1, 1988, or such other date as may be mutually agreed upon in writing by the Parties.

4.3 Notwithstanding any other provision of this Agreement, this Agreement shall not come into force until approved by the Treasury Board pursuant to the Financial Administration Act (Canada).

Section 5 - Disposition of Action

5.1 Immediately upon the execution by all Parties of this Agreement:

(a) The Parties will apply to adjourn generally the trial of the Action and cease from taking any further legal steps or proceedings with respect to the Action except as expressly provided in this Agreement; provided, however, that nothing herein shall prevent the Attorney-General of Canada from applying for injunctive or other relief in the event that Alcan fails to release flows equivalent to those set out in clause 2.1A.(a) in accordance with this Agreement; and

(b) Upon the satisfaction of all conditions set forth in section 4, the Parties will consent to the discontinuance of the Action.

5.2 Each Party will bear its own costs and expenses incurred in connection with the Action and the negotiation and settlement of this Agreement.

Section 6 - General

6.1 No Party to this Agreement will be liable, or suffer any consequence under this Agreement, for any failure to observe or perform any term, condition, covenant or agreement contained in this Agreement for reasons beyond its reasonable control, including, without limitation, by reason of fire, flood or Act of God. Any Party unable to observe or perform any term, condition, covenant or agreement contained in this Agreement by reason of the foregoing will make every effort to resume such observance or performance as soon as such force majeure is eliminated.

6.2 All notices, requests and other communications hereunder will be

in writing and will be delivered by hand as follows:

i. To Alcan:

Alcan Aluminium Limited,
1188 Sherbrooke Street West,
Montreal, Quebec,
H3A 3G2

Attention: Chief Legal Officer

ii. To the Federal Crown:

The Regional Director-General,
Department of Fisheries and Oceans, Canada
555 West Hastings Street,
Vancouver, British Columbia
V6B 5G3

iii. To the Provincial Crown:

Deputy Minister of Environment and Parks,
Parliament Buildings,
Victoria, British Columbia,
V8V 1X4

or to such other address as may be given by notice as aforesaid by the particular Party, and will be deemed to have been given on the date of delivery.

6.3 This Agreement, the Schedules hereto, and the documents and agreements to be delivered pursuant hereto constitute the entire Agreement between the Parties and will not be amended or modified except by agreement in writing executed by the Parties.

6.4 No waiver of any provision of this Agreement, the Schedules hereto or the documents and agreements to be delivered pursuant hereto will be deemed to or will constitute a waiver of any other provision hereof or thereof nor will such waiver constitute a continuing waiver unless otherwise expressly provided.

6.5 This Agreement and the documents and agreements to be delivered pursuant hereto will be governed by and construed in accordance with the applicable laws in force in the Province of British Columbia.

6.6 Time will be of the essence of this Agreement.

6.7 This Agreement will be binding upon and enure to the benefit of the Parties hereto and their successors and assigns. Alcan may assign any interest, right or obligation of Alcan hereunder provided the assignee first covenants with the Federal Crown and the Provincial Crown to observe and perform all terms, conditions, covenants and agreements on the part of Alcan for the benefit of the other Parties. Notwithstanding any such assignment by Alcan, it will continue to be bound by such terms, conditions, covenants and agreements.

6.8 Subject as herein provided this Agreement will continue in full force and effect for the duration of Alcan's Licence and of all further licences, permits and authorities in place or succession thereof issued or granted to Alcan, its successors or assigns.

6.9 This Agreement does not constitute approval or precedent regarding any principle or issue in the Action.

6.10 Each of the Parties stipulate that execution of this Agreement will not constitute approval or admission of or precedent regarding any principle, factor or issue in any subsequent proceedings.

6.11 Notwithstanding any other provision of this Agreement, any Party may seek relief arising solely from non-compliance with this Agreement by any Party.

6.12 Notwithstanding any other provision of this Agreement, the availability of all funds to be paid under this Agreement by the Federal Crown is subject to the appropriation thereof by Parliament of Canada.

6.13 No member of the House of Commons will be admitted to any share or part of this Agreement or benefit to arise therefrom.

6.14 Any reference in this Agreement to any statute or enactment of the Parliament of Canada or of the Legislature of British Columbia will be deemed to include all subsequent amendments thereto, and to all subsequent statutes and enactments in place of or substitution for the statute or enactment so named or having similar or related purpose.

6.15 Nothing herein shall be construed as affecting the Minister's powers under the Fisheries Act (Canada) except as such powers may be affected by regulations made as a result of clause 2.2C. of this Agreement.

IN WITNESS WHEREOF Alcan, the Federal Crown and the Provincial Crown have each executed this Agreement, each party being duly authorized and empowered to execute this Agreement, as of the day and year first above written.

WITNESS:)
)
)
"Louise Cartier")
Name)
)
"1300 Lombard Crescent")
Address)
)
"Town of Mount Royal, Quebec")

ALCAN ALUMINIUM LIMITED,
by its Attorney-in-Fact

"D. Morton"

"W.J. Rich"

HER MAJESTY THE QUEEN IN RIGHT OF CANADA

Per:)
"Thomas E. Siddon")

Honourable Tom Siddon, P.C., M.P.,
Minister of Fisheries and Oceans.

HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF BRITISH COLUMBIA

Per:)
"Jack Davis")
)

Honourable Jack Davis, Minister of Energy, Mines and Petroleum Resources.

Minister of
Fisheries and Oceans

Ministre des
Pêches et des Océans

September 14, 1987

Mr. David Morton, President
Aluminum Company of Canada Limited
1188 Sherbrooke Street West
Montreal, Quebec
H3A 3G2

Dear Sir:

You are in receipt of my letter of April 9, 1987 setting out my opinion pursuant to Section 20(10) of the Fisheries Act, R.S.C. 1970, c.F-14 and amendments thereto with respect of the flows, measured at hydro-metric station 08JA017 on the Nechako River, below Cheslatta Falls, which are required to provide sufficient water for the safety of fish and the flooding of the spawning grounds to such depth as is necessary for the safety of the ova deposited thereon.

Since forming that opinion, I have received additional information which allows me to conclude that there exist alternative ways of providing an acceptable level of certainty for the protection of the fish in the Nechako River to the flow regime set out in my letter of April 2, 1987. With the existing facilities in place, it is my opinion that flows can be reduced to the level identified in paragraph 2.1 A(b) of the Agreement made the 14th day of September, 1987 between Alcan, the Federal Crown, and the Provincial Crown, provided that the program identified in section 3 is also implemented.

It is my further opinion that the quantity of water which Alcan must permit to escape from the Nechako Reservoir in order to provide an acceptable level of certainty for the protection of the fish and their ova can be reduced by the installation of certain mitigative and remedial works.

Ottawa, Canada K1A 0E6

Accordingly, if the remedial measures contemplated by the Summary Report referred to in the Agreement made the 14th day of September, 1987 between Alcan, the Federal Crown and the Provincial Crown are implemented as contemplated by that Agreement then it is my opinion that the flow which will provide sufficient water for the safety of fish and the flooding of the spawning grounds to such depth as is necessary for the safety of the ova deposited thereon is as set out in the Agreement.

With the issuance of this opinion, it is my conviction that the objectives of your Company and my Department are met. On the one hand, your Company is provided with certainty with respect to the amount of the natural inflow which it will be permitted to divert for power production purposes. This will allow your Company to commit funds to the further expansion of its power works at Kemano. On the other hand, the water being provided in accordance with this opinion will ensure that there is sufficient flow in the Nechako to provide an acceptable level of certainty for the protection of fish and ova therein.

Yours sincerely,

Tom Siddon, P.C., M.P.

SCHEDULE "B"

THE UNIVERSITY OF BRITISH COLUMBIA

CONFIDENTIAL

6328 Memorial Road
Vancouver, B.C. Canada V6T 2B3

Telephone (604) 228-2121
Fax (604) 224-3134

Office of the President

August 24, 1987

Mr. William Rich
Vice-President
ALCAN (Aluminum
Company of Canada)
4th floor
1285 W. Pender St.
Vancouver, B.C.

Dr. Peter Meyboom
Deputy Minister
Dept. of Fisheries and Oceans
Ottawa, c/o Vancouver Office
10th floor, 1090 W. Pender St.
Vancouver, B.C.

Dear Mr. Rich and Dr. Meyboom:

I was asked to participate in a working group established jointly by the Department of Fisheries and Oceans and the Aluminum Company of Canada to deal with technical questions associated with the proposal to change the flow regime of the Nechako River. My role was as a facilitator and not as an expert in the field. I am pleased to report to you that in my judgement, all issues of concern were presented and discussed thoroughly.

In all cases, the working group was able to reach a definitive agreement relating to the terms of reference in a process of full discussion and assessment of the risks. In my view, this was because all parties were expert in the field, and were able to review the technical issues as scientists and engineers.

I hereby transmit to you the unanimous report of the working group. Every member of this group is in full support of the contents of this report as it derives from the terms of reference.

Yours sincerely,

David W. Strangway
President

Attachment

SUMMARY REPORT OF THE NECHAKO RIVER WORKING GROUP

1) Following signing of an agreement between the Department of Fisheries and Oceans (DFO), the Aluminum Company of Canada (ALCAN), and the Province of British Columbia (B.C.), the water flows in the Nechako River will be managed to a mean annual flow of 26.4 cms including Cheslatta basin runoff. The Nechako River working group was established on Aug 20, 1987 by mutual agreement of DFO and ALCAN. The working group consisted of technical specialists from DFO, ALCAN, and the Province of B.C. The task of the working group was "To develop a program of measures and plan of implementation which will provide an acceptable level of certainty for the conservation and protection of the chinook fisheries resource of the Nechako River . Deliberations of the working group were from August 20-23, 1987 and were facilitated by Dr. David Strangway, President of U.B.C. This report summarizes the deliberations of the working group.

2) **Terms of Reference:**

To develop a program of measures and plan of implementation which will provide an acceptable level of certainty for the conservation and protection of the chinook fisheries resource of the Nechako River.

The program will be based on the following assumptions:

2.1. Flows in the Nechako River at Cheslatta Falls will be equivalent to Alcan's fish and other use flows as set out in the attached flow chart.

2.2. A cold water release facility will be constructed at the Kenney Dam.

2.3. Additional means required to provide an acceptable level of certainty will be selected to accord with the full hierarchy of preferences outlined at pages 25-26 of the Policy of the Management of Fish Habitat.

3) **Principal Conclusions:**

1. The total population of chinook salmon to be conserved is that represented by the average escapement to the river plus the average harvest during the period 1980-1986. DFO escapement records during this period averaged 1550 with a range of 850-2000. In view of the known inaccuracies in spawner count data the working group recognizes that the estimated escapement is on average 3100 spawning chinook but ranges from 1700 to 4000. This number will be referred to as the target population.

3.2. The working group concludes that conserving and protecting the chinook fisheries resource of the Nechako River can be achieved with an acceptable level of certainty by implementing the program of measures described below.

4) **The Program of Measures:**

The working group has agreed that the goal of conserving the target population of chinook can be achieved through implementatin of a three-stage process. The First Stage represents a set of measures that, if properly applied, should be sufficient to ensure conservation of the chinook stock. The Second Stage represents a set of additional measures that could be implemented in the event that the First Stage measures prove inadequate. The Third Stage represents the ultimate fall-back position in the event that implementation of First and Second Stages proves inadequate. The design and prioritization of the three stages is consistent with the hierarchy of preferences in the DFO Policy for the Management of Fish Habitat.

A. First Stage measures to ensure maintenance of the target population.

Following appropriate feasibility and bioengineering design work, specific measures, as outlined below, will be implemented as part of the program. Several categories are defined with specific measures listed under each category.

A.1. Flow design changes;

Outflows from Nechako Reservoir must be provided by means of a two-level release at Kenney Dam. The release structures are to include hollow cone valves to control any problem with Total Gas Pressure.

As a general principle, flow changes should not e instantaneous. Rather, these changes should be made over as long a period as is deemed practicable, so that ambient temperature changes are minimized and temperature shears avoided. The working group recognizes that: 1) this procedure will not change the total amount of water dedicated to fish and other use flows; and 2) moderation of the rate of flow change may not be possible during the period that cooling flows are being provided for sockeye.

Begin reduction to winter flows during late October to achieve winter flows in early November. Water saved during November should be allocated to the December to March period so as to increase overwinter flows.

A.2. Instream habitat modifications.

Design and construct a new channel through the Cheslatta outwash fan to carry outflow from Kenney Dam without eroding the fan. The existing channel is currently used as rearing habitat by juvenile chinook and should be preserved as such.

Control specific sediment sources that are endangering spawning beds, e.g. rip rap key areas of mainstem banks, construct sediment traps at existing aggradation areas such a below Greer Creek.

Modify tributary mouths to ensure that young chinook have access all year. Also breach beaver dams to ensure access to lower reaches of tributaries.

Increase habitat complexity by applying techniques to the river to increase habitat for all rearing life stages from post emergence to overwintering. Habitat complexing includes such measures as installation of woody debris and other cover, groins, scalloping shoreline, bolder clusters, rooted aquatics, or any other procedure that experience in British Columbia or elsewhere suggests would increase habitat complexity and suitability.

Fertilize upper river in spring and early summer to increase fish food production.

A.3. Off-channel modifications.

Encourage riparian vegetation in association with habitat complexing.

Fence areas of tributary streams and main-stem where cattle are creating erosion problems and disrupting habitat.

Open side and back channnels to help ensure availability of this type of habitat at low flows.

B. Second Stage measures to ensure maintenance of the target population. These measures not to be implemented until those of the First Stage have been demonstrated to be inadequate.

B.1. Additional habitat alterations.

Gravel cleaning in localized spawning areas after monitoring.

Place additional clean gravel.

Build artificial spawning dunes after monitoring.
Construction of artificial dunes.
Requires pilot and development studies.

Habitat modifications in tributaries to increase their productivity for chinook.

B.2. Ensure access to new habitat created by Kenney Dam water releases and develop suitable habitat conditions for chinook.

C. Third Stage measures to ensure maintenance of the target population. These measures not to be implemented until those of the First and Second Stages have been demonstrated to be inadequate.

C.1. Measures could include any of those below;

Spawning channel.

Incubate Nechako chinook eggs at an existing hatchery and return fry to the Nechako.

Hatchery on the Nechako.

Compensate for lost production by implementing appropriate measures in other systems.

Maintain Nechako stock gene pool at some other hatchery.

5) Implementation plan:

5.1. Organizational framework.

To implement this program of measures so as to achieve the goal of sustaining the target population in the Nechako river system, a long term, tripartite commitment is requred from each of ALCAN, DFO, and the Province of B.C.

A Technical Committee comprised of senior technical staff from each of the threee parties and at least one external technical expert should be formed. This

Committee should be charged with administering a program of feasibility, design, implementation, monitoring, and applied research activities performed in a co-operative manner with the practical and sound application of existing and new scientific/engineering knowlege.

This committee could employ smaller, specialized, working groups from time to time if this would facilitiate their tasks.

The Technical Committe could report to a senior level Policy/Steering Committee consisting of one or more representatives from each of the three parties. The Policy/Steering Committee would have the responsibility for directing and monitoring the implementation of the plan consistent with the tripartite agreement.

Terms of reference should be estalished for the committees immediately, and should incorporate such guiding priciples as "reasonableness", "practicality" and "cost effectiveness" in relation to decisions on the extent, timing, nature and efficacy of measures employed.

Decisions regarding the duration of technical programs and sources of funding were judged not to be part of this assignment and were not addressed. However, there must be a commitment on all sides to continue programs and measures until such time as sustained achievement of the conservation goal could be demonstrated.

Criteria for deciding to advance to the Second or Third stage measures were not addressed and should be the responsibiity of the Technical Committee. Such decisions must be based on the results of the monitoring program.

5.2. Time table for implementation.

The organizational structure should be created as soon as practicable after the agreement is in place. Provided the development timetable permits, monitoring of stock status and habitat performance as outlined below should begin before flows are reduced. In addition, feasibility, design, and pilot testing of selected First Stage measures should be initiated. Monitoring of the Nechako before initiation of First Stage measures will provide an important reference point against which to assess the first year or two of monitoring results following implementatin of First Stage measures. A timetable for implementation of the specific measures in

the First Stage is to be the responsibility of the Technical Committee with the expectation that this will be accomplished in an anticipatory and timely manner.

It is assumed that the technical committee will follow a process in evaluating possible measures that involves feasibility, design, pilot testing, production implementation, and evaluation. Responsible stop/go criteria will be applied at any of these stages.

6) **Monitoring and Evaluation of Program Success:**

There should be three types of monitoring and evaluation.

These are:

6.1. Monitoring for stock performance.

This is defined as monitoring to ensure that the conservation goal is met.

The most critical measure of conservation of the target stock is the total adult recruitment. However, the time lags involved in obtaining this measure mitigate against its sole use as a criterion of success. Consequently, stock performance monitoring should include counts of juveniles leaving the system, contribution of maturing fish to various fisheries and counts of adult fish returning to spawn.

6.2. Monitoring for overall habitat performance.

This is defined as monitoring particular types of habitat and the success of fish utilizing that habitat.

This includes;

a. Success of egg deposition and egg retention in females.

b. Incubation environment, particularly permeability and dissolved oxygen.

c. Gravel quality and composition.

d. Juvenile growth, condition and similar criteria.

e. Predator populations.

f. Stream temperature monitoring.

g. Total gas pressure.

3. Monitoring Implemented Measures.

This is defined as monitoring the utilization of any measures introduced to improve production to ensure their efficacy and success in terms of the conservation goal.

Monitoring of any measure to ensure that production is maintained must involve sampling to satisfy two criteria: 1. is there an acceptable degree of utilization by the fish; and 2. are there acceptable effects of the modification or structure on fish growth, condition, and similar criteria?

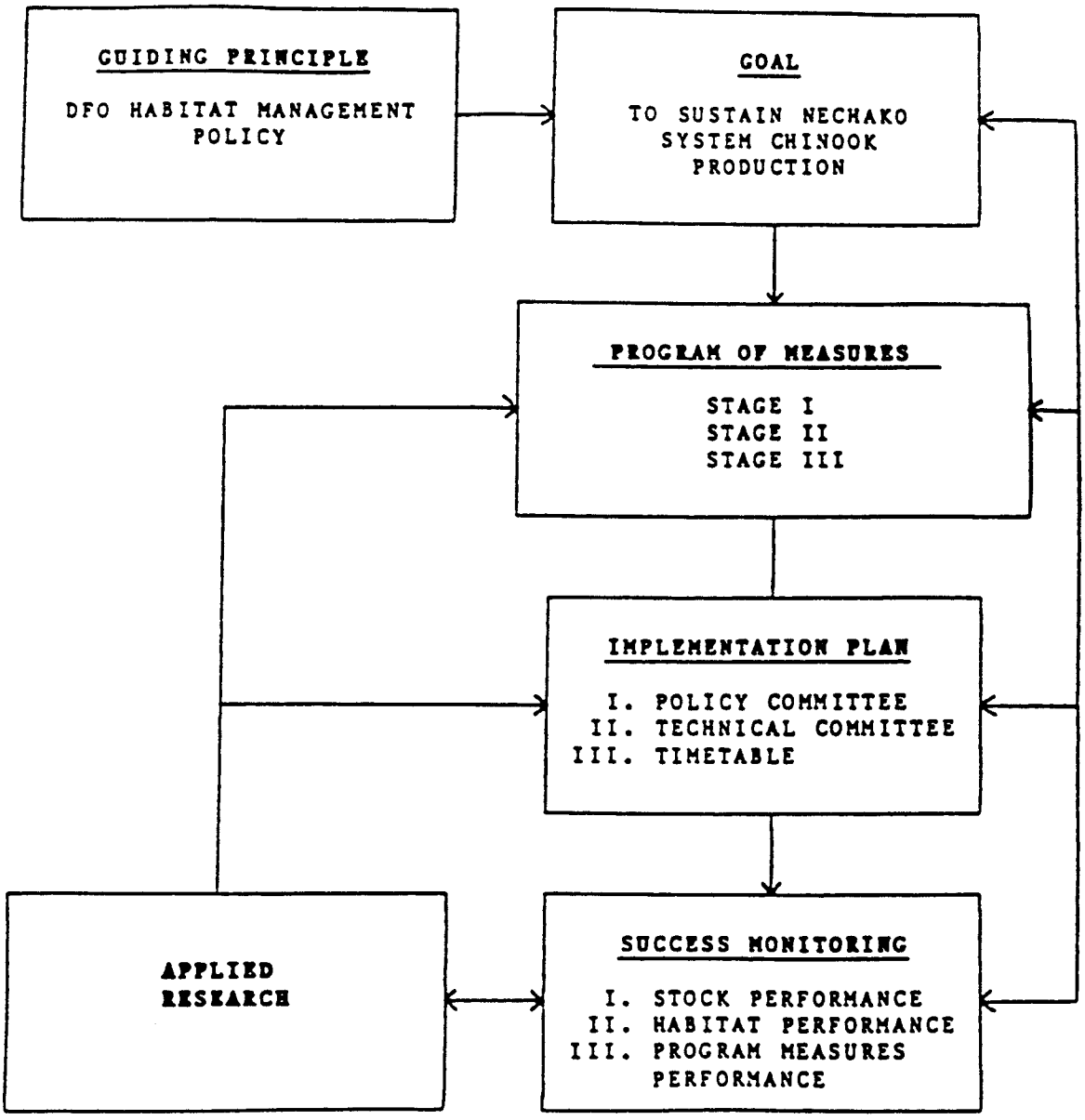
7) **Applied Research Program:**

The working group indentified important gaps in knowledge. These require that an applied research program be carried out. The committee identified the need for research in four principal areas: 1. Predator-competitor-prey interactions; 2. winter habitat; 3. temperature effects on food and fish growth; 4. develop a model to integrate the available information to assess the limiting factors to productivity.

MEMBERS OF THE WORKING GROUP WERE:

David Strangway (Facilitator)
Don Chapman
Dennis Deans
Mike Healey
Bruce Jenkins
Colin Levings
Slyde Mitchell
Bruce Sheperd
Pat Slaney
Glenn Stewart

FIGURE 1: FRAMEWORK TO ACHIEVE NECHAKO SYSTEM CHINOOK PRODUCTION GOAL



SCHEDULE "C"

SCHEDULE OF SHORT TERM WATER RELEASES FOR NECHAKO RESERVOIR

	Column I Reservoir Release (mean monthly)	Column II Approximate Nechako River Flow below Cheslatta Falls measured at hydro-metric station no. 08JA017 (mean monthly)
	m^3/s cfs	m^3/s cfs
Jan	29.2 (1031)	31.1 (1098)
Feb	29.3 (1035)	31.1 (1098)
Mar	29.4 (1038)	31.1 (1098)
Apr	54.6 (1928)	56.6 (2000)
May	47.2 (1667)	56.6 (2000)
Jun	40.9 (1444)	56.6 (2000)
Jul	45.6 (1610) *	56.6 (2000) *
Aug	50.4 (1780) *	56.6 (2000) *
Sep	27.6 (975)	31.1 (1098)
Oct	28.6 (1010)	31.1 (1098)
Nov	28.8 (1017)	31.1 (1098)
Dec	29.1 (1028)	31.1 (1098)
Annual Mean	36.8 (1300)	41.7 (1472)

* plus additional flows as are determined to be required for cooling purposes.

138H006

SCHEDULE "D"

SCHEDULE OF LONG TERM WATER RELEASES FOR NECHAKO RESERVOIR

	Column I Reservoir Release (mean monthly)	Column II Approximate Nechako River Flow below Cheslatta Falls measured at hydrometric station no. 08JA017 (mean monthly)
	m^3/s cfs	m^3/s cfs
Jan	12.3 (434)	14.2 (501)
Feb	12.4 (438)	14.2 (501)
Mar	12.5 (441)	14.2 (501)
Apr	29.1 (1028)	31.1 (1098)
May	21.7 (766)	31.1 (1098)
Jun	15.4 (544)	31.1 (1098)
Jul	20.1 (710) *	31.1 (1098) *
Aug	24.9 (879) *	31.1 (1098) *
Sep	24.8 (876)	28.3 (1000)
Oct	25.8 (911)	28.3 (1000)
Nov	23.2 (819)	25.5 (900)
Dec	12.2 (431)	14.2 (501)
Annual Mean	19.60 (692)	24.53 (866)

* plus additional flows as are determined to be required for cooling purposes.

138H006

Province of
British Columbia

OFFICE OF THE MINISTER

Ministry of
Environment
and Parks

Parliament Buildings
Victoria
British Columbia
V8V 1X4

SCHEDULE "E"

August 28, 1987

The Honorable Tom Siddon
Minister
Department of Fisheries and Oceans
200 Kent Street
Ottawa, ON
K1A 0E6

Dear Mr. Siddon:

The purpose of this letter is to confirm the intention of the Province of British Columbia to retain the present recreational fisheries values of the Upper Nechako River watershed.

The full impact of the proposed water release regime from the Nechako Reservoir on the above freshwater fishery is unknown. However, our studies indicate that there may be significant impact on the resident trout and char populations particularly by the proposed winter flow regime.

Our strategy for maintaining the recreational fishery in the Upper Nechako, based on a no net loss principle, is as follows:

1. Maintain populations in the Upper Nechako River at the level that the resultant habitat and flows will support.

2. Mitigate losses in the Nechako River by developing off-site river and lake fisheries on tributaries within the Upper Nechako River Basin.

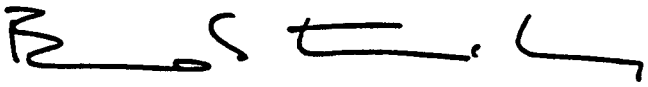
3. Mitigate losses in the Nechako River by developing off-site river and lake fisheries elsewhere in the Nechako River Basin.

It is proposed to implement the above management strategies in sequence as monitoring confirms the degree of loss and effectiveness of mitigation processes.

One of the best opportunities for off-site mitigation is in the rehabilitation of the Murray/Cheslatta system. With reduced releases from the Skins Lake Spillway, enhancement of the freshwater fisheries in this watershed could proceed. We have identified a number of enhancement projects for Cheslatta Lake.

The Province of British Columbia will be a full participating party in the Upper Nechako River fishery program, and will implement the above freshwater fishery management strategy cooperatively with that program.

Yours sincerely,



Bruce Strachan
Minister
Ministry of Environment and Parks
Province of British Columbia

APPENDIX III: KDRF APPROVAL LETTER

NECHAKO FISHERIES CONSERVATION PROGRAM

A Joint Program of the Government of Canada, Alcan and the Province of British Columbia

March 25, 1993

Reference: 2140.01/WP5035

Alcan Smelters and Chemicals Ltd.
Kemano Completion Project
1285 West Pender Street
Vancouver, B.C.
V6E 4B1

Attention: Mr. P. Holcak

Dear Sir:

Re: **Kemano Completion Project**
Kenney Dam Release Facility - Approval of Plans and Specifications

Please find attached for your records the signed approval document of the Technical Committee regarding the plans and specifications of the Kenney Dam Release Facility.

Yours truly,

NECHAKO FISHERIES CONSERVATION PROGRAM
Technical Committee

D. Hay
Chairman

P.O. Box 1630, Station "A", Vancouver, B.C. V6C 2P7

NECHAKO FISHERIES CONSERVATION PROGRAM

A Joint Program of the Government of Canada, Alcan and the Province of British Columbia

KENNEY DAM RELEASE FACILITY
PLANS AND SPECIFICATIONS APPROVAL DOCUMENT

DISTRIBUTION LIST

1, 2, 3.	Alcan - KCP
4.	P. Chamut, Steering Committee
5.	J.H.C. Walker, Steering Committee
6.	W.J. Rich, Steering Committee
7.	D. Hay, Technical Committee
8.	B.W. Jenkins, Technical Committee
9.	A. Martin, Technical Committee
10.	J. Payne, Technical Committee

P.O. Box 1630, Station "A", Vancouver, B.C. V6C 2P7

NECHAKO FISHERIES CONSERVATION PROGRAM

A Joint Program of the Government of Canada, Alcan and the Province of British Columbia

NECHAKO FISHERIES CONSERVATION PROGRAM
TECHNICAL COMMITTEE MEETING (92/93-19)

DATE: Thursday, March 25, 1993

PLACE: Triton Environmental Consultants Ltd.
120-13511 Commerce Parkway
Richmond, B.C.

ATTENDEES: D. Hay (Independent Member)
A. Martin (Provincial Crown)
J. Payne (Federal Crown)
B.W. Jenkins (Alcan Aluminum Ltd.)

G. Faulkner (Federal Crown)
W.O. Rublee (Alcan Aluminum Ltd.)
A.C. Mitchell (Alcan Aluminum Ltd.)

Decision Record

2. The Technical Committee approved the Plans and Specifications for the Kenney Dam Release Facility.

D. Hay

A. Martin

J. Payne

B.W. Jenkins

P.O. Box 1630, Station "A", Vancouver, B.C. V6C 2P7

NECHAKO FISHERIES CONSERVATION PROGRAM

A Joint Program of the Government of Canada, Alcan and the Province of British Columbia

March 25, 1993

NECHAKO FISHERIES CONSERVATION PROGRAM

TECHNICAL COMMITTEE

Approval of

Plans and Specifications

for Kenney Dam Release Facility

In accordance with Section 2.1C(a) of the 1987 Settlement Agreement, and subject to the provisions of Section 2.1B(b)i and 3.3(e)i, the Technical Committee, formed in accordance with the Agreement, has reviewed documentation, including plans and specifications, related to the design of the Kenney Dam Release Facility (KDRF).

The Technical Committee, having specified the necessary KDRF design criteria (Attachment A) that the KDRF should meet in order to support the Conservation Goal for chinook and sockeye salmon of the Nechako River system, as established in the Settlement Agreement, has completed a review of the following:

1) Investigation and design reports related to achieving the design criteria (Attachment A); and,

2) KDRF plans, specifications and addenda prepared for construction tenders.

The reports and supplementary information reviewed by the Technical Committee include those shown in Attachment B.

Correspondence from the Technical Committee to the Kemano Completion Project providing comments and questions on the reports and supplementary information is listed in Attachment C.

The plans and specifications reviewed by the Technical Committee include:

- Kenney Dam Release Facility - Plans and Specifications, including Bid Documents No. 19486-C071, Volumes I, II, and III. (letter from KCP dated May 27, 1991 (KCP0887).
- Kenney Dam Release Facility - Bid Documents Addendum No. 1 (letter from KCP dated June 13, 1991 (KCP0892).
- Kenney Dam Release Facility - Plans and Specifications Addendum No. 2 (letter from KCP dated March 5, 1992 (KCP0950).
- Supplementary information supplied by letters from KCP dated: September 24, 1992 (KCP 969 & 970); October 22, 1992 (KCP 972); and November 4, 1992 (KCP 975).

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Based on the review of the documents listed in Attachment B, and subsequent discussions for clarification with Kemano Completion Project staff, and subject to the terms and conditions for such approvals set out in the Steering Committee's memorandum dated March 27, 1991 (copy in Attachment D), the Technical Committee approves the Kenney Dam Release Facility design, as represented by the plans and specifications reviewed. This completes the review of plans and specifications in accordance with the requirements of Section 2.1C(a) of the 1987 Settlement Agreement.

The parameters to be monitored by KCP for compliance with the design criteria, with the results to be distributed to the Technical Committee, include those shown in Attachment E.

Nechako Fisheries Conservation Program - Technical Committee

MAR 25 1993
Dated

Duncan Hay
Hay and Company Consultants Inc.
(Independent)

John Payne
Department of Fisheries & Oceans
(Federal Crown)

Alan D. Martin
Ministry of Environment, Lands
and Parks
(Provincial Crown)

Bruce W. Jenkins
Triton Environmental Consultants Ltd.
(Alcan Aluminium Limited)

ATTACHMENT A

DESIGN CRITERIA SPECIFIED BY THE TECHNICAL COMMITTEE

P.O. Box 1630, Station "A", Vancouver, B.C. V6C 2P7

GENERAL FISHERIES RELATED CRITERIA

1. The primary function of the Kenney Dam release facility is to provide the fisheries water releases to the Nechako River required by the 1987 Settlement Agreement between Alcan and the federal and provincial governments.

2. The fisheries releases are to control downstream river temperatures to protect migrating sockeye salmon in July and August.

3. The fisheries releases are to maintain satisfactory year round conditions for chinook salmon.

4. Fisheries releases are to be possible with the reservoir at any level between the minimum operating level and the maximum flood discharge level.

5. Rate of change of water levels in the Nechako River downstream of Cheslatta Falls should not adversely affect the Conservation Goal set out in the Settlement Agreement through stranding or premature migration of juvenile chinook.

SPECIFIC FISHERIES FLOW RELEASE CRITERIA

6. The quantity of water to be released for fisheries purposes, Long Term Water Allocation, is equivalent to a mean annual flow of 19.6 m^3/sec measured at the facility plus additional flows in July and August for cooling purposes.

7. The Long Term Annual Water Allocation will be managed by the NFCP Technical Committee with the object of achieving certain mean monthly flows below the confluence of the Nechako and Cheslatta Rivers at Cheslatta Falls or as the Technical Committee may otherwise determine in accordance with the Settlement Agreement. The Technical Committee will direct releases accordingly, provided that the total mean annual release does not exceed 19.6 m^3/sec. In the absence of such directions, the mean annual flow of 19.6 m^3/sec is to be released varying on a mean monthly basis from a minimum of 12.2 m^3/sec to a maximum of 29.1 m^3/sec as shown in Schedule "D" appended to the Settlement Agreement (1987).

8. Cooling water releases are to control temperatures in the Nechako River above the Stuart River confluence between July 20 and August 20 to limit the occurrence of mean daily water temperatures above 21.7^{o}C to less than once in 200-years on average and to reduce the occurrence of mean daily water temperatures above 20.0^{o}C compared to observed data for the period 1958 to 1982.

   The historical average of mean daily temperatures above 20^{o}C for the period 1958 to 1982 is 3.88 days. The Technical Committee will use the 3.88 day value as a basis for comparison with post-Kemano completion flows.

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The temperature control period is July 20 to August 20 and the "cooling water operating period" required to achieve this temperature control above the Stuart River may be longer than July 20 to August 20 in order to meet the temperature criterion during this stipulated control period. The date cold water releases are commenced is likely to be July 12 based on the need to gain control of river temperatures and meet temperature ramping criteria.

The July 12 date is an operational criterion. Experience with the operation of KDRF, and the numerical models used to forecast river water temperatures, may lead to a date other than July 12 being either necessary, or desirable.

9. All releases during the cooling water operating period will be at the controlled mean daily temperature of not less than 10.0°C over a 24 hour period and an instantaneous temperature of not less than 9.5°C.

10. The rate of change of temperatures during transitions between surface and deep sources, and immediately prior to and following the cooling water period should not adversely affect the Conservation Goal set out in the Settlement Agreement through temperature shears.

11. The target design objective is less than 103% total gas pressure (TGP) within 1 km of Kenney Dam.

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FLOOD RELEASES - FISHERIES RELATED CRITERIA

12. The maximum monthly reservoir releases suggested as targets by the NFCP are shown in Table 1.

TABLE 1

NECHAKO RESERVOIR
NFCP SUGGESTED MAXIMUM MONTHLY RELEASES

MONTH	SUGGESTED MAXIMUM FLOW M^3/S	RATIONALE	OTHER LMITATIONS
September October	125 125	Defines maximum spawnable area	
November December January February	85 85 85 85	Not to exceed March and April maxima to avoid negative stage change and consequent risk of ice cover collapse and scouring of chinook-bearing substrate.	Initiation to precede river ice formation. Not to be less than 50% of September/October flow to avoid risk of exposing eggs to desiccation or freezing.
March April May	85 85 85	Limit at which marginal velocities would start to displace emergent fry.	Risks due to ice break up persist until ice is off the river.
June July August	283 283 283	Juvenile chinook begin selecting habit. Fish actively migrating out of the river. Flow limit identified by Water Comptroller.	Water Comptroller may require other limitation in June.

13. In accordance with the primary fisheries objective of the facility, flood releases are to meet the same dissolved gas level criterion as fisheries releases.

INITIAL COMMISSIONING RELEASES - FISHERIES RELATED CRITERIA

14. Commissioning of the release facility will reintroduce significant flows to the canyon between Kenney Dam and Cheslatta Falls and there is a risk that the organic and inorganic debris that will be entrained by initial releases could lead to short and long-term impacts on the Nechako fishery. In accordance with the Conservation Goal of the Settlement Agreement, these impacts must be minimized.

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15. The Kenney Dam Release Facility will not be put into operation until at least the expiration of 12 months from the cessation of flows which are in excess of 283.2 m^3/sec, and which are a result of the construction of a new tunnel or modifications to the existing tunnel to the powerhouse at Kemano.

P.O. Box 1630, Station "A", Vancouver, B.C. V6C 2P7

ATTACHMENT B

REPORTS AND SUPPLEMENTARY INFORMATION

REVIEWED BY THE TECHNICAL COMMITTEE

P.O. Box 1630, Station "A", Vancouver, B.C. V6C 2P7

REPORTS AND CORRESPONDENCE REVIEWED FOR APPROVAL OF KENNEY DAM RELEASE FACILITY

I. General Review Documentation

Triton Environmental Consultants Ltd./Klohn Leonoff Ltd. March 1991. Kenney Dam Release Facility Summary Report. PB50601505.

II. Module #1 - Design Criteria

Klohn Leonoff Ltd. 1991b. Kenney Dam Release Facility, Design Criteria Report including Addenda Nos. 1 and 2, prepared for Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Alcan Smelters and Chemicals Ltd. Letter of December 20, 1991. Kenney Dam Release Facility, KCP-0925

Alcan Smelters and Chemicals Ltd. Letter of January 31, 1992 KCP-0939. Interaction Meeting Notes.

Alcan Smelters and Chemicals Ltd. Letter of March 3, 1992 KCP-0948. Kenney Dam Release Facility.

Alcan Smelters and Chemicals Ltd. Letter of May 11, 1992, KCP 0959.

Alcan Smelters and Chemicals Ltd. Letter of July 3, 1992 (KCP 965).

Alcan Smelters and Chemicals Ltd. Letter of August 18, 1992, KCP 968.

Alcan Smelters and Chemicals Ltd. Letter of September 16, 1992, KCP 969(a).

Alcan Smelters and Chemcials Ltd. Letter of September 24, 1992 (KCP 969b).

Alcan Smelters and Chemicals Ltd. Letter of September 24, 1992 (KCP 970).

Alcan Smelters and Chemcials Ltd. Letter of October 22, 1992 (KCP 972).

Alcan Smelters and Chemicals Ltd. Letter of November 4, 1992 (KCP 975).

III. Module #2 Cold Water Release

LaSalle Hydraulic Laboratory Ltd. 1991. Kenney Dam Release Facility, 1/120 Scale Reservoir Intake Hydraulic Model Study. Report prepared for Klohn Leonoff Ltd. on behalf of Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Northwest Hydraulic Consultants Ltd. 1991c. Kenney Dam Release Facility, Release Structure Hydraulic Model Studies. Report prepared for Klohn Leonoff Ltd. on behalf of Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

P O Box 1630, Station "A", Vancouver, B C. V6C 2P7

Northwest Hydraulic Consultants Ltd. 1991d. Kenney Dam Release Facility, Low-Level-Outlet Regulating Structure Hydraulic Model Study. Report prepared for Klohn Leonoff Ltd. on behalf of Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Triton Environmental Consultants Ltd. 1991a. Nechako Reservoir Mathematical Modelling. Report prepared for Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Triton Environmental Consultants Ltd. 1992a. KCP Responses to NFCP Supplementary Questions (Raised on March 19, 1992) on Cold Water Releases, WP4689.

Alcan Smelters and Chemicals Ltd. Letter of January 31, 1992 KCP-0939. Meeting Notes.

Alcan Smelters and Chemicals Ltd. Letter of February 10, 1992 (KCP 944).

Alcan Smelters and Chemicals Ltd. Letter of April 13, 1992, KCP 0956.

Alcan Smelters and Chemicals Ltd. Letter of May 11, 1992, KCP 0959.

Alcan Smelters and Chemicals Ltd. Letter of June 8, 1992 (KCP 963).

Alcan Smelters and Chemicals Ltd. KCP Responses to NFCP Supplementary Questions on "Cold Water Releases", dated July 17, 1992 (KCP 967).

Alcan Smelters and Chemicals Ltd. Letter of August 18, 1992 (KCP 968).

Alcan Smelters and Chemicals Ltd. Letter of October 22, 1992 (KCP 972).

Alcan Smelters and Chemicals Ltd. Letter of November 4, 1992 (KCP 975).

Alcan Smelters and Chemicals Ltd. Letter of March 5, 1993 (KCP 979).

Alcan Smelters and Chemicals Ltd. Letter of March 24, 1993 (KCP 981).

Triton Environmental Consultants Ltd. 1992b. "Supplementary Extreme Conditions Hydrothermal Modelling". Report prepared for Alcan Smelters and Chemcials Ltd. Kemano Completion Project. September 1992

Klohn Leonoff Ltd. 1992c. Kenney Dam Release Facility - Operational Impact of Internal Waves. Report prepared for Alcan Smelters and Chemicals Ltd. Kemano Completion Project. October 1992.

Triton Environmental Consultants Ltd. and J.E. Edinger Associates Inc. 1992a. Nechako Reservoir - Investigation of Magnitude of Thermocline Depression in Response to Winds. Report prepared for Alcan Smelters and Chemicals Ltd. Kemano Completion Project. October 1992.

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Triton Environmental Consultants Ltd. and J.E. Edinger Associates Inc. 1992b. Investigations of Internal Waves in Nechako Reservoir - GLVHT Analysis of Dynamic Response to Winds at Kenney Dam. Report prepared for Alcan Smelters and Chemicals Ltd. Kemano Completion Project. November 1992.

IV. Module #3 Water Quality

Falvey, H.T. 1991. Kenney Dam Release Facility, Evaluation of Cavitation and Air Flow Characteristics. Report prepared for Klohn Leonoff Ltd on behalf of Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Klohn Leonoff Ltd. 1991e. Kenney Dam Release Facility, Evaluation of Withdrawal Characteristics of Surface Water Intakes. Report prepared for Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Klohn Leonoff Inc. 1991f. Kenney Dam Release Facility, Saddle Mountain Baffle Block Spillway, Prototype Gas Transfer Tests and Evaluation of Results. Report prepared for Klohn Leonoff Ltd. on behalf of Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Klohn Leonoff Ltd. 1991g. Kenney Dam Release Facility, Hollow-Cone Valve Model Studies, Evaluation of Gas Transfer Characteristics. Report prepared for Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Klohn Leonoff Ltd. 1992a - Kenney Dam Release Facility, Hollow-Cone Valve Gas Transfer Analysis. Report prepared for Alcan Smelters and Chemicals Ltd., Kemano Completion Project, February, 1992.

Northwest Hydraulic Consultants Ltd. 1991a. Kenney Dam Release Facility, Spillway Hydraulic ad Gas Transfer Model Studies. Report prepared for Klohn Leonoff Ltd. on behalf of Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Northwest Hydraulic Consultants Ltd. 1991b. Kenney Dam Release Facility, Hollow-Cone Valve Hydraulic Model Gas Transfer Tests. Report prepared for Klohn Leonoff Ltd. on behalf of Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Wilhelms, S.C. 1991. Gas Transfer Investigation of the Kenney Dam Release Facility. Memorandum of Record. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi. Prepared for Klohn Leonoff Inc. on behalf of Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Alcan Smelters and Chemicals Ltd. Letter response to NFCP Comments on Water Quality, January 17, 1992 (KCP 0936).

Alcan Smelters and Chemicals Ltd. Letter of March 18, 1992 (KCP 0940) documenting discussion topics from February 27, 1992 meeting.

Alcan Smelters and Chemicals Ltd. Letter of April 29, 1992 (KCP 0957).

Alcan Smelters and Chemicals Ltd. Letter of May 11, 1992 KCP 0959.

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V. Module #4 Structure Operation

British Columbia Hydro and Power Authority (B.C. Hydro) 1988. Simulation of Kemano Operation. Letter to Klohn Leonoff Ltd., dated October 11, 1988.

British Columbia Hydro and Power Authority (B.C. Hydro) 1990. Kemano Completion Project, Simulation of Kemano Project Operations. Letter to Alcan Smelters and Chemicals Ltd., Kemano Completion Project, dated October 19, 1990.

Triton Environmental Consultants Ltd. and Klohn Leonoff Ltd. 1991b. Reconnaissance of Fish Habitat and Surficial Deposits of Nechako Canyon. Report prepared for Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Triton Environmental Consultants Ltd. 1991c. Nechako River Preliminary Flow Ramping Studies. Report prepared for Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Triton Environmental Consultants Ltd. 1991d. Nechako River Flow Ramping Investigation. Report prepared for Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Triton Environmental Consultants Ltd. 1991e. Investigation of Flushing of Accumulated Sediments from the Nechako Canyon. Report prepared for Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Klohn Leonoff Ltd. 1991h. Kenney Dam Release Facility, Gate and Valve Operation. Report prepared for Alcan Smelters and Chemicals Ltd., Kemano Completion Project, December 1991.

Alcan Smelters and Chemicals Ltd. Letter of December 20, 1991 (KCP-0925 & 0926). KCP response to NFCP review memo.

Alcan Smelters and Chemicals Ltd. Letter of January 31, 1992 (KCP 939). NFCP/KCP discussion notes from January 30, 1992 meeting.

Alcan Smelters and Chemicals Ltd. Additional Response to NFCP, Structure Operation, dated February 20, 1992 (KCP 0945).

Alcan Smelters and Chemicals Ltd. Letter of March 18, 1992 KCP-0953, KDRF verification of flow accuracy.

Alcan Smelters and Chemicals Ltd. Letter of May 5, 1992 (KCP 0960).

Alcan Smelters and Chemicals Ltd. Letter of May 11, 1992, KCP 0959.

Alcan Smelters and Chemicals Ltd. Additional Response to NFCP, Structure Operations, dated July 3, 1992 (KCP 966).

Alcan Smelters and Chemicals Ltd. Letter of September 16, 1992, KCP 969.

Alcan Smelters and Chemicals Ltd. Letter of September 29, 1992 (KCP 971).

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Alcan Smelters and Chemicals Ltd. Letter of March 10, 1993 (KCP 980).

VI. Module #5 Flood Studies

Klohn Leonoff Ltd. 1989. Nechako Reservoir, Flood and Operating Studies. Report prepared for Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Klohn Leonoff Ltd. 1990. Kenney Dam Release Facility, Waste Management Permits. Letter to Alcan Smelters and Chemicals Ltd., Kemano Completion Project dated February 20, 1990.

Klohn Leonoff Ltd. 1991c. Nechako Reservoir, Probable Maximum Precipitation. Report prepared for Alcan Smelters and Chemicals Ltd., Kemano Power Operations.

Klohn Leonoff Ltd. 1991d. Nechako Reservoir, Probable Maximum Flood. Report prepared for Alcan Smelters and Chemicals Ltd., Kemano Power Operations.

Ministry of Environment, Water Management Branch. 1990a. Kemano Completion Project, Kenney Dam Release Facility. Letter from Comptroller of Water Rights to Alcan Smelters and Chemicals Ltd., Kemano Completion Project, dated September 14, 1990.

Ministry of Environment, Water Management Branch. 1990b. Meeting with Kemano Completion Project Team, October 22, 1990.

Klohn Leonoff Ltd. 1992b. Nechako Reservoir Flood Forecasting and Operating Study. Report prepared for Alcan Smelters and Chemicals Ltd., Kemano Completion Project.

Alcan Smelters and Chemicals Ltd. Letter of May 29, 1992, KCP 962.

Alcan Smelters and Chemicals Ltd. Letter of June 11, 1992 (KCP 964).

VII. Module #6 Construction Activities

I.R. Wilson Consultants Ltd. 1989. Heritage Resource Inventory and Impact Assessment. Kemano Completion Studies. Transmission Line and Borrow Areas Permit 1989-90. Prepared for Triton Environmental Consultants Ltd. on behalf of Alcan Chemicals and Smelters Ltd., Kemano Completion Project.

Klohn Leonoff Ltd. 1990. Kenney Dam Release Facility, Waste Management Permits. Letter to Alcan Smelters and Chemicals Ltd., Kemano Completion Project, dated February 20, 1990.

Alcan Smelters and Chemicals Ltd. Letter of March 11, 1992, KCP 0951.

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ATTACHMENT C

CORRESPONDENCE FROM THE TECHNICAL COMMITTEE TO

KEMANO COMPLETION PROJECT

P.O. Box 1630, Station "A", Vancouver, B.C. V6C 2P7

1. Letter of May 9, 1991 on NFCP initial review.
2. File memorandum of November 6, 1991 on cold water release.
3. File memorandum of November 22, 1991 on structure operations.
4. File memorandum of January 20, 1992 on structure operations.
5. File memorandum of January 20, 1992 on flood studies.
6. File memorandum of February 26, 1992 on structure operations.
7. File memorandum of March 10, 1992 on construction activities.
8. File memorandum of March 11, 1992 on water quality.
9. File memorandum of April 24, 1992 on structure operations.
10. File memorandum of April 24, 1992 on water quality.
11. File memorandum of May 20, 1992 on design criteria.
12. File memorandum of August 6, 1992 on structure operations.
13. File memorandum of August 27, 1992 on flood studies.
14. File memorandum of October 25, 1992 on water quality.
15. Letter of February 10, 1993 on cold water release.
16. Letter of February 11, 1993 on KDRF - gate operation rates.

P.O. Box 1630. Station "A", Vancouver, B.C. V6C 2P7

ATTACHMENT D

STEERING COMMITTEE MEMORANDUM DATED MARCH 27, 1991

P.O. Box 1630, Station "A", Vancouver, B.C. V6C 2P7

NECHAKO FISHERIES CONSERVATION PROGRAM

A Joint Program of the Government of Canada, Alcan and the Province of British Columbia

MEMORANDUM

TO: The Members, Nechako Fisheries Conservation Program Technical Committee

FROM: Nechako Fisheries Conservation Program Steering Committee

FILE: 2059.01b/WP 4123

DATE: March 27, 1991

RE: Technical Committee Approval of the Kenney Dam Release Facility and Associated Works

---

Section 2.1 C(a) of the Settlement Agreement states:

> "In the event that Alcan proceeds to construct the Kenney Dam Release Facility, it will do so at its own expense and in accordance with plans and specifications approved by the Technical Committee. The Kenney Dam Release Facility together with the Computer Models and Protocol will be operated and maintained at the sole expense of Alcan". (UNDERLINING ADDED FOR EMPHASIS).

The review and approval function to be performed by the Technical Committee under Section 2.1 C(a) of the Settlement Agreement must be distinguished from the design, engineering, procurement and construction management function provided by or through the KCP Project Management Team (the "KCP Project Manager Team"), being the group of persons designated from time to time by Alcan to manage the Kemano Completion Project. The function of the Technical Committee under Section 2.1 C(a) of the Settlement Agreement comprises the tasks of specifying fish protection criteria and providing these to the KCP Project Management Team together with technical comments and questions concerning the conceptual feasibility of various designs to achieve these criteria. While the relationship between the Technical Committee and the KCP Project Management

P.O. Box 1630, Station "A", Vancouver, B.C. V6C 2P7

Team is necessarily interactive, their respective functions in this regard are separate and distinct.

We wish to confirm that approval by the Technical Committee of the plans and specifications for the Kenney Dam Release Facility and Associated Works is for the sole purpose of carrying out the mandate of the Technical Committee under the Settlement Agreement, and does not constitute a confirmation or technical judgement on the part of the Technical Committee or its members as to the engineering design or safety of the Kenney Dam Release Facility and Associated Works or their capacity to operate in accordance with approved specifications and design criteria. In the context of the Settlement Agreement, the responsibility to construct and operate the Kenney Dam Release Facility and Associated Works so as to achieve specified fish protection criteria remains with Alcan, and the attendant professional liabilities for engineering design and safety, with its consultants.

P.O. Box 1630, Station "A", Vancouver, B.C. V6C 2P7

ATTACHMENT E

PARAMETERS TO BE MONITORED BY KCP FOR

COMPLIANCE WITH THE DESIGN CRITERIA

P.O. Box 1630, Station "A", Vancouver, B.C. V6C 2P7

General

The following lists the data collection program and instrumentation to be used to document compliance with criteria related to fisheries and other flow releases from the project into the Nechako River (Extracted from KCP letters KCP 0948 dated March 3, 1992 and KCP 0959 dated May 11, 1992). Detailed information on the actual sensing and recording instruments which will be located at the KDRF can be found in the KDRF Bid Documents.

A. FLOW RELEASED

1. Kenney Dam Release Facility (KDRF)

Data to be Collected

- Reservoir Level at KDRF
- Pressure Level in the deep water intakes pipes immediately upstream from high level deepwater gates (each of two pipes)
- Pressure level on Hollow Cone Valve (in conduit upstream of valve)
- High Level Regulating Gate Openings (each of 4 gates)
- Low level outlet valve opening

Readings are recorded by the Data Collection System in the KDRF Control Room. The values are scanned at a time interval adjustable down to 1 second. Data will be recorded hourly and more frequently during operating changes. (e.g. change in gate openings)

Flow Determination

Flow through the high level outlet gates will be calculated using the computer model developed from the hydraulic model tests of the KDRF, measured reservoir level, measured pressures in the water passages upstream from the high level deepwater gates and measured gate openings.

Flow through the low level valve will be computed using the measured pressure in the conduit, the measured valve opening and the valve manufacturer's rating curves based on the results from hydraulic model test data for the KDRF valve.

2. Skins Lake Spillway

Data to be Collected

- Reservoir Level at Skins Lake
- Spillway Gate Opening (2 gates)

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These data will be obtained manually using the existing staff gauge at the spillway and the existing technique for estimating gate openings.

Flow Determination

Flow through the gates will be calculated from the rating curves for the spillway using the data on reservoir level and gate openings.

B. TEMPERATURE OF RELEASED WATER

1. Kenney Dam Release Facility

Data to be Collected

Temperature of the water released from the KDRF will be measured using a thermograph located on the right bank of the river downstream from the spillway outlet.

Temperature measurements will be made at the following specific locations within the structure.

- Left Deep Water Intake
- Right Deep Water Intake
- Low Level Surface Water Passage
- High Level Surface Water Left Intake
- High Level Surface Water Right Intake

Temperature data will be recorded in the Data Collection System in the KDRF Control Room. The values are scanned at up to 1 second intervals. Data will be recorded hourly and more frequently during changing operating conditions.

2. Skins Lake Spillway

No temperature recording instrument is to be provided.

C. TGP OF RELEASED WATER

1. Kenney Dam Release Facility

Data to be Collected

A tensionometer will be used to measure TGP of water released from KDRF. Measurements of TGP will be performed periodically over a range of discharges released through the hollow cone valve and down the spillway during KDRF commissioning and for the first year of operation only. Additional testing would be performed in future years, if necessary, to cover operating conditions not experienced in the first year.

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D. FLOW RAMPING RATES

Instruments

River staff gauges located at selected locations in the Nechako River between the downstream end of the Nechako Canyon and the confluence of the Nechako and Nautley Rivers.

Reading will be performed manually during commissioning of the KDRF (and during the Canyon Flushing) during periods of increasing and decreasing flow releases to be made while KDRF is being commissioned.

E. DATA RECORDS TO BE SUPPLIED TO NFCP

Monthly Reports detailing data on the rate of flow and temperature of releases, will be compiled by KCP and delivered to NFCP within one week of the last day of each month.

1. Flow Releases

The monthly report will include records of calculated mean daily rates of release and timing of revisions to structure operation indicating:

i) Release Structure - (KDRF and/or SLS)
ii) Time - (Year/Month/Day/Hour/Minute)
iii) Calculated Release Rates:
  a) At initiation of change (cumecs)
  b) At completion of change (cumecs)
  c) Mean daily rate
iv) Assignment of Flows
  - Long Term Allocation (cumecs)
  - Cooling Water (cumecs)
  - Other including flood flow releases (cumecs)
v) Current month's flow volume
  - Long Term Allocation (cubic metres)
  - Cooling Water (cubic metres)
  - Other (cubic metres)
vi) Accumulated flow volumes since previous April 1st
  - Long Term Allocation (cubic metres)
  - Cooling Water (cubic metres)
  - Other (cubic metres)

2. Temperature of Releases

The monthly report will include records of calculated average and minimum recorded temperatures of water releases for each day of the month computed from the continuous temperature record.

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APPENDIX IV: STMP DECISION PROTOCOL

Nechako Fisheries Conservation Program
Summer Water Temperature and Flow Management Project (STMP)

Skins Lake Spillway Release Protocol

Introduction

The Summer Water Temperature and Flow Management Project (STMP) is operated each summer by Triton Environmental Consultant Ltd. (Triton) on behalf of the Nechako Fisheries Conservation Program (NFCP). Management of Nechako River flows and water temperatures is accomplished using water temperature predictions based on five-day meteorological forecasts to determine the schedule of Skins Lake Spillway releases required to meet project objectives. The Summer Water Temperature and Flow Management Project (STMP) uses an unsteady-state flow routing model and an unsteady-state water temperature prediction model designed to compute the conditions in the Nechako River defined by the nature of the meteorological conditions. Numerical modelling of flows and water temperatures in the Nechako River is performed daily during July 10 to August 20 (the operational period).

Daily operations (follow the original protocol as set out in the Settlement Agreement (Anon. 1987)), involve collection of water temperature and river stage data from several locations in the study area, and development of five-day meteorological forecasts. Water temperatures are obtained daily from recorders maintained in the Nechako River below Cheslatta Falls (at Bert Irvine's Lodge), in the Nechako River at Fort Fraser (upstream of the Nautley River), in the Nechako River above the Stuart River confluence and in the Nautley River. River stages are obtained daily from recorders maintained in the Nechako River below Cheslatta Falls, in the Nechako River at Vanderhoof and from a staff gauge in the Nautley River. Five-day meteorological forecasts are provided by World Weatherwatch as a subconsultant to Triton.

River stage and minimum and maximum water temperature data are obtained daily for each location identified except the Nechako River below Cheslatta Falls, where hourly water temperature and river stage data recorded are obtained from the data collection platform via computer link to Water Survey of Canada (WSC), Vancouver. In addition, spot and corresponding recorded water temperatures are collected at each location visited daily and used to adjust the recorded water temperatures.

The adjustment provides an ongoing check of each thermograph, and is performed in the following manner. If the spot temperature is higher than the thermograph record, the thermograph record is adjusted to agree with the recorded spot temperature for that day. If the thermograph record is higher than the spot temperature, the thermograph record is not adjusted. This procedure is implemented as a conservative measure.

Skins Lake Spillway releases reported are as requested by Triton. All Nechako River and Nautley River flow data reported are preliminary data, and are part of the database utilized in the daily operation of the STMP. These data are not updated as it is the

preliminary data that is used in real-time modelling of the Nechako River system. Therefore, values presented may differ slightly from those reported by WSC.

The first 10 days of the operational period, July 10 to July 19, are utilized for system start up, for initialization of the database required to schedule Skins Lake Spillway releases and to increase flows in the Nechako River from spring flows to the minimum cooling flow of 170 m^3/s (6,000 cfs) below Cheslatta Falls.

Release Protocol

Throughout the operational period, water temperatures in the Nechako River are calculated daily for the previous day, the current day and each of the next four days using the unsteady-state flow routing and water temperature prediction models. These calculations are based on recorded and five-day forecast meteorological data, recorded water temperature and computed flow data. Forecast water temperature predictions are tabulated and reviewed daily to identify trends in water temperature changes. These trends are the same as those used in the water temperature and flow management projects since 1984 (Envirocon Ltd. 1985), and are best explained through reference to Table 1.

Assuming the current day is July 16, entries corresponding to the current day's operation are represented by the letter c. Entries co and cs represent the recorded and calculated water temperatures, respectively, for the previous day (July 15). Entries c1 through c5 represent predicted water temperatures computed using the current day's five-day meteorological forecast and an assumed current day's flow regime. The entry rc represents the current day Skins Lake Spillway release required to meet project objectives.

The following three trends in water temperature changes are reviewed on a day-by-day basis:

1. Observed trend; developed from recorded mean daily water temperatures measured in the Nechako River above the Stuart River confluence each day (bo and co in Table 1). The difference in recorded water temperatures for the previous two days is extrapolated over the next five days to determine the observed water temperature trend.

2. Predicted trend; developed from the predicted water temperatures for the previous day and the following five days (cs, c1, c2, c3, c4, c5, in Table 1). These data represent the predicted trend.

3. Forecast trend; developed from the difference between the current five-day and previous five-day predictions for the same calendar days (c3 and b4, c2 and b3, c1 and b2 in Table 1). Differences between forecasted data on coincident dates for the current day and the next two days only are averaged and added to the fifth day predicted temperature to determine the trend in forecasted temperatures.

Each day predicted water temperatures for the five-day forecast period are checked and the three trends calculated. If two of the three trends indicate that the water temperature in the Nechako River above the Stuart River confluence could potentially exceed 19.4°C (67.0°F) then an increase in the Skins Lake Spillway release will be required. When this occurs the current day's release is revised and the flow and temperature models are re-run using the modified flow regime. Results of each day's final computer run are subsequently used to initialize water temperatures for the following day's computations. Entries in Table 1 represent each day's final cooling water release and resultant predicted water temperatures.

The following release criteria are used with the three trends identified above to determine the timing and magnitude of Skins Lake Spillway releases:

1. When two of the three trends show an increase in water temperature in the Nechako River above the Stuart River confluence, and these trends show that potentially the water temperature could exceed 19.4°C (67.0°F), increase the Skins Lake Spillway release according to criteria 2 and 3 below.

2. Operate Skins Lake Spillway such that flow in the Nechako River below Cheslatta Falls ranges between 170 m^3/s (6,000 cfs) and 283 m^3/s (10,000 cfs) as required, and flow in the Nechako River above the Stuart River confluence does not exceed 340 m^3/s (12,000 cfs). It is understood that the flow in the Nechako River below Cheslatta Falls is to be not less than 170 m^3/s (6,000 cfs) by the beginning of the control period, and is to be reduced to approximately 31.2 m^3/s (1,100 cfs) by September 6.

3. At any time, increase the Skins Lake Spillway release from the current level to 453 m^3/s (16,000 cfs) to achieve the flow changes in the Nechako River as fast as possible.

4. During cooling periods when two of three trends in forecasted water temperatures are decreasing and these trends indicate that potentially the water temperature could drop below 19.4°C (67.0°F) within the forecast period (five days), reduce the Skins Lake Spillway release from the current level to 14.2 m^3/s (500 cfs).

References

Anon. 1987. The 1987 Settlement Agreement between Alcan Aluminium Ltd. and Her Majesty the Queen in Right of Canada, represented by the Minister of Fisheries and Oceans, and her Majesty the Queen in Right of the Province of British Columbia, represented

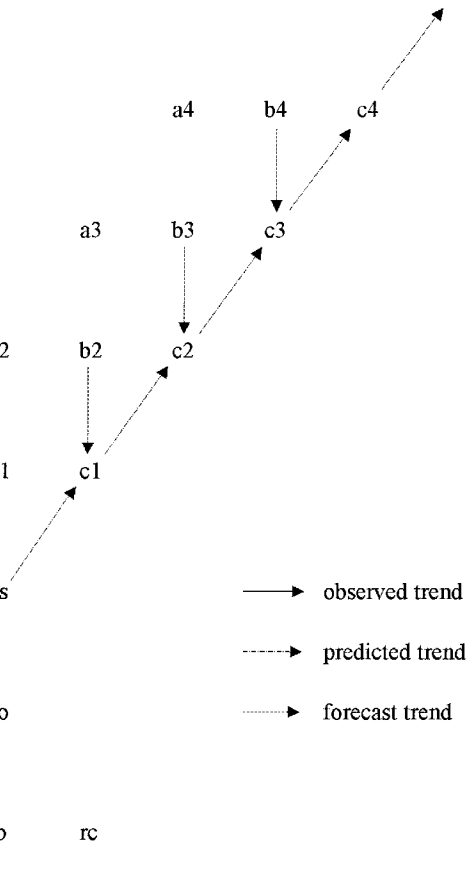
Envirocon Limited. 1985. Review of the 1984 Nechako River Hydrothermal Monitoring and Control Program. Technical Memorandum 1941/C. Chapter 2.0, Methods. Prepared for Alcan Smelters and Chemicals Ltd.

NFCP STMP SLS Rel Protocol Tab 1.xls

Table 1

Daily Operations to Manage Water Temperatures in the Nechako River above the Stuart River Confluence

Date	11-Jul	12-Jul	13-Jul	14-Jul	15-Jul	16-Jul*	17-Jul	18-Jul	19-Jul	20-Jul
Fifth Day's Predicted Water Temperature @ Date + 4 Days								a5	b5	c5
Fourth Day's Predicted Water Temperature @ Date + 3 Days							a4	b4	c4	
Third Day's Predicted Water Temperature @ Date + 2 Days						a3	b3	c3		
Second Day's Predicted Water Temperature @ Date + 1 Day					a2	b2	c2			
Current Day's Predicted Water Temperature @ Date				a1	b1	c1				
Previous Day's Calculated Water Temperature @ Date - 1 Day			as	bs	cs					
Previous Day's Recorded Water Temperature @ Date - 1 Day			ao	bo →	co					
Current Day's Release @ Date				ra	rb	rc				



* The current day (i.e., the day of operation) for this example is July 16.

APPENDIX V: INFORMATION EXCHANGE PROTOCOL

Nechako Fisheries Conservation Program
Summer Water Temperature and Flow Management Project (STMP)

Skins Lake Spillway Release Information Protocol

In order to manage and control the exchange of information between the NFCP Technical Committee and Alcan regarding directives for changes to gate settings (and therefore water release rates) at the Skins Lake Spillway, the attached protocol was developed. In general, the attached protocol is used as follows:

1) The Technical Committee (or its agent(s)) requests a change in release from the Spillway, stating the reason for the change and the conditions to be met in making the release rate change;
2) Alcan then gives direction to the gate operator to make the requested change (confirming that the correct password has been received to authenticate the order); and;
3) The gate operator confirms that the change was made and provides the final gate settings used to make the requested change in release rate.

This protocol has been used since 1997 and has ensured that all requested gate changes are properly authorized and accurately implemented.

Alcan Primary Metal – B.C.

SKINS LAKE SPILLWAY
WATER DISCHARGE CHANGE RECORD

SECTION A: Request

Date of request: _____

Reason for request: ☐ NFCP Decision Record Dated: _____ (attach copy)
☐ STMP Cooling Flow
☐ Other (specify in Comments)

We request that the Skins Lake Spillway release be changed from _____m^3/s (_____ ft^3/s)

to _____ m^3/s (_____ ft^3/s) on _____ _____ at _____
(Day) (Date) (Time)

The new rate of water discharge is a: ☐ minimum discharge ☐ average discharge

Absolute minimum discharge is 14.2 m^3/s.Normal operating maximum is 453.1 m^3/s.

Comments: _____ **Requester:** _____
(Signature)

_____
(Print Name)

SECTION B: Gate Movement Order PASSWORD RECEIVED ☐

Please make the following change to gate opening(s) at Skins Lake Spillway:

Date: _____ **Time:** _____

Gate No. 1: Raise to:_____ metres (_____gear teeth) / Lower to:_____metres (_____gear teeth)

Gate No. 2: Raise to:_____ metres (_____gear teeth) / Lower to:_____metres (_____gear teeth)

Reservoir Elevation: _____ feet **Ordered by:** _____
(Signature)

Estimated Discharge: _____ m^3/s (_____) ft^3/s _____
(Print name)

SECTION C: Gate Movement Confirmation PASSWORD RECEIVED ☐

☐ Gate Movement Calculation checked and confirmed by the Operator

The following change has been made to the Skins Lake Spillway gate opening(s) as requested:

Date: _____ **Time:** _____

Gate No. 1: Raised to: _____metres (_____ gear teeth) Encoder: _____
Lowered to: _____metres (_____ gear teeth) Encoder: _____

Gate No. 2: Raised to: _____metres (_____ gear teeth) Encoder: _____
Lowered to: _____metres (_____ gear teeth) Encoder: _____

Operator: _____
(Signature)

_____
(Print Name)

WGW\AWB:MGG FORMS\922\OPS503 (03-09-12)

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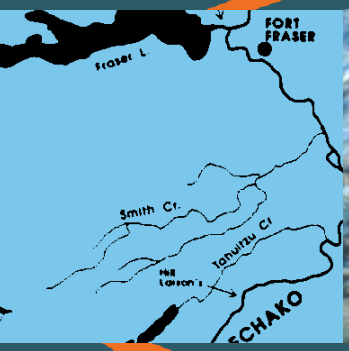
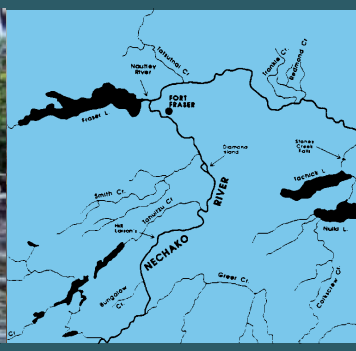
Nautley River
Tatuzinai Cr.
Frankie Cr.
Redmond Cr.
FORT FRASER
Diamond Island
Stoney Creek Falls
VANDERHOOF
Tachick L.
Tahuitzu Cr.
NECHAKO RIVER
Nulki L.
Sinkut R.
Greer Cr.
Cotlo Creek Cr.


FORT FRASER
Fraser L.
Smith Cr.
Tanuritzu Cr
Mill Lorson's
ECHAKO


Tanuritzu Cr.
Nautley River
Tsacha Cr.
Pinkerton Cr
FORT FRASER
Fraser L.
Stoney Creek Ranch
Tachick L.
Smith Cr.
Tanuritzu Cr
Mill Lorson's
RIVER
Nulki L.
NECHAKO
Grassy Cr.
Runyon Cr.
Cheslatta Cr