

**ALBERTA
GAUGING STATION
CONSTRUCTION AND MAINTENANCE
ANNUAL REPORT
1994-95**

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1.0 INTRODUCTION

Annual gauging station construction reports have been prepared by the Alberta District, Water Survey of Canada Division since 1949. These reports contain financial and construction details for all projects. This report is for the fiscal year April 1, 1994 to March 31, 1995.

The contents of this report include a summary of expenditures incurred during 1994/95 for new station construction, for normal maintenance, for removal or relocation, and for electrical power installations.

The report also contains details on work performed and expenditures at each site. Cost breakdowns are grouped by gauging designation; Federal, Federal-Provincial, and Provincial.

Brief descriptions of construction practices, material and equipment are presented in Appendix A. Also in Appendix A are photographs of some of the projects carried out during the year. Appendix A also contains environmental pre-screening forms.

Appendix B contains information and costs for work performed for the Atmospheric Environment Service.

2.0 COST- SHARING ARRANGEMENTS

The 1994/95 construction and maintenance program between Canada and the Province of Alberta is managed under the Memorandum of Agreement for hydrometric surveys signed by both governments on April 15, 1975. The annual construction programs are established via a joint consultative process between Alberta Environmental Protection and Environment Canada.

Under the terms of the agreement each gauging station is designated as Federal, Federal-Provincial or Provincial by a Co-ordinating Committee. Maintenance, power installation upgrading or new construction costs are shared according to the designation of the hydrometric gauging station.

Costs chargeable to the construction program are defined in the Memorandum of Agreement and Schedule B of the agreement. In summary, direct costs such as salaries of construction personnel, field travel expenses, vehicle operating costs, construction materials, contract payments for services and depreciation of construction equipment are chargeable. Stations designated as Federal are the cost responsibility of the Water Survey of Canada; stations designated as Federal-Provincial are cost shared equally; and stations designated Provincial are the cost responsibility of the Province of Alberta. The exceptions relate to equipment and instrumentation whereby, under Article VII of the Memorandum of Agreement, the operating agency is responsible for providing and paying the total cost of the basic water level recording equipment. However, beginning with 1983/84, manometer gauges have not been considered to be water level recording equipment and are shared according to designation. Specialized equipment and/or instrumentation is paid for by the party or parties requiring the service.

3.0 THE 1994/95 CONSTRUCTION PROGRAM

No new gauging stations were constructed in 1994/95 .

In all, maintenance was carried out at 50 W.S.C Sites and 2 A.E.S. Sites.

This maintenance consisted of the following:

- Removal of 9 stations.
- Relocation of 3 stations.
- Upgrading of 3 stations.
- Cableway repairs at 13 stations.
- Maintenance at 24 sites.

The installation of electric power at a gauging station reduces the incidence of record loss, eases the manual work effort of the field technician and in general, improves the efficiency of operation. In all, electric power was installed at 0 sites in 1994/95, bringing the total power installations at gauging stations in the Alberta District to 137 sites.

3.1 Distribution of Costs

Table 1, which follows, contains a summary of costs and numbers of construction projects according to gauging station designation. The costs in Table 1 include instrumentation and supervision, but do not include cost for depreciation.

3.2 Specific Costs and Site Locations

Table 2, which follows, contains a summary of costs for each specific site and Figure 1 is a map showing the general location of each of the projects. Bracketed figures are negative costs because of the return of salvageable materials to the warehouse, to be used again (salvaged material less construction costs).

Maintenance in the table and on the map is represented by the letter "M" and electrical installation is represented by the letter "E".

TABLE 1

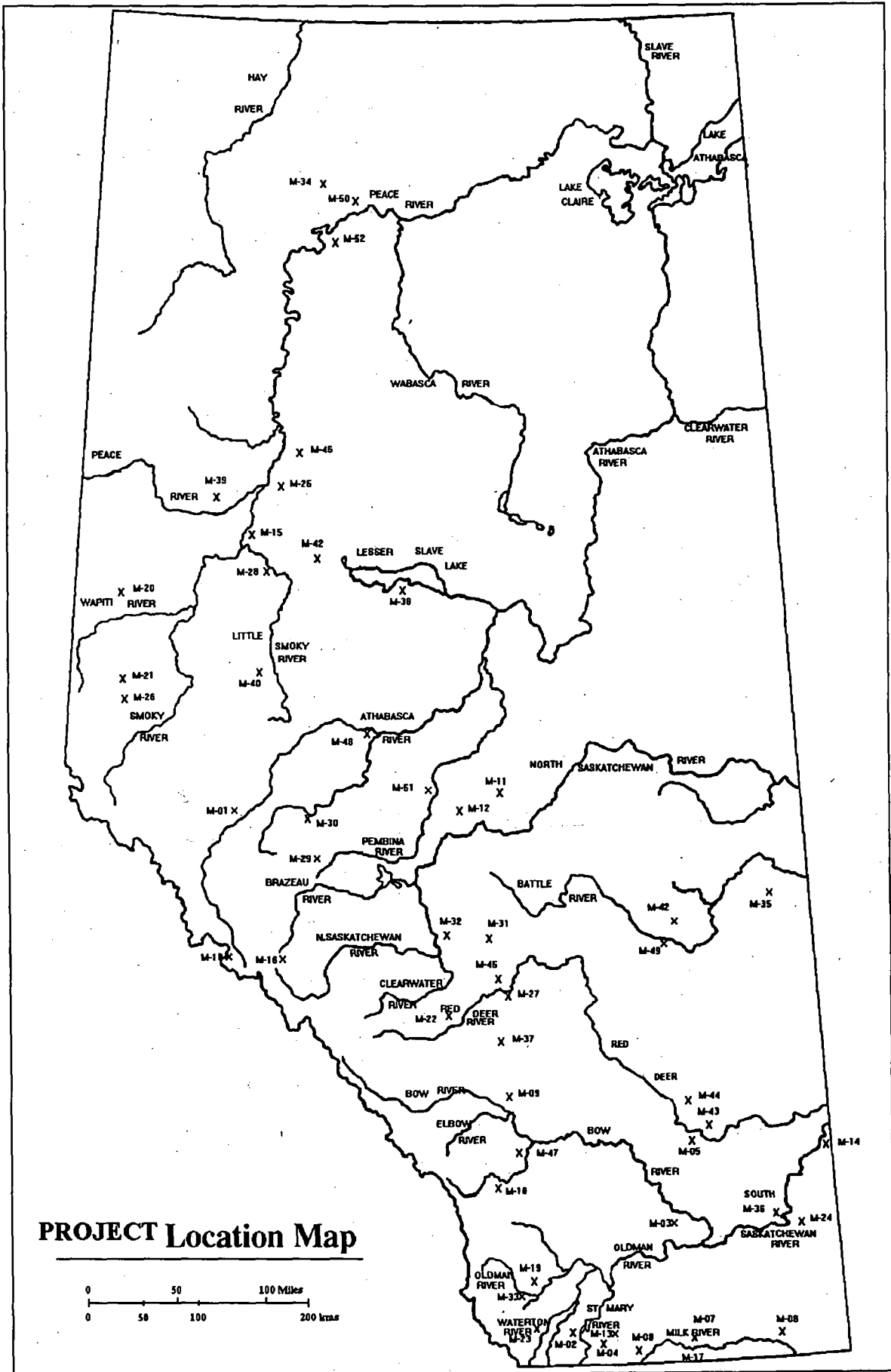
1994/95 CONSTRUCTION PROJECTS AND COSTS

<u>TYPE</u>	<u>NUMBER</u>	<u>DESIGNATION</u>	<u>COST</u>
<u>MAINTENANCE</u>	<u>23</u>	<u>Federal/Provincial</u>	<u>\$58,365.79</u>
	<u>18</u>	<u>Federal</u>	<u>\$40,234.83</u>
	<u>11</u>	<u>Provincial</u>	<u>\$22,341.44</u>
<u>RECORDERS</u>		<u>Federal</u>	<u>\$5000.00</u>
<u>TOTAL</u>	<u>52</u>		<u>\$125,942.06</u>

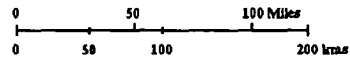
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TABLE 2

FEDERAL STATION		STN NO	TOTAL	RECORDER	FED-SHARE	PROV-SHARE
M-01	Athabasca River at Hinton	07AD002	\$ 18,482.79	\$ 2,500.00	\$ 15,982.79	\$ -
M-02	Lee Creek at Cardston	05AE002	\$ 339.24		\$ 339.24	\$ -
M-03	Little Bow River below Travers Dam	05AC012	\$ 572.36		\$ 572.36	\$ -
M-04	M.I.D. Canal near Spring Coulee	05AE021	\$ 512.61		\$ 512.61	\$ -
M-05	Matzhiwin Creek below Ware Coulee	05CJ012	\$ 133.97		\$ 133.97	\$ -
M-06	Milk River Project	?	\$ 551.48		\$ 551.48	\$ -
M-07	Milk Rr. at Western Crossing	11AA025	\$ 150.00		\$ 150.00	\$ -
M-08	North Milk near Intenational Boundary	11AA001	\$ 1,048.32		\$ 1,048.32	\$ -
M-09	Nose Creek at Calgary	05BH003	\$ 427.89		\$ 427.89	\$ -
M-10	Pekisko Creek Special Survey	?	\$ 1,677.61		\$ 1,677.61	\$ -
M-11	Stony Plain Upper Air Station	?	\$ 2,966.95		\$ 2,966.95	\$ -
M-12	Highvale Tower	?	\$ 1,012.86		\$ 1,012.86	\$ -
M-13	Rolph Creek near Kimball	05AE005	\$ 2,643.25		\$ 2,643.25	\$ -
M-14	S.Sask. Rr. at Highway 41	05AK001	\$ 4,503.93		\$ 4,503.93	\$ -
M-15	Smoky River at Watino	07GJ001	\$ 4,608.20		\$ 4,608.20	\$ -
M-16	Sunwapta Rr. at Athabasca Glacier	07AA007	\$ 257.80		\$ 257.80	\$ -
M-17	Verdigris Coulee near the Mouth	11AA038	\$ 2,597.37		\$ 2,597.37	\$ -
M-18	Whirlpool River near the Mouth	07AA009	\$ 248.20		\$ 248.20	\$ -
TOTAL FEDERAL MAINTENANCE COSTS			\$ 42,734.83	\$ 2,600.00	\$ 40,234.83	\$ -
FEDERAL/PROVINCIAL STATION						
M-19	Beaver Creek near Brocket	05AB013	\$ 7,330.40		\$ 3,665.20	\$ 3,665.20
M-20	Beaverlodge Rr. near Beaverlodge	07GD001	\$ 559.29		\$ 279.65	\$ 279.65
M-21	Cutbank Rr. near Grande Prairie	07GB001	\$ 1,771.94		\$ 885.97	\$ 885.97
M-22	Deer Creek Main Stem near Sundre	05CA003	\$ 1,696.10		\$ 848.05	\$ 848.05
M-23	Drywood Creek near the Mouth	05AD010	\$ 2,000.74		\$ 1,000.37	\$ 1,000.37
M-24	Gross Ventre Creek near Dunmore	05AH037	\$ 1,040.15		\$ 520.08	\$ 520.08
M-25	Heart River near Nampa	07HA003	\$ 736.24		\$ 368.12	\$ 368.12
M-26	Kakwa River near Grande Prairie	07GB002	\$ 3,649.62		\$ 1,824.81	\$ 1,824.81
M-27	Little Red Deer Rr. near the Mouth	05CB001	\$ 858.35		\$ 429.18	\$ 429.18
M-28	Little Smoky River near Guy	07GH002	\$ 3,170.82		\$ 1,585.41	\$ 1,585.41
M-29	Lovett River near the Mouth	07BA003	\$ 4,024.27		\$ 2,012.14	\$ 2,012.14
M-30	McLeod Rr. above Embarass River	07AF002	\$ 4,329.29		\$ 2,164.65	\$ 2,164.65
M-31	Medicine River near Eckville	05CC007	\$ 235.00		\$ 117.50	\$ 117.50
M-32	N.Sask. Rr. at Rocky Mountain House	05DC001	\$ 1,030.66		\$ 515.33	\$ 515.33
M-33	Oldman River near Brocket	05AA024	\$ 860.14		\$ 430.07	\$ 430.07
M-34	Ponton Rr. above Boyer River	07JF003	\$ 13,440.66	\$ 2,500.00	\$ 5,470.33	\$ 5,470.33
M-35	Ribstone Creek near Edgerton	05FD001	\$ 6,368.10		\$ 3,184.05	\$ 3,184.05
M-36	S.Sask. Rr. at Medicine Hat	05AJ001	\$ 365.17		\$ 182.59	\$ 182.58
M-37	Sheep Coulee near Carstairs	05CE019	\$ 29.50		\$ 14.75	\$ 14.75
M-38	Swan River near Kinuso	07BJ001	\$ 862.99		\$ 431.50	\$ 431.50
M-39	Wainscott Coulee near Brownvale	07FD014	\$ 1,006.08		\$ 503.04	\$ 503.04
M-40	Waskahigan River near the Mouth	07GG001	\$ 3,654.43		\$ 1,827.22	\$ 1,827.22
M-41	West Prairie Rr. near High Prairie	07BF002	\$ 1,845.86		\$ 922.93	\$ 922.93
TOTAL F/P MAINTENANCE COSTS			\$ 60,865.80	\$ 2,600.00	\$ 29,182.94	\$ 29,182.93
PROVINCIAL STATION						
M-42	Battle River near Forestburg	05FC001	\$ 787.74		\$ -	\$ 787.74
M-43	Berry Creek below Deadfish Creek	05CH016	\$ 2,030.06		\$ -	\$ 2,030.06
M-44	Deadfish Inflow Canal near Cessford	05HC012	\$ 1,633.80		\$ -	\$ 1,633.80
M-45	Dickson Dam Tunnel Outlet	05CB007	\$ 1,709.35		\$ -	\$ 1,709.35
M-46	Elder Creek at Highway 686	07HB002	\$ 2,115.30		\$ -	\$ 2,115.30
M-47	Highwood River near Aldersyde	05BL009	\$ (123.13)		\$ -	\$ (123.13)
M-48	McLeod River near Whitecourt	07AG004	\$ 9,509.33		\$ -	\$ 9,509.33
M-49	Paintearth Creek near Halkirk	05FC004	\$ 754.77		\$ -	\$ 754.77
M-50	Peace River at Fort Vermillion	07HF001	\$ 717.25		\$ -	\$ 717.25
M-51	Pembina River near Entwistle	07BB002	\$ 1,726.54		\$ -	\$ 1,726.54
M-52	Teepee Creek near La Crete	07JD004	\$ 1,480.43		\$ -	\$ 1,480.43
TOTAL PROVINCIAL MAINTENANCE COSTS			\$ 22,341.44	\$ -	\$ -	\$ 22,341.44
TOTAL COST OF CONSTRUCTION			\$ 125,942.07	\$ 6,000.00	\$ 69,417.77	\$ 51,524.37

NOTE: Cost of recorders is included in the total cost of construction but is not part of federal/provincial cost sharing.



PROJECT Location Map



3.3 Typical Costs

Table 5 indicates the average cost of various types of installations without instruments, for stations installed in Alberta during 1994/95. Costs are for standard access sites. Remote installation costs would be approximately double the cost shown. This table also provides a breakdown of the various types of frequently used instrumentation.

TABLE 5

TYPICAL COSTS OF GAUGING STATION INSTALLATIONS AND EQUIPMENT

ITEM	AVERAGE COST
Uninsulated steel shelter 1.63m x 1.63m x 2.44m on wooden base for instrument installations.	\$2390.00
Gauge well 2.44m x 1.52m dia. with 1.63m x 1.63m x 3.05m standard used steel shelter	\$7330.40
Cableway rebuilt using old towers and cable	\$4024.27
Recorder A-71	\$2500.00
Fluid Gauge (new small type)	\$7319.00
Electric Contact Gauge	\$135.00
Wire Weight Gauge	\$500.00
Steel Shelter 1.63m x 1.63m x 2.44m (used)	\$537.50

M-01

Athabasca River at Hinton

07AD002

F

Relocate instrument shelter. Cableway maintenance.

Labour: \$2,466.00

Board: \$1,064.69

Travel: \$435.88

Material: \$1,147.46

Contracts: \$188.51

Equipment - Instruments: \$8,180.25

Recorder: \$2,500.00

TOTAL: \$15,982.79

M-02

Lee Creek at Cardston

05AE002

F

Intake repairs.

Labour: \$237.00

Board: \$59.10

Travel: \$28.21

Material: \$14.93

Contracts: \$0.00

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$339.24

M-03

Little Bow River below Travers Dam

05AC012

F

Mouse cleanup.

Labour: \$388.00

Board: \$89.61

Travel: \$25.00

Material: \$69.75

Contracts: \$0.00

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$572.36

M-04

M.I.D. Canal near Spring Coulee

05AE021

F

Remove secondary gauge.

Labour: \$388.00

Board: \$89.61

Travel: \$25.00

Material: \$10.00

Contracts: \$0.00

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$512.61

M-05

Matzhiwin Creek below Ware Coulee

05CJ012

F

Station yearly startup.

Labour: \$133.97

Board: \$0.00

Travel: \$0.00

Material: \$0.00

Contracts: \$0.00

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$133.97

M-06

Milk River Project

0077000

F

Instrument installation.

Labour: \$372.00

Board: \$119.11

Travel: \$60.37

Material: \$0.00

Contracts: \$0.00

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$551.48

M-07:

Milk Rr. at Western Crossing

11AA025

F

Install cablecar.

Labour: \$0.00

Board: \$0.00

Travel: \$0.00

Material: \$150.00

Contracts: \$0.00

Equipment-Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$150.00

M-08:

North Milk near International Boundary

11AA001

F

Mouse cleanup and cableway maintenance.

Labour: \$582.00

Board: \$179.22

Travel: \$72.00

Material: \$215.10

Contracts: \$0.00

Equipment-Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$1,048.32

M-09: Nose Creek at Calgary 05BH003 F

Remove station.

Labour:	\$417.89
Board:	\$0.00
Travel:	\$10.00
Material:	\$0.00
Contracts:	\$0.00
Equipment - Instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$427.89

M-10: Pekisko Creek Special Survey 01??000 F

Establish B.M.'s for Fish Habitat Study.

Labour:	\$0.00
Board:	\$0.00
Travel:	\$0.00
Material:	
Contracts:	\$0.00
Equipment - Instruments:	
Recorder:	
TOTAL:	\$1,677.61

M-11 Rolling Hills Canal No. 1 Spill 05BN015 F

Site transferred to E.I.D.

Labour: \$0.00

Board: \$0.00

Travel: \$0.00

Material: \$0.00

Contracts: \$0.00

Equipment - instruments: \$0.00

Recorder: \$0.00

TOTAL: \$0.00

M-12 Rolling Hills Canal No. 2 Spill 05BN019 F

Site transferred to E.I.D.

Labour: \$0.00

Board: \$0.00

Travel: \$0.00

Material: \$0.00

Contracts: \$0.00

Equipment - instruments: \$0.00

Recorder: \$0.00

TOTAL: \$0.00

M-13

Rolph Creek near Kimball

05AE005

F

Replace intakes. Mouse cleanup. Repair shelter.

Labour: \$1,485.50

Board: \$406.46

Travel: \$105.50

Material: \$378.49

Contracts: \$267.50

Equipment instruments: \$0.00

Recorder: \$0.00

TOTAL: \$2,643.25

M-14

S.Sask. Rr. at Highway 41

05AK001

F

Remove poles and cable from catamaran site.

Labour: \$582.00

Board: \$130.07

Travel: \$49.00

Material: \$0.00

Contracts: \$3,742.86

Equipment instruments: \$0.00

Recorder: \$0.00

TOTAL: \$4,503.93

M-15

Smoky River at Watino

07GJ001

F

Site maintenance.

Labour: \$2,524.00

Board: \$813.82

Travel: \$372.56

Material: \$253.14

Contracts: \$644.68

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$4,608.20

M-16

Sunwapta Rr. at Athabasca Glacier

07AA007

F

Recon.

Labour: \$194.00

Board: \$23.52

Travel: \$30.68

Material: \$9.60

Contracts: \$0.00

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$257.80

M-17:

Verdigris Coulee near the Mouth

11AA038

F

Replace Intakes. Mouse cleanup.

Labour: \$1,477.23

Board: \$418.40

Travel: \$173.94

Material: \$383.35

Contracts: \$144.45

Equipment-Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$2,597.37

M-18:

Whirlpool River near the Mouth

07AA009

F

Remove old tower irons.

Labour: \$194.00

Board: \$23.52

Travel: \$30.68

Material: \$0.00

Contracts: \$0.00

Equipment-Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$248.20

M-19:

Beaver Creek near Brocket

05AB013

FP

Install new well and shelter.

Labour: \$3,132.50

Board: \$859.00

Travel: \$245.00

Material: \$2,396.26

Contracts: \$697.64

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$7,330.40

M-20:

Beaverlodge Rr. near Beaverlodge

07GD001

FP

Cableway maintenance.

Labour: \$212.00

Board: \$191.72

Travel: \$76.69

Material: \$78.88

Contracts: \$0.00

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$559.29

M-21 Cutbank Rr. near Grande Prairie 07GB001 FP

Cableway maintenance.

Labour:	\$609.50
Board:	\$472.60
Travel:	\$220.48
Material:	\$469.36
Contracts:	\$0.00
Equipment - instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$1,771.94

M-22 Deer Creek Main Stem near Sundre 05CA003 FP

Site maintenance.

Labour:	\$1,357.00
Board:	\$38.28
Travel:	\$175.00
Material:	\$125.82
Contracts:	\$0.00
Equipment - instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$1,696.10

M-23

Drywood Creek near the Mouth

05AD010

FP

Install used instrument shelter for P2K.

Labour: \$979.50

Board: \$209.83

Travel: \$97.50

Material: \$713.91

Contracts: \$0.00

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$2,000.74

M-24

Gross Ventre Creek near Dunmore

05AH037

FP

Repair large hole in well.

Labour: \$630.23

Board: \$208.57

Travel: \$59.44

Material: \$18.37

Contracts: \$123.54

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$1,040.15

M-25

Heart River near Nampa

07HA003

FP

Cableway maintenance.

Labour:	\$344.50
Board:	\$267.12
Travel:	\$124.62
Material:	\$0.00
Contracts:	\$0.00
Equipment - Instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$736.24

M-26

Kakwa River near Grande Prairie

07GB002

FP

Relocate shelter. Remove cableway.

Labour:	\$3,041.00
Board:	\$1,018.20
Travel:	\$452.52
Material:	(\$861.83)
Contracts:	\$0.00
Equipment - Instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$3,649.62

M-27

Little Red Deer Rr. near the Mouth

05CB001

FP

Site maintenance.

Labour: \$264.75

Board: \$61.60

Travel: \$46.00

Material: \$486.00

Contracts: \$0.00

Equipment Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$858.35

M-28

Little Smoky River near Guy

07GH002

FP

Cableway maintenance. Install new main cable.

Labour: \$1,114.90

Board: \$570.96

Travel: \$200.00

Material: \$1,284.96

Contracts: \$0.00

Equipment Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$3,170.82

M-29:

Lovett River near the Mouth

07BA003

FP

Relocate cableway. Install new concrete anchors, etc.

Labour:	\$1,959.00
Board:	\$741.60
Travel:	\$321.59
Material:	\$274.22
Contracts:	\$727.86
Equipment - Instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$4,024.27

M-30:

McLeod Rr. above Embarass River

07AF002

FP

Cableway repairs.

Labour:	\$1,623.00
Board:	\$982.22
Travel:	\$153.00
Material:	\$814.90
Contracts:	\$756.17
Equipment - Instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$4,329.29

M-31 Medicine River near Eckville 05CC007 FP

Manometer maintenance.

Labour:	\$186.00
Board:	\$9.00
Travel:	\$20.00
Material:	\$20.00
Contracts:	\$0.00
Equipment - instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$235.00

M-32 N.Sask. Rr. at Rocky Mountain House 05DC001 FP

Repair intake.

Labour:	\$897.00
Board:	\$58.56
Travel:	\$67.35
Material:	\$7.75
Contracts:	\$0.00
Equipment - instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$1,030.66

M-33

Oldman River near Brocket

05AA024

FP

Remove old shelter and fill well with pitrun.

Labour: \$326.50

Board: \$132.00

Travel: \$25.00

Material: \$0.00

Contracts: \$376.64

Equipment - instruments: \$0.00

Recorder: \$0.00

TOTAL: \$860.14

M-34

Ponton Rr. above Boyer River

07JF003

FP

Install well and shelter.

Labour: \$2,154.90

Board: \$979.90

Travel: \$404.66

Material: \$3,146.01

Contracts: \$1,578.18

Equipment - instruments: \$175.00

Recorder: \$2,500.00

TOTAL: \$10,940.65

M-35

Ribstone Creek near Edgerton

05FD001

FP

Manufacture and install metering bridge.

Labour:	\$3,867.50
Board:	\$268.40
Travel:	\$240.85
Material:	\$1,991.35
Contracts:	\$0.00
Equipment Instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$6,368.10

M-36

S.Sask. Rr. at Medicine Hat

05AJ001

FP

Repair shelter door.

Labour:	\$260.25
Board:	\$75.20
Travel:	\$29.72
Material:	\$0.00
Contracts:	\$0.00
Equipment Instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$365.17

M-37

Sheep Coulee near Carstairs

05CE019

FP

Remove well and shelter.

Labour: \$530.00

Board: \$18.00

Travel: \$46.00

Material: (\$725.00)

Contracts: \$160.50

Equipment - instruments: \$0.00

Recorder: \$0.00

TOTAL: \$29.50

M-38

Swan River near Kinuso

07BJ001

FP

Cableway maintenance. Install platform extension.

Labour: \$504.40

Board: \$118.90

Travel: \$26.69

Material: \$213.00

Contracts: \$0.00

Equipment - instruments: \$0.00

Recorder: \$0.00

TOTAL: \$862.99

M-39: Wainscott Coulee near Brownvale 07FD014 FP

Station discontinued. All appurtenances were removed and salvagable material r

Labour:	\$609.50
Board:	\$472.60
Travel:	\$220.48
Material:	(\$885.00)
Contracts:	\$588.50
Equipment - Instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$1,006.08

M-40: Waskahigan River near the Mouth 07GG001 FP

Cableway maintenance. Relocate left bank tower and anchor.

Labour:	\$1,959.00
Board:	\$659.32
Travel:	\$240.68
Material:	\$795.43
Contracts:	\$0.00
Equipment - Instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$3,654.43

M-41

West Prairie Rr. near High Prairie

07BF002

FP

Cableway maintenance. Install new main cable.

Labour: \$848.90

Board: \$386.02

Travel: \$160.18

Material: \$450.76

Contracts: \$0.00

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$1,845.86

M-42

Battle River near Forestburg

05FC001

P

Site cleanup (hantavirus)

Labour: \$530.00

Board: \$165.74

Travel: \$70.00

Material: \$22.00

Contracts: \$0.00

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$787.74

M-43: Berry Creek below Deadfish Creek 05CH016 P

Repairs to control and intakes.

Labour:	\$628.14
Board:	\$136.67
Travel:	\$84.50
Material:	\$0.00
Contracts:	\$1,180.75
Equipment - Instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$2,030.06

M-44: Deadfish Inflow Canal near Cessford 05HC012 P

Site cleanup (hantavirus)

Labour:	\$1,178.25
Board:	\$102.26
Travel:	\$170.72
Material:	\$182.57
Contracts:	\$0.00
Equipment - Instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$1,633.80

M-45

Dickson Dam Tunnel Outlet

05CB007

P

Cableway maintenance. Install new main cable.

Labour:	\$750.00
Board:	\$276.55
Travel:	\$136.54
Material:	\$546.26
Contracts:	\$0.00
Equipment - instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$1,709.35

M-46

Elder Creek at Highway 686

07HB002

P

Relocate shelter.

Labour:	\$1,306.00
Board:	\$493.80
Travel:	\$174.68
Material:	\$140.82
Contracts:	\$0.00
Equipment - instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$2,115.30

M-47

Highwood River near Aldersyde

05BL009

P

Remove cableway.

Labour: \$653.00

Board: \$27.00

Travel: \$20.00

Material: (\$823.13)

Contracts: \$0.00

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: (\$123.13)

M-48

McLeod River near Whitecourt

07AG004

P

Cableway maintenance. Replace 18' wooden tower.

Labour: \$4,757.00

Board: \$1,879.67

Travel: \$252.18

Material: \$2,620.48

Contracts: \$0.00

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$9,509.33

M-49: Paintearth Creek near Halkirk 05FC004 P

Site cleanup (hantavirus)

Labour:	\$530.00
Board:	\$129.67
Travel:	\$70.00
Material:	\$25.10
Contracts:	\$0.00
Equipment - Instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$754.77

M-50: Peace River at Fort Vermillion 07HF001 P

Site maintenance.

Labour:	\$522.40
Board:	\$169.02
Travel:	\$25.83
Material:	\$0.00
Contracts:	\$0.00
Equipment - Instruments:	\$0.00
Recorder:	\$0.00
TOTAL:	\$717.25

M-51:

Pembina River near Entwistle

07BB002

P

Site maintenance. Repair walkway. Repair intake.

Labour: \$979.50

Board: \$199.52

Travel: \$188.35

Material: \$361.17

Contracts: \$0.00

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$1,726.54

M-52:

Teepee Creek near La Crete

07JD004

P

Replace intake.

Labour: \$653.00

Board: \$386.02

Travel: \$160.20

Material: \$136.76

Contracts: \$144.45

Equipment - Instruments: \$0.00

Recorder: \$0.00

TOTAL: \$1,480.43

APPENDIX A

DESCRIPTION OF CONSTRUCTION PRACTICES

MATERIAL AND EQUIPMENT

Well and Shelter Construction

In-Bank Well Installations

Practically all in-bank installations of stilling wells had been, and are being, made with Triple C wood staves, radially milled to the internal and external circumference of the pipe size used. They are interlocked by tongue and groove and the edges of the staves are in full bearing with each other. Commonly used soft wood species are the pines, western and eastern hemlock, and Douglas fir. Any soft wood which meets grading specifications and is suitable for pressure treatment may be used. All staves are pressure-treated in accordance with C.S.A. 080 Specification Group Penatchlorophenol. Standard staves are used (6.5 cm thick) for 1.52m inside diameter wells and steel walk-in shelter. Access to the bottom of the well is by two aluminum ladders, one the full well depth and the other one half the well depth.

Hoops are milled steel, rolled to the correct diameter and dipped in tar or asphalt-base paint to give them long life. Their principal function is to keep the staves in tight bearing with each other. Hoops are placed at 0.61m intervals and tightening is accomplished by a 15.6mm bolt and nut working against the bracket welded to the angle.

Other Wells

A few wells are installed using 45.7cm diameter, 16-gauge corrugated steel pipe (galvanized) with a look-in shelter to house the recorder. These installations are made by strapping the culvert to suitable bridge abutments, piers, or piles.

Stilling Well Inlet System

Inlet systems are 7.6cm steel pipes. Both inlet pipes (7.6cm) are reduced to 5.1cm in the well. The lower inlet (inside the well) is fitted with a four-way flushing system to accommodate a heat tape. In streams where velocity past the pipe could affect stage, the lower inlet is provided with a static tube.

The lower inlet is placed on the stream bed and generally the bottom of the well is excavated 0.3m below the lower inlet. The upper inlet is placed approximately 0.3m above the winter ice level. This pipe is supported before the trench is backfilled to prevent the pipe from sagging.

Box culvert inlets, made of treated fir (50mm x 200mm on top and bottom, and 50mm x 150mm on sides) may be utilized in some cases.

Electrical Contact Gauges

All well installations are now equipped with an electric contact gauge. The gauge consists of a stainless steel tape graduated in 1.0mm increments. Attached to the tape are: A cylindrical weight, a reel for the tape, an electrical power source and a device to indicate when an electrical circuit is complete. There is an index mark provided on the reel mounting. When the weight touches the water surface the electrical circuit is completed producing a deflection of the voltmeter. The tape is then read at the index mark.

Shelters

Metal shelter 1.63m x 2.44m (walk-in type) are erected on concrete foundations for manometer or pressure-type gauge installations. A wooden base can also be utilized. This base is constructed of 0.1016m x 1.63m pressure treated wood exterior framing with 0.1016m and 0.1016m wooden joints set at 0.61m and 1.22m for internal support. The framework is covered with 19mm plywood. The floor is anchored to the ground with wooden and/or angle iron stakes driven into the ground.

Metal shelters, 1.63m x 1.63m x 2.44m are also erected on top of 1.524m diameter stilling wells. The shelters have a plywood floor with access trapdoor to the well. The shelter is supported on a 75mm x 75mm x 6.25mm angle iron frame attached to the well.

Special precautions are now being taken to be sure that the shelters are completely sealed to prevent the entry of mice. This is due to the recent cases of Hantivirus found in Western Canada.

Station Bench Marks

Each station has been supplied with two bench marks but the stations are presently being upgraded to 3 bench marks at each site. Former bench marks consisted of a standard bench mark cap set on a 50mm diameter standard pipe 1.524m in length at riveted to the pipe. The pipe was 20mm in diameter with a 6.25mm steel plate welded to the bottom. A hole approximately 304.8mm square was dug to take the length of the pipe. At ground level a 50mm x 100mm x 0.4064m square frame was built and the hole and square frame was filled with concrete.

Recently bench mark installations have been made utilizing 1.22m lengths of ground rod (19mm diameter) joined by couplings and driven into the ground to refusal. When refusal is attained, the last section of the rod is cut off near ground level and the bench mark cap is fastened to the top.

One bench mark is placed near the shelter while the second and third are separated such that if the area is disturbed by construction, or for other reasons, at least one bench mark will remain intact.

Cableways

Towers and Platforms

All cableways are built to standard plan. A 10.16cm fabricated standard steel galvanized pipe is used for A-Frame construction. All steel is painted International orange and white to Department of Transport specifications. Cablecar access platforms are also provided and are made of 63.5mm x 63.5mm x 6.35mm angle iron, 1.31m wide by 1.64m long, with Armco floor plank (50mm rib) interlock leg, 16-gauge, 35 gram galvanized steel, non-skid surface.

Anchorage's and A-Frame Pedestal

Concrete: 20 Mpa at 28 days, maximum size of aggregate 25mm is specified. Where necessary, sulfate resistant cement is used in the mixture; otherwise normal Portland cement is used. Anchorage deadmen and pedestals are steel-reinforced. Deadmen are not a standard size, but are designed according to span and soil conditions for each cableway. Transit Mix concrete is used for cableways where available; otherwise, it is mixed on the job.

Two lengths of cold, roll steel, bent in the shape of triangles, are embedded in the concrete deadmen for cableway anchorage's. A 3.35m length of 2.54cm diameter steel is used for the main cable anchorage. A 2.13m length of 19mm steel is used for the A-Frame tower, "tie-back" anchorage. If aircraft warning markers are required, another length of 2.13m of 19mm steel is embedded in the concrete for the warning marker cable anchorage.

The A-Frame pedestals are constructed of concrete with 2.54cm diameter redi-rod sat in the concrete to which the tower legs are bolted. The concrete forms are: 45.7cm in diameter and 0.91m in length of A-frame towers 1.83m to 3.05m in height. For A-frame towers 3.66m to 6.1m in height, 61cm diameter sonatube is used.

Wire Rope

19mm diameter main cableway milled plough steel cable, galvanized 6 x 19 construction with fiber core, regular lay 19 501 kg breaking strength.

12.7mm diameter tie-back cable milled plough steel cable, galvanized 6 x 19 construction with fiber core, regular lay 9 070 kg breaking strength.

9.53mm diameter main aircraft warning cable guy cable 6 x 19 construction, grade 110 galvanized 4 898 kg breaking strength

4.76mm diameter tag line cable aircraft control cable, 7 x 19 construction, galvanized or tinned 2 490 kg breaking strength.

Cable Accessories

Turnbuckle 31.75cm diameter x 60.96cm, jaw and eye galvanized drop forged, approximate strength 24 041 kg

Turnbuckle 19mm diameter x 45.72cm, jaw and eye galvanized drop forged, approximate strength 8 165 kg.

Crosby clips - 19mm, 12.7mm, 9.53mm drop forged and galvanized.

Wire rope thimbles - 19mm, 12.7mm, 9.53mm regular pattern galvanized.

Aircraft Warning Markers

Standard extensions are designed for attachment to the 10.16cm pipe A-Frames. 12.7mm or 9.53mm (6 x 19) cable is used, depending upon the span, to carry the cones. The cable is anchored to the deadmen and is provided with a turnbuckle for adjustment.

Various types of cones are used. Fiberglass-molded cones 76.2cm diameter x 76.2cm high, painted orange; also 0.4522m spherical cones constructed in two halves, fabricated or molded fiberglass and painted International orange and white, half-and-half, and both made by commercial firms. Cones 45.7cm in diameter were made by combining polyurethane (Super Second Resin) approximately 1 kg of each by weight, and pouring the liquid in a 150mm diameter latex meteorological air balloon. This mixture will expand the balloon to a half circle, 45.7cm diameter. The two halves are glued together and a 5cm ready rod is put through the center of the cone for hanging the cone to the cable. The cone is painted orange and white, half-and-half. These cones are light and durable.

Cable Cars

Standard Sit-Down

A standard sit-down car with two seats and foot rest is 1.83m x 61cm x 27.9cm. The cable car frame is a rectangle made of 5.1cm x 5.1cm x 6.4mm aluminum angle welded together at the corners. 19mm pressure-treated, plywood is bolted to this frame and the top edge is covered with a galvanized 28 gauge metal channel to keep out moisture. Standard cable car and foot rest hangers are made of 50mm x 4.68mm iron specifically shaped for their purpose.

Sheaves are made of an aluminum alloy, 203cm diameter, cast with a shallow groove to accommodate 19mm cable. The sheaves are equipped with an NSK 6205 DU bearing. The cable car is moved by a hand operated aluminum puller. The interior of the car is painted with an oil-based white paint and the outside is painted with oil-based International orange and white to Department of Transport specifications. All cable cars are now equipped with a removable sheave hanger. This is an aluminum bracket which allows the cable car to be hung from the main cable, while enabling the sheave to be removed.

Cable Car Puller

Adjustable aluminum cable car puller is made to standard plan.

Cable Car Lock and Car Holder

A standard padlock and chain is used to lock the car.

Control Construction

Gabion

Several gabion controls have been installed for stream bed stabilization. In most cases these were a single row of gabions (0.9144m x 0.3048m x 2.443m) filled with rock in place. Erosion may take place below the gabion control, in the center of the stream. This can be overcome by placing two rows of gabions with the lower gabion at the stream bed level to dissipate the energy of the water falling over the upper gabion.

Steel Sheet Piling

Built by driving 4.877m splined steel piling. The piling is trimmed to make a 0.787m head 125 notch weir of angle iron bolted to the piling, or can be cut for desired head and angle of notch. In most cases, log or timber approach sections are installed.

Concrete Controls

Various designs and sizes, with V-notches, H-flumes, San Dimas flumes, broad-crested weirs, etc. have been constructed. Standard plans are used for most projects, with special design for projects when required.

CONSTRUCTION PERSONNEL

Labour

The construction in Alberta was carried out by one field crew consisting of the Facilities Specialist, and a Foreman, plus hydrometric field technologists, as required. Job number M-35 was done by the Saskatchewan Facilities crew but was included in this report.

Supervision

Construction supervision is carried out by a Facilities Specialist..

Equipment

During 1994/95, the construction crew used three vehicles, a 9000 kg GVW truck and a heavy duty pickup, to haul staff, materials and tools to the job sites. A new 1-Ton Tool Truck was acquired late in the season and was used. A 1983 3/4 Ton was used as a welding truck.

Hired Equipment

Backhoes, draglines, ready mix concrete trucks and gravel trucks were hired under service contracts, when required. Helicopters were used in remote areas to transport staff and materials.



Scene's from the River Boat Handling and River Rescue Course held in July 1994 and instructed by the Calgary Fire Department River Rescue Team.





Before (Upper) and After (Lower) photo's of 18' tower replacement at the McLeod River near Whitecourt. The old wooden tower was quite rotten.





Smoky River at Watino- The Instrument shelter was dismantled and 40 yards of fill hauled in and compacted and the shelter re-installed at a higher level.



Platform extension installation at the Swan River near Kinuso.



Scene's during excavating and backfilling the stilling well at the Ponton River above Boyer River
24-Sep-94



3.5 Environmental Assessment

In 1984 the District began formal environmental assessment following "The Environmental Assessment and Review Procedure for Inland Waters Directorate, Western and Northern Region, Work Plan Activities" which implements the Department of Environment's "guideline on Procedures and Environmental Screening of Departmental Projects".

The purpose of the process is to ensure that the environmental effects of federal projects are assessed in relation to possible adverse effects upon the environment. Thirteen criteria, were specified as being conditions where environmental assessment was required.

1. Clearing
2. Top soil removal
3. Culverting
4. Channel dredging
5. Weir construction
6. Rip rap replacement
7. Herbicide usage
8. Stream in fill
9. Chemical preservatives
10. Bank excavation
11. Permafrost disturbance
12. Drainage
13. Drilling and blasting

The following prescreening form lists those locations on the 1994/95 construction program where one or more of these criteria existed. It also notes the areas of potential impact of a project and what mitigative measures and consultations took place before project initiation.

PRESCREENING FORM
 Technical Services
 Facilities Engineering
 Prairie and Northern Region

Alberta District

Manager

Fiscal Year 1994/95

PROJECT DETAILS						CONCLUSION		
Location		Type of work (a)	Schedule			Potential impact (b)	Mitigative Measures (c)	Consultation
River/Lake	Latitude/Longitude		Components	Start	Finish			
Athabasca Rr. at Hinton	53 24 /117 35	2	2	Aug.	Aug.	4		
Castle Rr. at Ranger Station	49 23 /114 20	2	2	Apr.	Apr.	4		
Deep Valley Cr. nr. Hinton	54 23/114 20	2	10	July	July	3	4*	
Gros Ventre Cr. nr. Dunmore	49 53/110 30	2		Apr.	Apr.	4		
Hargraves Diversion	50 01/109 59	2		Oct.	Oct.	4		
Hartley Cr. nr. Fort MacMurray	57 15/111 27	2	10	Oct.	Oct.	3	4*	
Highwood Rr. nr. Aldersyde.	50 41/113 51	2	2	July	July	3	4*	
Joslyn Cr. nr. Ft. McMurray	57 16/111 44	2	2	Oct.	Oct.	3	4*	
Kyiskap Cr. nr. Granum	49 48/113 35	2	10	Oct.	Oct.	3	4*	
Mackay Cr. nr. Grabum Gap	49 44/110 02	2	10	Nov.	Nov.	3	4*	
McLeod Rr./Embarass Rr.	53 28/116 37	2		Aug.	Aug.	4		
Marmot Cr. Main Stem	50 57/115 09	2		May	May	4		
Mooselake Rr. nr. Franchere	54 19/110 57	2		July	July	4		
Oldman Rr. below the Dam	49 33/113 49	2	10	May	May	3		
Peace Rr. at Fort Vermillion	58 23/116 02	2		Sep.	Sep.	3		
Peerless Lake	56 38/114 36	2		Sep.	Sep.	3		
Red Deer Rr. nr. Burnt Timber	51 38/115 01	2	10	Aug.	Aug.	3	2	
Rolph Cr. nr. Kimball	49 07/113 08	2	10	Apr.	Apr.	4	4*	
Sheep Coulee / Carstairs Cr.	51 33/114 02	2	10	Apr.	Apr.	3	4*	
Smoky Rr. at Watino	55 42/117 37	2		Sep.	Sep.	4	2	
S. Sask. Rr. at Highway 41	50 44/110 05	2		Apr.	Apr.	3		
Sturgeon Lake at the Park	55 05/117 33	2		Sep.	Sep.	3		
Sunwapta Rr. at Athabasca Gl.	52 13/117 13	2		Aug.	Aug.	4		

- (a) 1. Research
 2. Maintenance
 3. New Facility

- (b) 1. Ecological
 2. Social
 3. Aesthetic
 4. No Impact

- (c) 1. Design Change
 2. Location Change
 3. Schedule Change
 4. Other

Signed by

[Handwritten Signature]

Date

March 20/94

* Site restoration by replacing topsoil and reseeding grass.

-45-

PRESCREENING FORM
 Technical Services
 Facilities Engineering
 Prairie and Northern Region

Alberta District

Manager

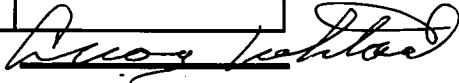
Fiscal Year: 1994/95

PROJECT DETAILS						CONCLUSION		
Location		Type of work (a)	Schedule		Potential impact (b)	Mitigative Measures (c)	Consultation	
River/Lake	Latitude/Longitude		Components	Start				Finish
Unnamed Cr. nr. Fort McMurray	57 39/111 31	2		Oct.	Oct.	3		
Verdigris Coulee nr. the Mouth	49 06/111 45	2		Apr.	Apr.	4		
Wabasca Rr. Bel. Trout River	56 19/113 47	2		Sep.	Sep.	3		
Wainscott Coulee nr. Brownvale	56 01/117 56	2	10	Sep.	Sep.	3	4*	
Whiskeyjack Cr. nr. Hinton	53 22/117 32	2	10	Aug.	Aug.	3	4*	

- (a) 1. Research
- 2. Maintenance
- 3. New Facility

- (b) 1. Ecological
- 2. Social
- 3. Aesthetic
- 4. No Impact

- (c) 1. Design Change
- 2. Location Change
- 3. Schedule Change
- 4. Other

Signed by 
 Date March 20/94

* Site restoration by replacing topsoil and reseeding grass.

APPENDIX B

Two jobs were done at A.E.S Sites during 1994/95 as well as visits to a number of other sites to familiarize the Facilities Team to the sites , which will now be their responsibility to maintain.

1. Highvale Tower Site. The propane tank that had fallen over was braced and stood back up. The fence around the south anchor was repaired and the fence around the east anchor was rebuilt.
Total cost of job. \$1,012.86

2. Stony Plain Upper Air Station. The floor tiles on the second floor were reglued as a lot of them were lose. A sidewalk was framed and poured to allow easier access to the instruments south of the building.
Total cost of job. \$2,966.95

These costs were included in all of the foregoing Tables under the Federal costs.