Attachment C Red Deer Region Transmission System Development Alternatives Details

REV 4

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C1. Alternative 1 Detail

Figure C-1: Red Deer Region Transmission System Development Alternative 1 805L Pigeon Lake 729L 40S WETASKIWIN Wetaskiwin 331S POWOKA (Rimbley Bashay Gull Lake 958S 212S WEST LACOMBE N.E. LACOMBE 757 Lacombe Berndey ELLIS Blackfalds Eckville 217S NORTH RED DEEP 6L31 535S 87S GAET Sylvan Lake RD14S 717L 17S BENALTO RED DEER NORTH 580S RED DEER RD175 247S RED DEER SOUTH EAST PIPER CREEK Penthold 848 214S INNISFAIL Innisfail 719BL Proposed Development Bowden 19Сելը Voltage 138 kV 240 kV Existing Substations Sundre 138 kV 240 kV 25630 152S DIDSBURY Major Highways HARMATTAN Lakes and Rivers Didsbury Cities or Towns First Nations 313_2010-07-21_OpenHouse_Alt1_NoTitle.m UPletz 2011-01-34 Carstairs

1.1 Substations

240kV Didsbury substation

1.2 Major system transformers

- Didsbury one 200MVA 240/138kV autotransformer
- Benalto 17S one 200MVA 240/138kV autotransformer

1.3 Transmission lines upgrades

- Re-build 716L (~40km) from Wetaskiwin 40S to Ponoka 331S with 795kcmil ACSR conductor per phase.
- Re-build of approximately 152km of 138kV 80L line Utilizing 1x795Kcmil ACSR conductors as follows
 - Re-build 47km from Ponoka 331S to West Lacombe 958S,
 - Re-build 22km from West Lacombe 958S to Blackfalds 198S,
 - Re-build 15 km from Blackfalds 198S to N. Red Deer 217S,
 - Re-build 68km from Red Deer though Innisfail 214S to Olds 55S,
- Re-build of approximately 14km of 138kV 80L line Utilizing 1x1590Kcmil ACSR conductors as follows
 - Re-build 7km from N. Red Deer 217S to S. Red Deer 194S,
 - Re-build 7km from S. Red Deer 194S to Red deer 63S,
- Re-build 717L (~32km) from Red Deer 63S through Sylvan Lake 580S to Benalto 17S with 795 kcmil ACSR conductor per phase
- Rebuild 755L(~30km) Red Deer 63S through Piper Creek 247S to Joffre 535S) with 795 kcmil ACSR conductor per phase
- Re-build 80AL (~10km) from N.E. Lacombe 212S to W. Lacombe 958S with 795 kcmil ACSR conductor per phase
- Re-build 166 L (~7km) from Didsbury 152S to Harmattan 256S with 795kcmil ACSR conductor per phase.

1.4 New Transmission lines

• New 138kV transmission line (~17km) from N.E. Lacombe 212 to Ellis 332 utilizing 1x795Kcmil ACSR conductors.

1.5 Voltage supporting facilities

- Cap bank additions
 - 138kV 50MVAr at Joffre 535S
 - 138kV 50MVAr at Prentiss 276S
 - 138kV 25MVAr at Ellis 332S

1.6 Other system upgrades

• Split 138kV 768L/778L line (Gaetz 87S to N. Red Deer 217S) into two circuits by providing breakers at Gaetz 87S and N. Red Deer 217S.

C2. Alternative 2 Detail

Figure C-2: Red Deer Region Transmission System Development Alternative 2 8051 Pigeon Lake 729L 40S WETASKIWIN **Buck Lake** Wetaskiwin 331S PONOKA 883L onoka (Rimbley Bashay Gull Lake WEST LACOMBE N.E. LACOMBE 757 Lacombe Bernley Buffalo Lake BLACKFALDS 332S Blackfalds Eckville 21/75 6L31 5355 87S NORTH RED DEEP Sylvan Lake RD14S 717L 17S BENALTO RED DEER NORTH 71.16 RED DEER 580S RD175 247S RED DEER SOUTH EAST PIPER CREEK PenDold 8481 214S INNISFAIL mnisfail 719BL Proposed Development Voltage, Type Bowden 240 kV 138 kV Salvage Existing Substations Sundre 138 kV 240 kV 256SII HARMATTAN 152S DIDSBURY Major Highways Lakes and Rivers Didsbury Cities or Towns First Nations 813_2010-07-21_OpenHouse_At2_NoTitle.mod _# letz 2011-01-24 Carstairs

illernative 2 Detail

2.1 Substations

- 240kV Didsbury substation
- 240kV Innisfail substation
- 240kV Ponoka substation

2.2 Major system transformers

- Didsbury one 200MVA 240/138kV transformer
- Innisfail- one 200MVA 240/138kV transformer
- Benalto 17S one 200MVA 240/138kV transformer
- Ponoka- two 200MVA 240/138kV transformer

2.3 Transmission lines upgrades

- Re-build of approximately 14km of 138kV 80L line with 1590 Kcmil ACSR conductor per phase as follows:
 - Re-build 7km from N. Red Deer 217S to S. Red Deer 194S,
 - Re-build 7km from S. Red Deer 194S to Red deer 63S,
- Re-build 717L (~32km) from Red Deer 63S through Sylvan Lake 580S to Benalto 17S with 795 kcmil ACSR conductor per phase
- Rebuild 755L(~30km) Red Deer 63S through Piper Creek 247S to Joffre 535S) with 795 kcmil ACSR conductor per phase
- Re-build 166 L (~7km) from Didsbury 152S to Harmattan 256S

2.4 New Transmission lines

 New 138kV transmission line (~17km) from N.E. Lacombe 212S to Ellis 332S with 795kcmil ACSR conductor per phase.

2.5 Voltage supporting facilities

- Cap bank additions
 - 138 kV 50MVAr at Joffre 535S
 - 138 kV 50MVAr at Prentiss 276S
 - 138 kV 25MVAr at Ellis 332S

2.6 Other system upgrades

 Split 138kV 768L/778L line (Gaetz 87S to N. Red Deer 217S) as two circuit by providing breakers at Gaetz 87S and N. Red Deer 217S.

2.7 Salvaging facilities

 Salvage 716L (~40km) from Wetaskiwin 40S to Ponoka 331S with 795kcmil ACSR conductor per phase.

- Salvage 80L section (~28km) from Ponoka 331S to West Lacombe 958S.
- Salvage 80L section (~25km) from Red Deer to Innisfail 214S.