

**ALBERTA
CONSTRUCTION AND MAINTENANCE
ANNUAL REPORT
1995-96**

**BY L. W. WHITNACK
FACILITIES SPECIALIST
TECHNICAL SERVICES**

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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, 1995 to March 31, 1996.

The contents of this report include a summary of expenditures incurred during 1995/96 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 Environmental Service.

2.0 COST-SHARING ARRANGEMENTS

The 1995/96 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 1995/96 CONSTRUCTION PROGRAM

No new gauging stations were constructed in 1995/96.

In all, maintenance was carried out at 85 W.S.C. Sites and 5 A.E.S. Sites.

This maintenance consisted of the following:

- Removal of 5 stations
- Relocation of 2 stations
- Cableway repairs at 12 stations
- Maintenance at 66 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. There were no power installations done in 1995/96, holding the total power installations at gauging stations in the Alberta District at 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".

TABLE 1

1995/96 CONSTRUCTION PROJECTS AND COSTS

<u>TYPE</u>	<u>NUMBER</u>	<u>DESIGNATION</u>	<u>COST</u>
<u>MAINTENANCE</u>	<u>42</u>	<u>Federal/Provincial</u>	<u>\$99,561.90</u>
	<u>24</u>	<u>Federal</u>	<u>\$18,080.19</u>
	<u>19</u>	<u>Provincial</u>	<u>\$15,881.54</u>
<u>RECORDERS</u>			<u>\$0.00</u>
<u>TOTAL</u>	<u>85</u>		<u>\$133,523.63</u>

FEDERAL MAINTENANCE COSTS		NUMBER	TOTAL	FedShare	ProvShare
M-01	Bear Creek near International Boundary	11AA028	\$ 589.36	\$ 589.36	\$ -
M-02	Beaver River at Cold Lake Reserve	06AD006	\$ 955.21	\$ 955.21	\$ -
M-03	Bow River at Banff	05BB001	\$ 280.13	\$ 280.13	\$ -
M-04	Bow River Development Main Canal	05AC004	\$ 377.75	\$ 377.75	\$ -
M-05	Brewster Creek near Banff	05BB004	\$ 491.50	\$ 491.50	\$ -
M-06	Canadian St. Mary Canal near Spring Coulee	05AE026	\$ 1,550.81	\$ 1,550.81	\$ -
M-07	Cold Lake at Cold Lake	06AF002	\$ 776.05	\$ 776.05	\$ -
M-08	Crowfoot Creek near Cluny	05BM008	\$ 578.42	\$ 578.42	\$ -
M-09	Dry Coulee near Magrath	05AE041	\$ 289.60	\$ 289.60	\$ -
M-10	E.I.D. Main Branch Canal at Bassano Dam	05CJ013	\$ 839.68	\$ 839.68	\$ -
M-11	Expanse Coulee near the Mouth	05AG003	\$ 926.31	\$ 926.31	\$ -
M-12	Hammer Hill Spillway near Gleichen	05BM005	\$ 651.75	\$ 651.75	\$ -
M-13	L.N.I.D. Canal above Oldman Flume	05AB019	\$ 1,645.85	\$ 1,645.85	\$ -
M-14	Little Bow River below Travers Dam	05AC012	\$ 572.36	\$ 572.36	\$ -
M-15	Magrath I.D. Canal near Spring Coulee	05AE021	\$ 1,764.38	\$ 1,764.38	\$ -
M-16	McLeod River near Rosevear	07AG007	\$ 191.34	\$ 191.34	\$ -
M-17	Milk River at Western Crossing of Int'l Boundary	11AA025	\$ 792.05	\$ 792.05	\$ -
M-18	Miners Coulee near International Boundary	11AA029	\$ 589.36	\$ 589.36	\$ -
M-19	North Milk River near International Boundary	11AA001	\$ 1,048.32	\$ 1,048.32	\$ -
M-20	Notikewin River at Manning	07HC001	\$ 1,077.05	\$ 1,077.05	\$ -
M-21	Peerless Lake near Peerless Lake	07JB001	\$ 357.73	\$ 357.73	\$ -
M-22	Ronalane Wasteway near Hays	05BN007	\$ 449.98	\$ 449.98	\$ -
M-23	United Irrigation District Canal near Hill Spring	05AD013	\$ 718.92	\$ 718.92	\$ -
M-24	Wapiti River near Grande Prairie	07GE001	\$ 566.28	\$ 566.28	\$ -
TOTAL FEDERAL MAINTENANCE COST			\$ 18,080.19	\$ 18,080.19	\$ -

FED-PROV. MAINTENANCE COSTS

M-25	Alkali Creek near the Mouth	05CK005	\$ 628.61	\$ 314.31	\$ 314.30
M-26	Atimoswe Creek near Elk Point	05ED002	\$ 598.44	\$ 299.22	\$ 299.22
M-27	Battle River near Ponoka	05FA001	\$ 294.50	\$ 147.25	\$ 147.25
M-28	Belly River near Mountain View	05AD005	\$ 18,245.52	\$ 9,122.76	\$ 9,122.76
M-29	Buffalo Creek at Highway No. 41	05FE002	\$ 1,053.96	\$ 526.98	\$ 526.98
M-30	Castle River at Ranger Station	05AA028	\$ 694.75	\$ 347.37	\$ 347.38
M-31	Chinchaga River near High Level	07OC001	\$ 658.79	\$ 329.40	\$ 329.39
M-32	Clear River near Bear Canyon	07FD009	\$ 883.43	\$ 441.71	\$ 441.72
M-33	Clearwater River at Draper	07CD001	\$ 6,601.94	\$ 3,300.97	\$ 3,300.97
M-34	Freeman River near Fort Assiniboine	07AH001	\$ 718.12	\$ 359.06	\$ 359.06
M-35	Gregoire Lake near Fort McMurray	07CE001	\$ 1,006.63	\$ 503.32	\$ 503.31
M-36	Haynes Creek near Haynes	05CD006	\$ 577.68	\$ 288.84	\$ 288.84
M-37	Hilda Lake near Cold Lake	06AC003	\$ 960.29	\$ 480.15	\$ 480.14
M-38	Iron Creek near Hardisty	05FB002	\$ 1,278.50	\$ 639.25	\$ 639.25
M-39	Jackpine Creek at Wadlin Lake Road	07JD003	\$ 964.60	\$ 482.30	\$ 482.30
M-40	Kleskun Hills Main Drain near Grande Prairie	07GE002	\$ 489.99	\$ 245.00	\$ 244.99
M-41	Lalby Creek near Girouxville	07GJ005	\$ 1,107.86	\$ 553.93	\$ 553.93
M-42	Lee Creek at Cardston	05AE002	\$ 569.73	\$ 284.87	\$ 284.87
M-43	Little Smoky River near Guy	07GH002	\$ 742.86	\$ 371.43	\$ 371.43
M-44	Mackay Creek at Walsh	05AH002	\$ 775.18	\$ 387.59	\$ 387.59
M-45	Mackay River near Fort Mackay	07DB001	\$ 2,585.42	\$ 1,292.71	\$ 1,292.71
M-46	Marmot Creek Main Stem	05BF016	\$ 3,142.42	\$ 1,571.21	\$ 1,571.21
M-47	McLeod River above Embarras River	07AF002	\$ 2,842.54	\$ 1,421.27	\$ 1,421.27
M-48	Medicine River near Eckville	05CC007	\$ 244.60	\$ 122.30	\$ 122.30
M-49	Monitor Creek near Monitor	05GA003	\$ 673.71	\$ 336.86	\$ 336.85
M-50	Oldman River below Oldman Dam	05AA024	\$ 4,899.96	\$ 2,449.98	\$ 2,449.98
M-51	Oldman River near Waldron's Corner	05AA023	\$ 19,839.35	\$ 9,919.67	\$ 9,919.68
M-52	Peace River at Peace River	07HA001	\$ 2,582.55	\$ 1,291.27	\$ 1,291.28

M-53	Pincher Creek at Pincher Creek	05AA004	\$ 3,414.95	\$ 1,707.48	\$ 1,707.47
M-54	Prairie Creek near Rocky Mountain House	05DB002	\$ (26.00)	\$ (13.00)	\$ (13.00)
M-55	Ribstone Creek near Edgerton	05FD001	\$ 6,369.00	\$ 3,184.50	\$ 3,184.50
M-56	Rolph Creek near Kimball	05AE005	\$ 596.86	\$ 298.43	\$ 298.43
M-57	Rosebud River below Carstairs Creek	05CE006	\$ 302.00	\$ 151.00	\$ 151.00
M-58	Simonette River near Goodwin	07GF001	\$ 653.69	\$ 326.85	\$ 326.84
M-59	Sounding Creek near Oyen	05GA008	\$ 764.04	\$ 382.02	\$ 382.02
M-60	Steepbank River near Fort McMurray	07DA006	\$ 7,973.45	\$ 3,986.73	\$ 3,986.72
M-61	Swan River near Swan Hills	07BJ003	\$ 696.35	\$ 348.17	\$ 348.18
M-62	Threehills Creek below Ray Creek	05CE018	\$ 518.17	\$ 259.09	\$ 259.08
M-63	Wandering River near Wandering River	07CA006	\$ 986.77	\$ 493.38	\$ 493.39
M-64	West Arrowwood Creek near Arrowwood	05BM014	\$ 402.93	\$ 201.47	\$ 201.46
M-65	Whitemud River near Dixonville	07HA005	\$ 738.11	\$ 369.05	\$ 369.06
M-66	Wolf Creek at Highway No. 16A	07AG003	\$ 509.65	\$ 254.82	\$ 254.83
TOTAL F/P MAINTENANCE COST			\$ 99,561.90	\$ 49,780.97	\$ 49,780.94

PROV. MAINTENANCE COSTS

M-67	Babette Creek near Colinton	07CA008	\$ 1,113.31	\$ -	\$ 1,113.31
M-68	Berry Creek near the Mouth	05CH007	\$ 839.68	\$ -	\$ 839.68
M-69	Berry Creek Reservoir Outlet	05CH011	\$ 881.10	\$ -	\$ 881.10
M-70	Blood Indian Creek near Cabin Lake	05CK007	\$ 832.68	\$ -	\$ 832.68
M-71	Boyer River near Paddle Prairie	07JF004	\$ 1,755.48	\$ -	\$ 1,755.48
M-72	Embarras River near Weald	07AF014	\$ 374.28	\$ -	\$ 374.28
M-73	Fish Creek above Little Fish Lake	05CG006	\$ 494.18	\$ -	\$ 494.18
M-74	Kyiskap Creek near Granum	05AB038	\$ 1,065.00	\$ -	\$ 1,065.00
M-75	Lomond Lateral near Headgate	05AC017	\$ 1,128.19	\$ -	\$ 1,128.19
M-76	Loyalist Creek near Consort	05GA013	\$ 650.41	\$ -	\$ 650.41
M-77	McGregor Travers Canal near Champion	05AC025	\$ 572.36	\$ -	\$ 572.36
M-78	Monitor Creek near Consort	05GA011	\$ 701.20	\$ -	\$ 701.20
M-79	Pembina River near Entwistle	07BB002	\$ 320.60	\$ -	\$ 320.60
M-80	Pothole Turnout near Magrath	05AE038	\$ 696.81	\$ -	\$ 696.81
M-81	Robert Creek near Anzac	07CE004	\$ 1,038.78	\$ -	\$ 1,038.78
M-82	Sounding Creek near Chinook	05GA012	\$ 629.64	\$ -	\$ 629.64
M-83	Tindastoll Creek near Markerville	05CC012	\$ 575.97	\$ -	\$ 575.97
M-84	Trout Creek near Granum	05AB005	\$ 1,532.21	\$ -	\$ 1,532.21
M-85	Vermilion Park Lake near Vermilion	05EE008	\$ 679.66	\$ -	\$ 679.66
TOTAL PROVINCIAL MAINTENANCE COST			\$ 15,881.54	\$ -	\$ 15,881.54

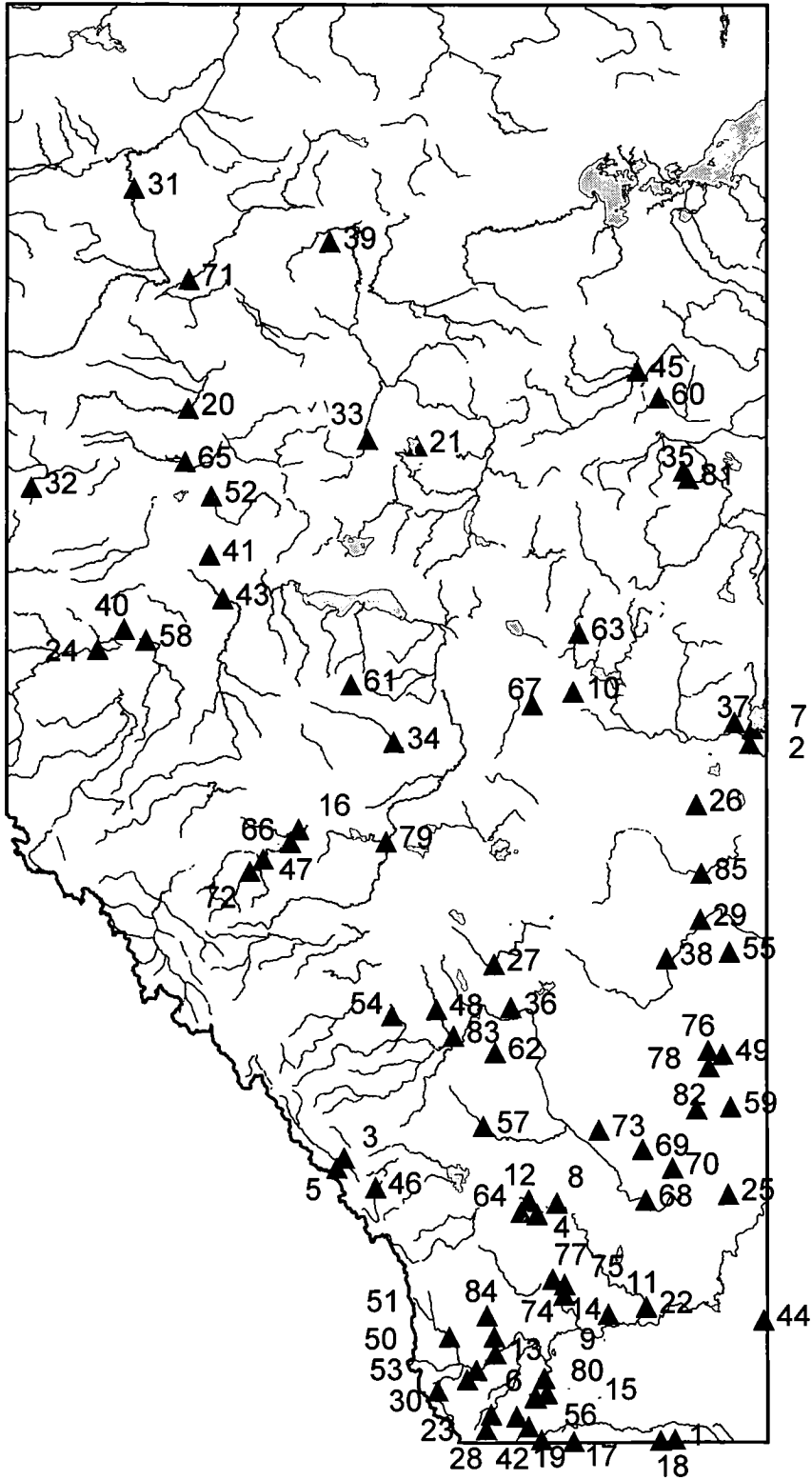
TOTAL COST OF CONSTRUCTION

\$ 133,523.63	\$ 67,861.16	\$ 65,662.48
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NOTE: The following list indicates the flood repairs completed in 1995.
These costs are also included in the report listed above.

M-05	Brewster Creek near Banff	05BB004	\$ 491.50	\$ 491.50	\$ -
M-28	Belly River near Mountain View	05AD005	\$ 18,245.52	\$ 9,122.76	\$ 9,122.76
M-30	Castle River at Ranger Station	05AA028	\$ 694.75	\$ 347.37	\$ 347.38
M-42	Lee Creek at Cardston	05AE002	\$ 569.73	\$ 284.87	\$ 284.87
M-50	Oldman River below Oldman Dam	05AA024	\$ 4,899.96	\$ 2,449.98	\$ 2,449.98
M-51	Oldman River near Waldron's Corner	05AA023	\$ 19,839.35	\$ 9,919.67	\$ 9,919.68
M-53	Pincher Creek at Pincher Creek	05AA004	\$ 3,414.95	\$ 1,707.48	\$ 1,707.47
M-84	Trout Creek near Granum	05AB005	\$ 1,532.21	\$ -	\$ 1,532.21
TOTAL COST OF FLOOD REPAIRS COMPLETED IN 1995			\$ 49,687.97	\$ 24,323.63	\$ 25,364.35

PROJECT LOCATION MAP



4.0 STATION COST BREAKDOWN

4.1 Definitions

The following are definitions and/or lists of items included in this report.

LABOUR

The cost includes salaries for the construction foreman, construction assistant and actual on-site time for the construction supervisor. Salaries of hydrometric staff are not included.

BOARD & ACCOMMODATION

Meals and living accommodation for personnel.

TRAVEL

Road and air travel costs for labour, equipment and materials, or freight costs, of materials and equipment to pick up point.

MATERIALS

Components and supplies used in construction and maintenance of gauging stations (instruments excluded).

CONTRACT SERVICES

All services supplied by outside sources such as aircraft, earth moving, machinery rental, electrical wiring, trucking of gravel, rock and concrete, etc.

INSTRUMENTS

Type A recorder.

SALVAGE MATERIAL

Salvaged material is credited to the station.

4.2 Site Specific Cost Breakdowns

For each gauging station site at which either a new station was established and built, normal maintenance was carried out, or electric power was installed, the cost breakdowns are contained in this section and divided according to designation.

The jobs done by the Saskatchewan crew show a total cost only as the breakdown was not supplied.

M-01: Bear Creek near International Boundary (11AA028) (F3)

Mouse cleanup.

Labour	\$ 388.00
Board	\$ 89.61
Travel	\$ 30.00
Contracts	\$ 0.00
Material	\$ 81.75
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 589.36</u>

M-02: Beaver River at Cold Lake Reserve (06AD006) (F2)

Replaced cable car. Job done by Saskatchewan crew.

Labour	\$ 0.00
Board	\$ 0.00
Travel	\$ 0.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 955.21</u>

M-03: Bow River at Banff (05BB001) (F1)

Straighten tower, add safety loop.

Labour	\$ 22.61
Board	\$ 18.00
Travel	\$ 20.00
Contracts	\$ 0.00
Materials	\$ 19.52
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 280.13</u>

M-04: Bow River Development Main Canal (05AC004) (F2)

Mouse cleanup.

Labour	\$ 265.00
Board	\$ 9.00
Travel	\$ 20.00
Contracts	\$ 0.00
Materials	\$ 83.75
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 377.75</u>

M-05: Brewster Creek near Banff (05BB004) (F1)

Replace wading bridge.

Labour	\$ 397.50
Board	\$ 9.00
Travel	\$ 35.00
Contracts	\$ 0.00
Materials	\$ 50.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 491.50</u>

M-06: Canadian St. Mary Canal near Spring Coulee (05AE026) (F2)

Mouse cleanup, roof repairs, cableway maintenance.

Labour	\$ 842.25
Board	\$ 185.06
Travel	\$ 130.11
Contracts	\$ 0.00
Materials	\$ 393.39
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,550.81</u>

M-10: E.I.D. Main Branch Canal at Bassano Dam (05CJ013) (F2)

Mouse cleanup.

Labour	\$ 582.00
Board	\$ 109.43
Travel	\$ 64.50
Contracts	\$ 0.00
Materials	\$ 83.75
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 839.68</u>

M-11: Expans Coulee near the Mouth (05AG003) (F2)

Mouse cleanup.

Labour	\$ 576.00
Board	\$ 130.43
Travel	\$ 127.13
Contracts	\$ 0.00
Materials	\$ 92.75
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 926.31</u>

M-12: Hammer Hill Spillway near Gleichen (05BM005) (F2)

Mouse cleanup.

Labour	\$ 530.00
Board	\$ 18.00
Travel	\$ 20.00
Contracts	\$ 0.00
Materials	\$ 92.75
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 651.75</u>

M-13: L.N.I.D. Canal above Oldman Flume (05AB019) (F2)

Mouse cleanup. (Aug. 3) Cableway maintenance. (July 27).

Labour	\$1,041.00
Board	\$ 270.71
Travel	\$ 74.50
Contracts	\$ 0.00
Materials	\$ 259.64
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,645.85</u>

M-14: Little Bow River below Travers Dam (05AC012) (F2)

Mouse cleanup.

Labour	\$ 388.00
Board	\$ 89.61
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 69.75
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 572.36</u>

M-15: Magrath I.D. Canal near Spring Coulee (05AE021) (F2)

Remove secondary gauge March 17. Mouse cleanup June 9.

Labour	\$1,164.00
Board	\$ 336.01
Travel	\$ 112.62
Contracts	\$ 0.00
Materials	\$ 151.75
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,764.38</u>

M-19: North Milk River near International Boundary (11AA001) (F3)

Mouse cleanup, cableway maintenance.

Labour	\$ 582.00
Board	\$ 179.22
Travel	\$ 72.00
Contracts	\$ 0.00
Materials	\$ 215.10
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,048.32</u>

M-20: Notikewin River at Manning (07HC001) (F4)

Manufacture and install cableway platform extension.

Labour	\$ 388.00
Board	\$ 275.37
Travel	\$ 63.30
Contracts	\$ 0.00
Materials	\$ 350.38
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,077.05</u>

M-21: Peerless Lake near Peerless Lake (07JB001) (F4)

Station removed (discontinued).

Labour	\$ 530.00
Board	\$ 286.06
Travel	\$ 63.29
Contracts	\$ 0.00
Materials	\$ (521.62)
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 357.73</u>

M-28: Belly River near Mountain View (05AD005) (FP2)

Station rebuild caused by flood of 1995.

Labour	\$2,612.00
Board	\$ 790.13
Travel	\$ 242.00
Contracts	\$ 0.00
Materials	\$2,101.39
Equipment - Inst.	\$10,000.00
TOTAL	<u>\$18,245.52</u>

M-29: Buffalo Creek at Highway No. 41 (05FE002) (FP3)

Constructed rock control. Job done by Saskatchewan crew.

Labour	\$ 0.00
Board	\$ 0.00
Travel	\$ 0.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,053.96</u>

M-30: Castle River at Ranger Station (05AA028) (FP3)

Site maintenance and flood inspection.

Labour	\$ 489.75
Board	\$ 150.00
Travel	\$ 55.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 694.75</u>

M-34: Freeman River near Fort Assiniboine (07AH001) (FP3)

Mouse cleanup.

Labour	\$ 326.50
Board	\$ 256.19
Travel	\$ 63.30
Contracts	\$ 0.00
Materials	\$ 72.13
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 718.12</u>

M-35: Gregoire Lake near Fort McMurray (07CE001) (FP1)

Site maintenance.

Labour	\$ 653.00
Board	\$ 252.88
Travel	\$ 72.75
Contracts	\$ 0.00
Materials	\$ 28.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,006.63</u>

M-36: Haynes Creek near Haynes (05CD006) (FP3)

Mouse cleanup.

Labour	\$ 381.62
Board	\$ 106.31
Travel	\$ 30.00
Contracts	\$ 0.00
Materials	\$ 59.75
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 577.68</u>

M-37: Hilda Lake near Cold Lake (06AC003) (FP2)

Installed new B.M. Job done by Saskatchewan crew.

Labour	\$ 0.00
Board	\$ 0.00
Travel	\$ 0.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 960.29</u>

M-38: Iron Creek near Hardisty (05FB002) (FP3)

Installed new metal steps and platform. Job done Saskatchewan crew.

Labour	\$ 0.00
Board	\$ 0.00
Travel	\$ 0.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,278.50</u>

M-39: Jackpine Creek at Wadlin Lake Road (07JD003) (FP3)

Manufacture and install platform extension. Manufacture and install front steps.

Labour	\$ 388.00
Board	\$ 162.92
Travel	\$ 63.30
Contracts	\$ 0.00
Materials	\$ 350.38
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 964.60</u>

M-40: Kleskun Hills Main Drain near Grande Prairie (07GE002) (FP2)

Repair plumbing and heat tape.

Labour	\$ 132.50
Board	\$ 228.19
Travel	\$ 63.30
Contracts	\$ 0.00
Materials	\$ 66.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 489.99</u>

M-41: Lalby Creek near Girouxville (07GJ005) (FP3)

Install gabion control.

Labour	\$ 653.00
Board	\$ 256.19
Travel	\$ 63.29
Contracts	\$ 0.00
Materials	\$ 135.38
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,107.86</u>

M-42: Lee Creek at Cardston (05AE002) (FP2)

Excavate lower intake.

Labour	\$ 388.00
Board	\$ 60.85
Travel	\$ 32.60
Contracts	\$ 88.28
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 569.73</u>

M-52: Peace River at Peace River (07HA001) (FP2)

Sep. 23 - Remove sediment box. Sep26 & 27 - Install used brytex shelter near old gauge.

Labour	\$1,306.00
Board	\$ 256.19
Travel	\$ 63.29
Contracts	\$ 0.00
Materials	\$ 957.07
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$2,582.55</u>

M-53: Pincher Creek at Pincher Creek (05AA004) (FP3)

Desilt well. Paint interior. Dig out intakes. R & R gabions. (17-Aug-95) Lower bottom intake. (18-Oct-95)

Labour	\$1,836.00
Board	\$ 781.76
Travel	\$ 95.00
Contracts	\$ 417.50
Materials	\$ 284.69
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$3,414.95</u>

M-54: Prairie Creek near Rocky Mountain House (05DB002) (FP3)

Remove cableway.

Labour	\$ 397.50
Board	\$ 83.50
Travel	\$ 27.00
Contracts	\$ 0.00
Materials	\$(534.00)
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 26.00</u>

M-55: Ribstone Creek near Edgerton (05FD001) (FP3)

Manufacture and install measuring bridge. Job done by Saskatchewan crew.

Labour	\$ 0.00
Board	\$ 0.00
Travel	\$ 0.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$6,369.00</u>

M-56: Rolph Creek near Kimball (05AE005) (FP2)

Mouse cleanup.

Labour	\$ 388.00
Board	\$ 89.61
Travel	\$ 47.50
Contracts	\$ 0.00
Materials	\$ 71.75
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 596.86</u>

M-57: Rosebud River below Carstairs Creek (05CE006) (FP3)

Mouse cleanup.

Labour	\$ 265.00
Board	\$ 9.00
Travel	\$ 20.00
Contracts	\$ 0.00
Materials	\$ 8.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 302.00</u>

M-64: West Arrowwood Creek near Arrowwood (05BM014) (FP3)

Mouse cleanup.

Labour	\$ 265.00
Board	\$ 82.43
Travel	\$ 20.00
Contracts	\$ 0.00
Materials	\$ 35.50
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 402.93</u>

M-65: Whitemud River near Dixonville (07HA005) (FP3)

Mouse cleanup.

Labour	\$ 326.50
Board	\$ 265.19
Travel	\$ 63.29
Contracts	\$ 0.00
Materials	\$ 92.13
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 738.11</u>

M-66: Wolf Creek at Highway No. 16A (07AG003) (FP3)

Cableway maintenance and inspection.

Labour	\$ 388.00
Board	\$ 96.65
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 509.65</u>

M-67: Babette Creek near Colinton (07CA008) (P1)

Remove gauge. (bridge construction)

Labour	\$ 882.00
Board	\$ 128.43
Travel	\$ 102.88
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,113.31</u>

M-68: Berry Creek near the Mouth (05CH007) (P1)

Mouse cleanup. Fence repairs.

Labour	\$ 530.00
Board	\$ 197.74
Travel	\$ 21.30
Contracts	\$ 0.00
Materials	\$ 90.64
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 839.68</u>

M-69: Berry Creek Reservoir Outlet (05CH011) (P1)

Mouse cleanup, replace roof.

Labour	\$ 397.50
Board	\$ 109.35
Travel	\$ 45.00
Contracts	\$ 0.00
Materials	\$ 329.25
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 881.10</u>

M-73: Fish Creek above Little Fish Lake (05CG006) (P1)

Mouse cleanup.

Labour	\$ 265.00
Board	\$ 103.35
Travel	\$ 46.58
Contracts	\$ 0.00
Materials	\$ 79.25
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 494.18</u>

M-74: Kyiskap Creek near Granum (05AB038) (P1)

Remove station (discontinued).

Labour	\$1,306.00
Board	\$ 109.75
Travel	\$ 80.00
Contracts	\$ 107.00
Materials	\$(537.50)
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,065.00</u>

M-75: Lomond Lateral near Headgate (05AC017) (P1)

Mouse cleanup.

Labour	\$ 776.00
Board	\$ 179.22
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 147.97
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,128.19</u>

M-76: Loyalist Creek near Consort (05GA013) (P1)

Mouse cleanup.

Labour	\$ 441.67
Board	\$ 92.97
Travel	\$ 46.02
Contracts	\$ 0.00
Materials	\$ 69.75
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 650.41</u>

M-77: McGregor Travers Canal near Champion (05AC025) (P1)

Mouse cleanup.

Labour	\$ 388.00
Board	\$ 89.61
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 69.75
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 572.36</u>

M-78: Monitor Creek near Consort (05GA011) (P1)

Labour	\$ 397.50
Board	\$ 177.90
Travel	\$ 46.55
Contracts	\$ 0.00
Materials	\$ 79.25
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 701.20</u>

M-79: Pembina River near Entwistle (07BB002) (P1)

Cableway maintenance and inspection.

Labour	\$ 265.00
Board	\$ 17.60
Travel	\$ 38.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 320.60</u>

M-80: Pothole Turnout near Magrath (05AE038) (P1)

Mouse cleanup.

Labour	\$ 388.00
Board	\$ 123.25
Travel	\$ 43.81
Contracts	\$ 0.00
Materials	\$ 141.75
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 696.81</u>

M-81: Robert Creek near Anzac (07CE004) (P1)

Mouse cleanup.

Labour	\$ 653.00
Board	\$ 261.48
Travel	\$ 73.05
Contracts	\$ 0.00
Materials	\$ 51.25
Equipment - Inst.	<u>\$1,038.78</u>

M-85: Vermilion Park Lake near Vermilion (05EE008) (P1)

Mouse cleanup. Job done by Saskatchewan crew.

Labour	\$ 0.00
Board	\$ 0.00
Travel	\$ 0.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 679.66</u>

APPENDIX A

DESCRIPTION OF CONSTRUCTION PRACTICES

MATERIAL AND EQUIPMENT

Well and Shelter Construction

In-Bank Well Installations (no in-bank well installations during 1995/96)

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 1mm increments. Attached to the tape are; A cylindrical weight, a reel for the tape, an electrical power source and a device to indicate when a 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 a wooden base for manometer or pressure-type gauge installations. 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 galvanized iron stakes driven into the ground. A concrete foundation can also be utilized.

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 Hantavirus 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 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 the A-Frame tower's 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 (all should conform to specifications of Crosby or better)

Turnbuckle - various sizes are used depending on cable size and length.

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 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 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 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 (0.9244m 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. Jobs numbered M-02, M-07, M-26, M-29, M-37, M-38, M-55, and M-85 were done by the Saskatchewan Facilities crew but were included in this report, as they were done in Alberta.

Supervision

Construction supervision is carried out by a Facilities Specialist.

Equipment

During 1995/96, the construction crew used three vehicles, a 9000kg GVW truck and a heavy duty pickup, to haul staff, materials and tools to the job sites. A 1-ton tool truck was used.

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.



**HELICOPTER BRINGING MORE CEMENT AT STEEPBANK RIVER NEAR
FORT McMURRAY
10-MAY-95**





CALGARY AWOS SP2 INSTRUMENT PLATFORM
31-AUGUST-95





**CABLEWAY PLATFORM EXTENDED AT NOTIKEWAN RIVER
AT MANNING
22-SEPTEMBER-95**

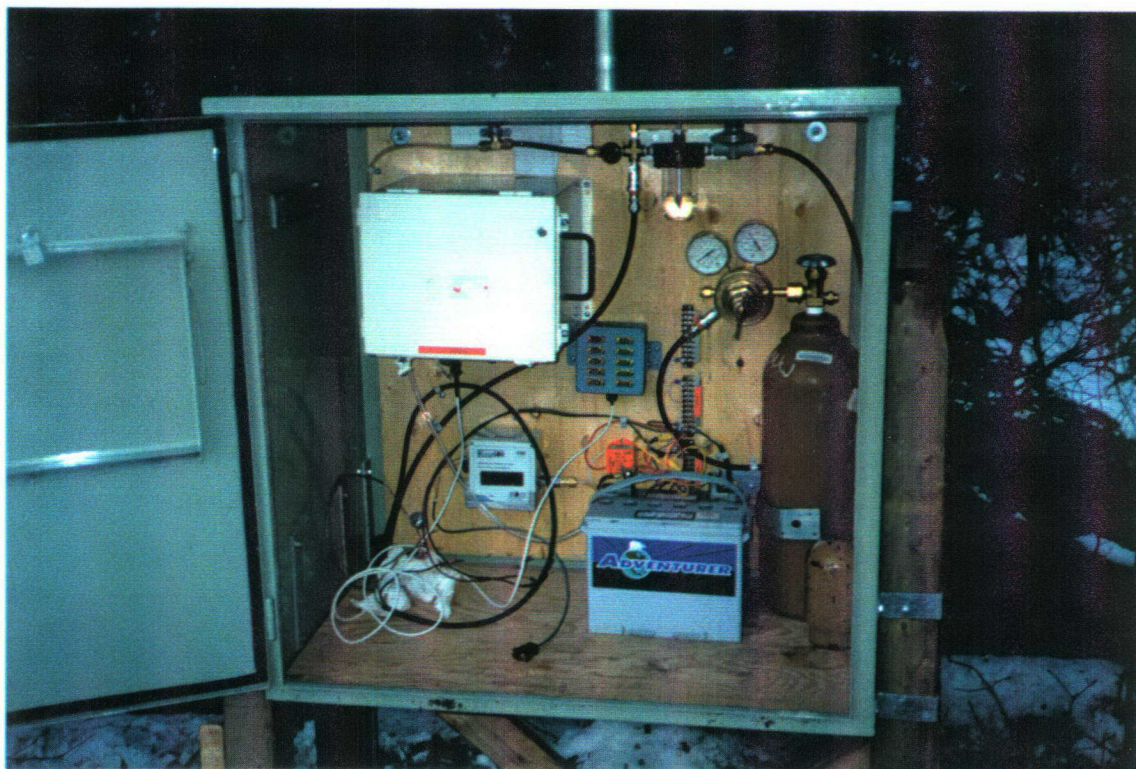
**TYPICAL SITE SHOWING CABLEWAY TOWER AND INSTRUMENT
SHELTER
JACKPINE CREEK AT WADLIN LAKE ROAD
21-SEPTEMBER-95**





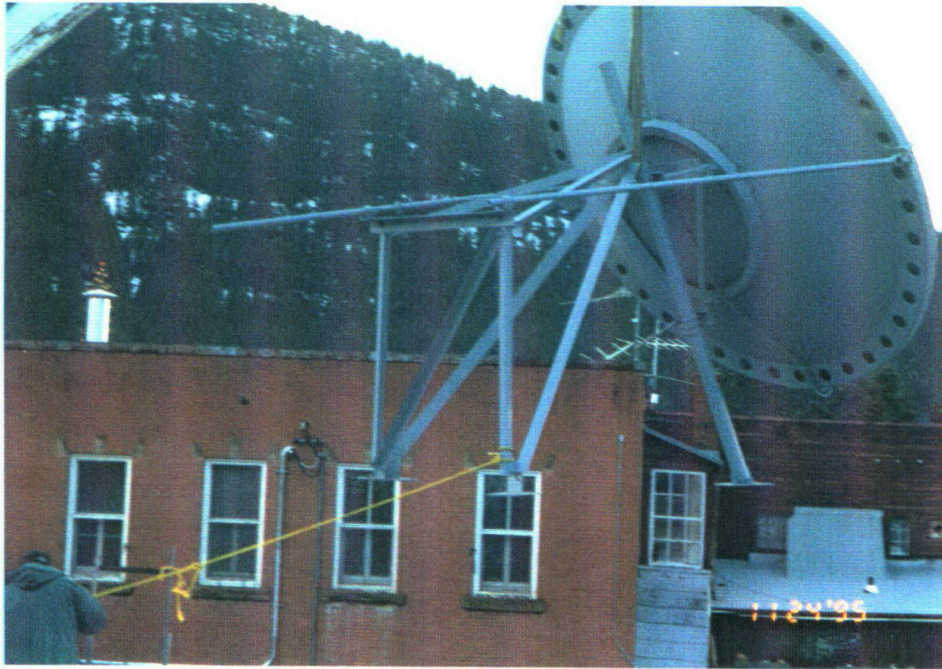
STONY PLAIN RADOME REMOVAL
17-OCTOBER-95





HEALY CREEK NEAR SUNSHINE
16-NOVEMBER-95





BANFF POST OFFICE SATELLITE DISH REMOVAL
24-NOVEMBER-95



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 is 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

The following prescreening form lists those locations on the 1995/96 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.

APPENDIX B

These costs were not included in any of the above tables.

Five sites were worked on during 1995/96.

SITE	DATE	COST	WORK DONE
Banff AWOS	24-Nov-95	\$ 1996.50	Remove satellite dish from post office and transport to AWOS.
Calgary Airport AWOS	31-Aug-95	\$2709.10	Construct instrument platform at SP2.
Carvel Radar Site	13-Jul-95	\$5677.97	Install new A/C. Repair road. Cut grass. Remove garbage.
Stony Plain UAS	26-Oct-95	\$21,645.72	Remove Radome, etc.
Vulcan Radar Site	16-Jun-95	\$7,754.25	Install heat, cool unit. Cut and spray weeds.
	<u>TOTAL</u>	<u>\$39,783.54</u>	

These costs are all inclusive and include labour costs.