

**ALBERTA
CONSTRUCTION AND MAINTENANCE
ANNUAL REPORT
1998-99**

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1.0 INTRODUCTION

The Alberta District, Water Survey of Canada Division since 1949, has prepared annual gauging station construction reports. These reports contain financial and construction details for all projects. This report is for the fiscal year April 1, 1998 to March 31, 1999.

The contents of this report include a summary of expenditures incurred during 1998/99 for new station construction, for normal maintenance, for removal or relocation, for electrical power installations, and for fall restraint installs.

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.

Appendix B contains project photographs.

2.0 COST-SHARING ARRANGEMENTS

The 1998/99 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 travels 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 the party or parties requiring the service pay for instrumentation.

3.0 THE 1998/99 CONSTRUCTION PROGRAM

3 new stations were built for the Pine Coulee project.

In all, maintenance was carried out at 56 W.S.C. Sites.

This maintenance consisted of the following:

- Removal of 7 stations
- Relocation of 1 stations
- Cableway repairs at 14 stations
- Maintenance at 27 sites
- Fall restraint was installed at 3 stations
- 3 new stations were built
- 1 power installation was done

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 was 1 power installation done in 1998/99, bringing the total power installations at gauging stations in the Alberta District at 140 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. Bracketed figures are negative costs because of the return of salvageable materials to the warehouse, to be used again (salvaged material less construction costs).

TABLE 1

1998/99 CONSTRUCTION PROJECTS AND COSTS

<u>TYPE</u>	<u>NUMBER</u>	<u>DESIGNATION</u>	<u>COST</u>
<u>MAINTENANCE</u>	<u>26</u>	<u>Federal/Provincial</u>	<u>\$40,627.42</u>
	<u>11</u>	<u>Federal</u>	<u>\$33,680.80</u>
	<u>19</u>	<u>Provincial</u>	<u>\$29,786.03</u>
<u>RECORDERS</u>			<u>\$0.00</u>
<u>TOTAL</u>	<u>56</u>		<u>\$104,094.25</u>

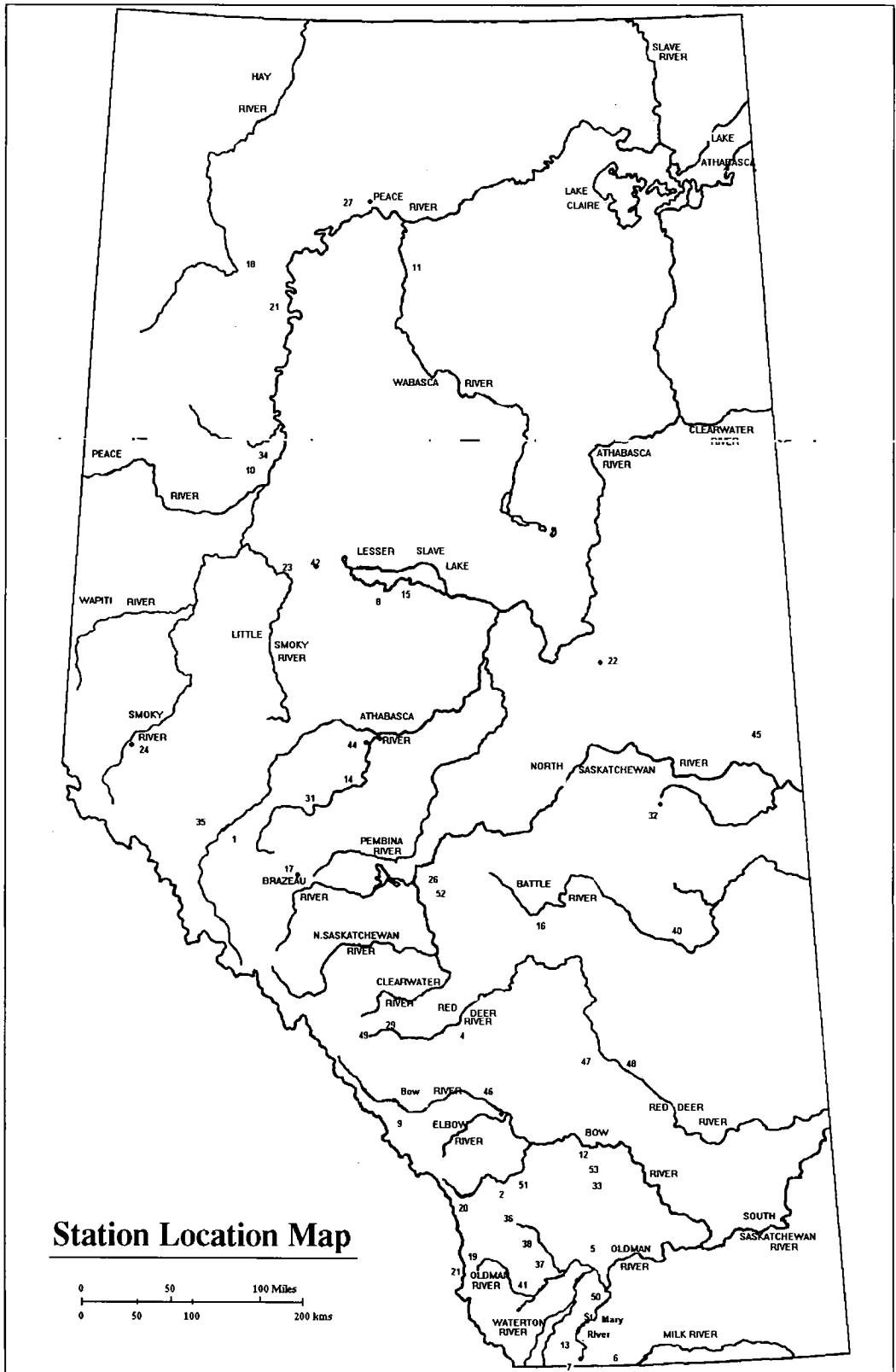
FEDERAL MAINTENANCE COSTS		NUMBER	TOTAL	Fed Share	Prov Share
M-01	Fiddle River above Morris Creek	07AA010	\$1,336.64	\$1,336.64	\$0.00
M-02	Gleniffer Reservoir near Dickson	05CB006	\$686.50	\$686.50	\$0.00
M-03	Lesser Slave Lake at Faust	07BJ002	\$171.03	\$171.03	\$0.00
M-04	Little Bow River at Carmangay	05AC003	\$290.40	\$290.40	\$0.00
M-05	Marmot Creek Main Stem	05BF016	\$643.60	\$643.60	\$0.00
M-06	North Milk River near International Boundary	11AA001	\$2,085.98	\$2,085.98	\$0.00
M-07	Peace River at Peace River	07HA001	\$1,369.54	\$1,369.54	\$0.00
M-08	Pekisko Creek near Longview	05BL023	\$785.00	\$785.00	\$0.00
M-09	St. Mary River at International Boundary	05AE027	\$24,313.63	\$24,313.63	\$0.00
M-10	Wabasca River at Wadlin Lake Road	07JD002	\$1,349.18	\$1,349.18	\$0.00
M-11	Whirlpool River near the Mouth	07AA009	\$649.30	\$649.30	\$0.00
TOTAL FEDERAL MAINTENANCE COSTS			\$33,680.80	\$33,680.80	\$0.00

FED/PROV MAINTENANCE COSTS					
M-12	Adams Creek near Kinuso	07BJ004	\$157.59	\$78.80	\$78.80
M-13	Battle River near Ponoka	05FA001	\$537.83	\$268.92	\$268.92
M-14	Bow River below Carseland Dam	05BM002	\$1,702.71	\$851.36	\$851.36
M-15	Brazeau River below Cardinal River	05DD007	\$1,307.50	\$653.75	\$653.75
M-16	Chinchaga River near High Level	07OC001	\$855.26	\$427.63	\$427.63
M-17	Dutch Creek near the Mouth	05AA026	\$890.00	\$445.00	\$445.00
M-18	Highwood River at Diebel's Ranch	05BL019	\$2,220.22	\$1,110.11	\$1,110.11
M-19	Keg River at Highway No. 35	07HF002	\$1,137.52	\$568.76	\$568.76
M-20	Lac La Biche at Lac La Biche	07CA004	\$494.00	\$247.00	\$247.00
M-21	Lee Creek at Cardston	05AE002	\$699.30	\$349.65	\$349.65
M-22	Little Smoky River at Little Smoky	07GG002	\$576.09	\$288.05	\$288.05
M-23	McLeod River near Rosevear	07AG007	\$570.76	\$285.38	\$285.38
M-24	Muskeg River near Grande Cache	07GA002	\$13,927.35	\$6,963.68	\$6,963.68
M-25	North Ram River at Forestry Road	05DC011	\$1,682.59	\$841.30	\$841.30
M-26	Pigeon Lake Creek near Usona	05FA019	\$1,224.26	\$612.13	\$612.13
M-27	Ponton River above Boyer River	07JF003	\$973.36	\$486.68	\$486.68
M-28	Racehorse Creek near the Mouth	05AA027	\$975.01	\$487.51	\$487.51
M-29	Red Deer River below Burnt Timber Creek	05CA009	\$4,473.24	\$2,236.62	\$2,236.62
M-30	Siffleur River near the Mouth	05DA002	\$621.26	\$310.63	\$310.63
M-31	Sundance Creek near Bickerdike	07AF010	\$770.06	\$385.03	\$385.03
M-32	Vermilion River Tributary near Bruce	05EE006	\$1,193.30	\$596.65	\$596.65
M-33	West Arrowwood Creek near Ensign	05BM018	\$267.35	\$133.68	\$133.68
M-34	Whitemud River near Dixonville	07HA005	\$608.45	\$304.23	\$304.23
M-35	Wildhay River near Hinton	07AC001	\$1,774.96	\$887.48	\$887.48
M-36	Willow Creek at Sec. Highway532	05AB040	\$353.50	\$176.75	\$176.75
M-37	Willow Creek near Nolan	05AB002	\$633.95	\$316.98	\$316.98
TOTAL FED/PROV MAINTENANCE COSTS			\$40,627.42	\$20,313.71	\$20,313.71

PROVINCIAL MAINTENANCE COSTS

M-38	Baptiste River near the Mouth	05DC012	\$409.85	\$0.00	\$409.85
M-39	Battle River near Forestburg	05FC001	\$550.00	\$0.00	\$550.00
M-40	Beaver Creek near Brocket	05AB013	\$1,828.86	\$0.00	\$1,828.86
M-41	East Prairie River near Enilda	07BF001	\$595.09	\$0.00	\$595.09
M-42	Erith River below Hanlan Creek	07AF016	\$178.15	\$0.00	\$178.15
M-43	Groat Creek near Whitecourt	07AG008	\$1,669.66	\$0.00	\$1,669.66
M-44	Hilda Lake near Cold Lake	06AC003	\$2,895.57	\$0.00	\$2,895.57
M-45	Jumpingpound Creek near the Mouth	05BH009	\$209.16	\$0.00	\$209.16
M-46	Kneehills Creek near Drumheller	05CE002	\$3,915.21	\$0.00	\$3,915.21
M-47	Michichi Creek at Drumheller	05CE020	\$1,043.57	\$0.00	\$1,043.57
M-48	Pine Coulee Site # 1	05AB042	\$713.30	\$0.00	\$713.30
M-49	Pine Coulee Site #2 (AFFRA)	05AB043	\$2,860.64	\$0.00	\$2,860.64
M-50	Pine Coulee Site #4 (Outlet Canal)	05AB045	\$2,931.05	\$0.00	\$2,931.05
M-51	Red Deer River above Panther River	05CA004	\$808.13	\$0.00	\$808.13
M-52	St. Mary River near Lethbridge	05AE006	\$4,331.64	\$0.00	\$4,331.64
M-53	Stimson Creek near Pekisko	05BL007	\$1,059.00	\$0.00	\$1,059.00
M-54	Weiller Creek near Wetskiwin	05FA024	\$2,714.42	\$0.00	\$2,714.42
M-55	West Arrowwood Creek near Arrowwood	05BM014	\$779.30	\$0.00	\$779.30
M-56	Willow Creek at Oxley Ranch	05AB041	\$293.43	\$0.00	\$293.43
TOTAL PROVINCIAL MAINTENANCE COSTS			\$29,786.03	\$0.00	\$29,786.03

TOTAL COST OF WSC MAINTENANCE		\$104,094.25	\$53,994.51	\$50,099.74
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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.

M-01: Fiddle River above Morris Creek (07AA010) (F1)

Removed cableway from old discontinued site.

Labour	\$ 830.00
Board	\$ 420.12
Travel	\$ 85.65
Contracts	\$ 0.00
Material	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,336.64</u>

M-02: Gleniffer Reservoir near Dickson (05CB006) (F2)

Installed 3 brass cap, ground rod Bench marks.

Labour	\$ 282.50
Board	\$ 150.00
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 229.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 686.50</u>

M-03: Lesser Slave Lake at Faust (07BJ002) (F4)

Removed metal shelter from discontinued site and shipped to Calgary.

Labour	\$ 365.00
Board	\$ 216.78
Travel	\$ 26.75
Contracts	\$ 100.00
Materials	\$ (537.50)
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 171.03</u>

M-04: Little Bow River at Carmangay (05AC003) (F2)

Mouse cleanup and install flashing around shelter base.

Labour	\$ 182.50
Board	\$ 32.90
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 50.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 290.40</u>

M-05: Marmot Creek Main Stem (05BF016) (F4)

Cleaned gravel and debris from behind weir.

Labour	\$ 565.00
Board	\$ 38.60
Travel	\$ 40.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 643.60</u>

M-06: North Milk River near International Boundary (11AA001) (F3)

Rebuilt fences around R.B. tower and L.B. deadman. Installed new IWRC main cable. Repainted R.B. tower.

Labour	\$ 930.00
Board	\$ 400.00
Travel	\$ 50.00
Contracts	\$ 0.00
Materials	\$ 705.98
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$2,085.98</u>

M-07: Peace River at Peace River (07HA001) (F4)

Removed and disposed of old mercury contaminated shelter. Insulated new shelter with Styrofoam.

Labour	\$ 730.00
Board	\$ 400.00
Travel	\$ 26.75
Contracts	\$ 0.00
Materials	\$ 212.79
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 1,369.54</u>

M-08: Pekisko Creek near Longview (05BL023) (F1)

Installed new cablecar.

Labour	\$ 465.00
Board	\$ 45.00
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 250.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 785.00</u>

M-09: St.Mary River at International Boundary (05AE027) (F3)

Rebuild cableway by removing old wooden 20' tower and replacing with galvanized metal tower, new right bank deadman, and 180m of 7/8" galvanized cable. Also installed used Brytex shelter on left bank approx. 2 km downstream of cableway.

Labour	\$ 7,435.00
Board	\$ 3,300.00
Travel	\$ 253.50
Contracts	\$10,132.39
Materials	\$ 3,192.74
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$24,313.63</u>

M-10: Wabasca River at Wadlin Lake Road (07JD002) (F4)

Picked up 40' used tapered tower at Carvel and transported to Wabasca River site where a 3' cement anchor block was dug, poured and tower erected on day 2.

Labour	\$ 697.50
Board	\$ 464.52
Travel	\$ 83.00
Contracts	\$ 0.00
Materials	\$ 104.16
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,349.18</u>

M-11: Whirlpool River near the Mouth (07AA002) (F1)

Removed cablecar and main cable and returned to Calgary warehouse.

Labour	\$ 365.00
Board	\$ 249.30
Travel	\$ 35.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 649.30</u>

M-12: Adams Creek near Kinuso (07BJ004) (FP3)

Removed metal shelter from discontinued site and shipped to Calgary Warehouse.

Labour	\$ 365.00
Board	\$ 203.34
Travel	\$ 26.75
Contracts	\$ 100.00
Materials	\$(537.50)
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 157.59</u>

M-13: Battle River near Ponoka (05FA001) (FP3)

Intakes out of water at lower stages. Installed water level sensor in lower intake.

Labour	\$ 265.00
Board	\$ 145.33
Travel	\$ 0.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 410.33</u>

M-14: Bow River below Carseland Dam (05BM002) (FP2)

Repair fence around cableway tower and deadman. (10/Aug/98) Spliced in 2nd 1" cable unto main cable to tie in all deadmen. (1/Oct/98) Cleared mega trees and brush from around deadmen and tower on R.B. (1/Oct/98)

Labour	\$ 730.00
Board	\$ 36.60
Travel	\$ 30.00
Contracts	\$ 0.00
Materials	\$ 906.11
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,702.71</u>

M-15: Brazeau River below Cardinal River (05DD007) (FP3)

Divert run off channel away from cableway. (27/Aug/98)

Labour	\$ 730.00
Board	\$ 450.00
Travel	\$ 127.50
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,307.50</u>

M-16: Chinchaga River near High Level (07OC001) (FP3)

Mouse cleanup. Found door sill rotten allowing mice to enter under door.
Replaced door sill. Installed weather stripping around door.

Labour	\$ 465.00
Board	\$ 232.26
Travel	\$ 0.00
Contracts	\$ 0.00
Materials	\$ 25.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 855.26</u>

M-17: Dutch Creek near the Mouth (05AA026) (FP3)

Dropped main cable and coiled up on left bank deadman. Removed equipment from shelter as above and screwed floor and doors shut. Removed and disposed of rotten cablecar.

Labour	\$ 565.00
Board	\$ 300.00
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 890.00</u>

M-18: Highwood River at Diebel's Ranch (05BL019) (FP3)

Installed new 7/8" x 60 meter main cable. Installed new 1/2" A/C cable, and 3 cones. Installed new cablecar complete.

Labour	\$ 697.50
Board	\$ 38.00
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$1,459.72
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$2,220.22</u>

M-19: Keg River at Highway No. 35 (07HF002) (FP3)

Desilted well. Cut bush around well and found large 2 meter deep drainage holes around well. Hired bobcat and operator to backfill these holes.

Labour	\$ 465.00
Board	\$ 232.26
Travel	\$ 83.00
Contracts	\$ 219.35
Materials	\$ 137.91
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,137.52</u>

M-20: Lac La Biche at Lac La Biche (07CA004) (FP3)

Supplied and installed 60 Amp. Overhead service. Installed 2 duplex receptacles and 1 lamp holder inside building.

Labour	\$ 0.00
Board	\$ 0.00
Travel	\$ 0.00
Contracts	\$ 494.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 494.00</u>

M-21: Lee Creek at Cardston (05AE002) (FP2)

Reset lower intake pipe extension.

Labour	\$ 630.00
Board	\$ 19.30
Travel	\$ 50.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 699.30</u>

M-22: Little Smoky River at Little Smoky (07GG002) (FP3)

Removed and reinstalled clamps on main cable. Had been installed wrong.

Labour	\$ 365.00
Board	\$ 184.34
Travel	\$ 26.75
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 576.09</u>

M-23: McLeod River near Rosevear (07AG007) (FP2)

Installed left bank tie back cable which had been removed by vandals.

Labour	\$ 365.00
Board	\$ 100.00
Travel	\$ 50.00
Contracts	\$ 0.00
Materials	\$ 55.76
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 570.76</u>

M-24: Muskeg River near Grande Cache (07GA002) (FP3)

Constructed new 70 meter cableway with 2 - 12' towers. Installed 18" x 10' plastic well housed in Brytex shelter and 20' x 2" intake pipe. Removed and disposed of old 12' tower which had fallen into river at old cableway site.

Labour	\$ 4,565.00
Board	\$ 2,346.00
Travel	\$ 163.00
Contracts	\$ 2,385.00
Materials	\$ 4,468.35
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$13,927.35</u>

M-25: North Ram River at Forestry Road (05DC011) (FP3)

Installed new tower pedestals on left bank. Repainted orange on both towers.
Added clamps to main cable and tie backs. Straightened both towers to vertical.

Labour	\$ 730.00
Board	\$ 450.00
Travel	\$ 133.25
Contracts	\$ 0.00
Materials	\$ 369.34
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,682.59</u>

M-26: Pigeon Lake Creek near Usona (05FA019) (FP3)

Removed shelter and gave to land owner. Cut off and backfilled well.

Labour	\$ 730.00
Board	\$ 282.76
Travel	\$ 41.00
Contracts	\$ 160.50
Materials	\$ 10.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,224.26</u>

M-27: Ponton River above Boyer River (07JF003) (FP3)

Insulated shelter and added 2" vents to try to stop moisture build up.

Labour	\$ 465.00
Board	\$ 232.26
Travel	\$ 83.00
Contracts	\$ 0.00
Materials	\$ 193.10
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 973.36</u>

M-28: Racehorse Creek near the Mouth (05AA027) (FP3)

Fabricated and installed new cablecar. Rip rap in front of shelter. Repositioned and cut off upper intake.

Labour	\$ 565.00
Board	\$ 300.00
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 85.01
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 975.01</u>

M-29: Red Deer River below Burnt Timber Creek (05CA009) (FP3)

Installed cantilever gauge. Installed 2 new Aircraft marker cones. Installed new cablecar and lock.

Labour	\$2,390.00
Board	\$ 975.60
Travel	\$ 203.50
Contracts	\$ 0.00
Materials	\$ 904.14
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$4,473.24</u>

M-30: Siffleur River near the Mouth (05DA002) (FP3)

Removed cablecar and main cable and secured to tree.

Labour	\$ 365.00
Board	\$ 221.26
Travel	\$ 35.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 621.26</u>

M-31: Sundance Creek near Bickerdike (07AF010) (FP3)

Repaired and replaced plumbing as required. Powerflushed intakes and desilted well.

Labour	\$ 465.00
Board	\$ 210.06
Travel	\$ 15.00
Contracts	\$ 0.00
Materials	\$ 80.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 770.06</u>

M-32: Vermilion river Tributary near Bruce (05EE006) (FP3)

Installed fall restraint assembly.

Labour	\$ 365.00
Board	\$ 179.86
Travel	\$ 44.94
Contracts	\$ 53.50
Materials	\$ 550.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,193.30</u>

M-33: West Arrowwood Creek near Ensign (05BM018) (FP3)

Mouse cleanup.

Labour	\$ 182.50
Board	\$ 9.85
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 50.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 267.35</u>

M-34: Whitemud River near Dixonville (07HA005) (FP3)

Retamped tower pedestals and installed shims to prevent towers from rocking.

Labour	\$ 365.00
Board	\$ 216.70
Travel	\$ 26.75
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 608.45</u>

M-35: Wildhay River near Hinton (07AC001) (FP3)

Repaired and replaced plumbing as required. Added clamps to tie back cable on right bank tower.

Labour	\$ 990.00
Board	\$ 531.00
Travel	\$ 87.30
Contracts	\$ 0.00
Materials	\$ 166.66
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,774.96</u>

M-36: Willow Creek at Secondary Highway 532 (05AB040) (FP3)

Mouse cleanup and repaired door.

Labour	\$ 232.50
Board	\$ 46.00
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 50.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 353.50</u>

M-37: Willow Creek near Nolan (05AB002) (FP3)

Pumped and desilted well. Found valve shut off end rusted off, (replaced).
Obtained hydrometric measurement by wading 500 m. below gauge.

Labour	\$ 565.00
Board	\$ 28.95
Travel	\$ 35.00
Contracts	\$ 0.00
Materials	\$ 5.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 633.95</u>

M-38: Baptiste River near the Mouth (05DC012) (P1)

Repaired door lock.

Labour	\$ 265.00
Board	\$ 65.65
Travel	\$ 28.10
Contracts	\$ 0.00
Materials	\$ 51.10
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 409.85</u>

M-39: Battle River near Forestburg (05FC001) (P1)

Mouse cleanup.

Labour	\$ 365.00
Board	\$ 100.00
Travel	\$ 35.00
Contracts	\$ 0.00
Materials	\$ 50.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 550.00</u>

M-40: Beaver Creek near Brocket (05AB013) (P1)

Dug out and extended lower intake. Replaced heat tape. Rip rapped in front of well. Installed fence around gauge.

Labour	\$ 665.00
Board	\$ 100.00
Travel	\$ 50.00
Contracts	\$ 829.25
Materials	\$ 184.61
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,828.86</u>

M-41: East Prairie River near Enilda (07BF001) (P1)

Dug drainage ditch to divert run off away from shelter.

Labour	\$ 365.00
Board	\$ 203.34
Travel	\$ 26.75
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 595.09</u>

M-42: Erith River below Hanlan Creek (07AF016) (P1)

Removed shelter etc. from old abandoned site.

Labour	\$ 365.00
Board	\$ 300.00
Travel	\$ 50.65
Contracts	\$ 0.00
Materials	\$(537.50)
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 178.15</u>

M-43: Groat Creek near Whitecourt (07AG008) (P1)

Moved shelter and equipment to a permanent site near the bridge.

Labour	\$1,095.00
Board	\$ 509.66
Travel	\$ 65.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,669.66</u>

M-44: Hilda Lake near Cold Lake (06AC003) (P1)

Installed used Brytex shelter near staff gauge.

Labour	\$1,215.50
Board	\$ 684.20
Travel	\$ 150.00
Contracts	\$ 0.00
Materials	\$ 845.87
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$2,895.57</u>

M-45: Jumpingpound Creek near the Mouth (05BH009) (P1)

Replaced broken ladder on right bank tower.

Labour	\$ 100.00
Board	\$ 0.00
Travel	\$ 15.00
Contracts	\$ 0.00
Materials	\$ 94.16
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 209.16</u>

M-46: Kneehills Creek near Drumheller (05CE002) (P1)

Excavated and replaced both intakes. Fill and rock was hauled into backfill and rip rap bank in front of gauge.

Labour	\$ 795.00
Board	\$ 396.50
Travel	\$ 70.00
Contracts	\$2,490.96
Materials	\$ 162.75
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$3,915.21</u>

M-47: Michichi Creek at Drumheller (05CE020) (P1)

Installed 18' culvert and flip open shelter on wing wall.

Labour	\$ 415.00
Board	\$ 224.61
Travel	\$ 35.00
Contracts	\$ 0.00
Materials	\$ 368.96
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,043.57</u>

M-48: Pine Coulee Site #1 (05AB042) (P1)

Installed used desert box on wading bridge.

Labour	\$ 315.00
Board	\$ 73.30
Travel	\$ 50.00
Contracts	\$ 0.00
Materials	\$ 275.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 713.30</u>

M-49: Pine Coulee Site #2 (AFFRA) (05AB043) (P1)

Installed used Brytex shelter, 2 B.M.'s and under road piping for conduit.

Labour	\$1,327.50
Board	\$ 260.48
Travel	\$ 85.00
Contracts	\$ 128.40
Materials	\$1,059.26
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$2,860.64</u>

M-50: Pine Coulee Site #4 (Outlet Canal) (05AB045) (P1)

Installed used Brytex shelter and under road pipe conduit.

Labour	\$1,460.00
Board	\$ 200.14
Travel	\$ 80.00
Contracts	\$ 128.40
Materials	\$1,062.51
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$2,931.05</u>

M-51: Red Deer River above Panther River (05CA004) (P1)

Installed 2 new aircraft warning marker cones.

Labour	\$ 465.00
Board	\$ 136.65
Travel	\$ 47.00
Contracts	\$ 0.00
Materials	\$ 159.48
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 808.13</u>

M-52: St. Mary River near Lethbridge (05AE006) (P1)

Replaced spliced main cable with 7/8" IWRC galvanized cable. Replaced rusty left bank tie back cable. Installed 3 new aircraft cones and installed new hangers on the 2 that were there.

Labour	\$1,560.00
Board	\$ 668.52
Travel	\$ 150.00
Contracts	\$ 0.00
Materials	\$1,953.12
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$4,331.64</u>

M-53: Stimson Creek near Pekisko (05BL007) (P1)

Installed fall restraint assembly.

Labour	\$ 465.00
Board	\$ 19.00
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 550.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,059.00</u>

M-54: Weiller Creek near Wetaskiwin (05FA024) (P1)

Installed gabions to try and back water into well. Intake high and dry. Installed fall protection frame assembly.

Labour	\$1,195.00
Board	\$ 800.00
Travel	\$ 55.00
Contracts	\$ 0.00
Materials	\$ 664.42
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$2,714.42</u>

M-55: West Arrowwood Creek near Arrowwood (05BM014) (P1)

Installed 2 gabions and a lot of rock.

Labour	\$ 630.00
Board	\$ 19.70
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 104.60
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 779.30</u>

M-56: Willow Creek at Oxley Ranch (05AB041) (P1)

Mouse cleanup and installed flashing around shelter base.

Labour	\$ 182.50
Board	\$ 35.93
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 50.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 293.43</u>

APPENDIX A

DESCRIPTION OF CONSTRUCTION PRACTICES

MATERIAL AND EQUIPMENT

Well and Shelter Construction

In-Bank Well Installations (no in-bank well installations during 1997/98)

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. Strapping the culvert to suitable bridge abutments, piers, or piles makes these installations.

Shelters

Metal shelter 1.63m x 2.44m (walk-in type) are erected on a wooden base for 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.

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 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

22 diameter main cableway milled plough steel cable, galvanized 6 x 19 construction with independent wire rope center is now used for most new cableways and cable replacements.

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.

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.

CONSTRUCTION PERSONNEL

Labour

One field crew consisting of the Facilities Specialist, and a Foreman, plus hydrometric field technologists, as required carried out the construction in Alberta. Two students were hired during the summer.

Supervision

A Facilities Specialist carries out construction supervision.

Equipment

During 1997/98 the construction crew used two 1 ton dual wheel vehicles to transport staff, tools and materials to job sites.

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.

APPENDIX B



St.Mary River at International Boundary
Another load of cement lifting off for
The right bank deadman. 29, April, 1998



St. Mary River at International Boundary
New 20 foot galvanized tower, 7/8" main cable,
and right bank deadman installed (3/Jun/1998)



Keg River at Highway 35 (5/August/1998)
Large holes had washed out around well
they were backfilled and levelled.





Muskeg River near Grande Cache (16/May/1998)
New Cableway, Plastic well and shelter installed.

