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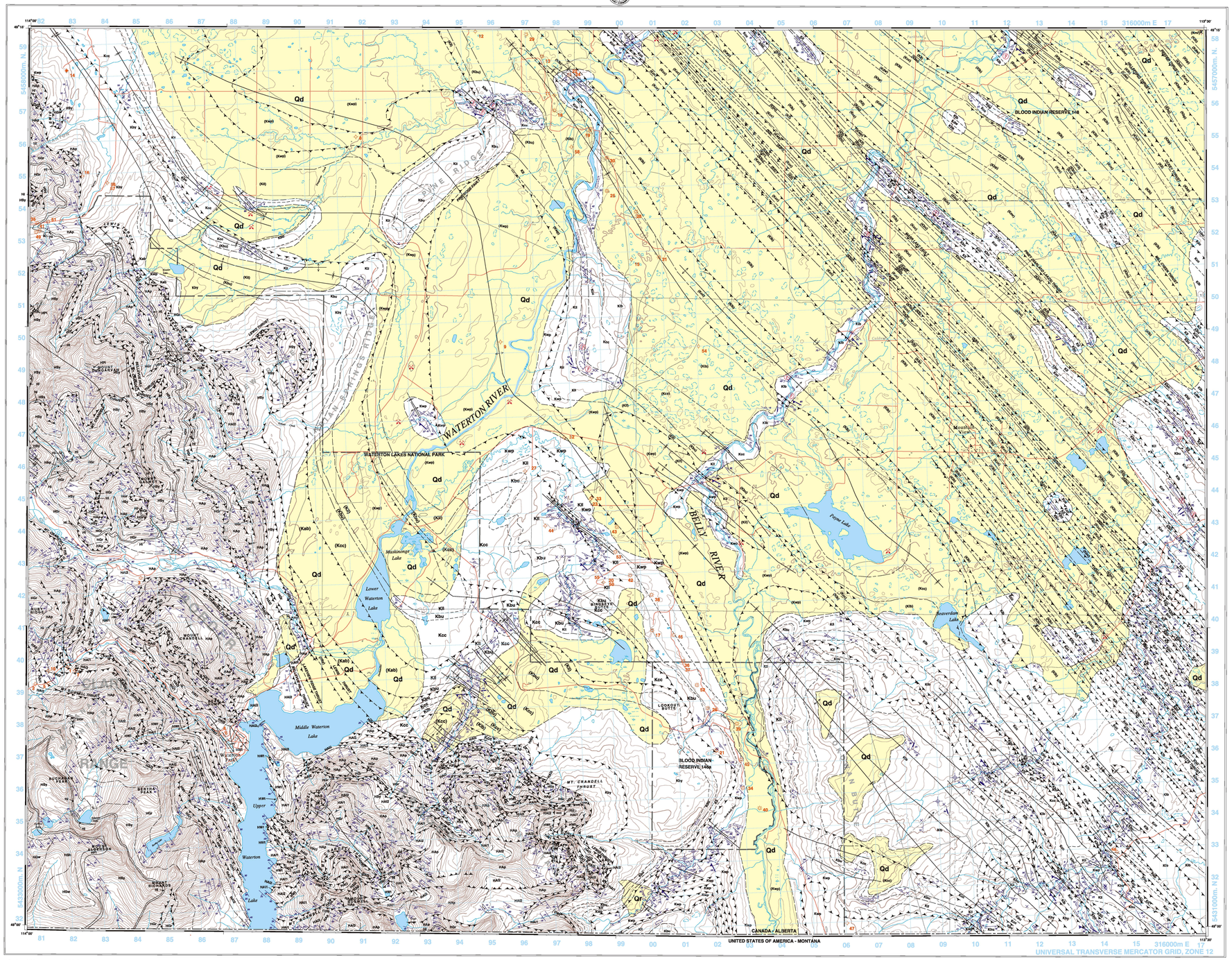
GEOLOGICAL SURVEY OF CANADA — COMMISSION GÉOLOGIQUE DU CANADA



LEGEND

Stratigraphic symbols in brackets on the map indicate projected under younger deposits

CENOZOIC

QUATERNARY
PLEISTOCENE AND RECENT

- **Qd** — *Till, alluvium, colluvium*
- **Qr** — *Rock slide debris*

MESOZOIC

CRETACEOUS
UPPER CRETACEOUS

- **Kmr** — *ST. MARY RIVER FORMATION: siltstone, channel- fill sandstone, and shale; bentonite and ironstone; basal member, coal-bearing*
- **Kbo** — *BLOOD RESERVE FORMATION: massive and crossbedded arenite; sandstone concretions; local shale partings; coquina lenses (Ostrea, Halymenites), up to 3 m thick*
- **Kbp** — *BEARPAW FORMATION: dark grey-brown shale; minor thin sandstone, bentonite, and ironstone; basal coquina (Ostrea)*

BELLY RIVER GROUP

- **Kdw** — *DRYWOOD CREEK FORMATION: sandstone, dark greenish grey shale; minor coal, coquina (formation present in subsurface only)*
- **Klb** — *LUNDBRECK FORMATION: greenish grey and red shale; limy concretions, pedogenic limestone, channelized sandstone bodies*
- **Kcc** — *CONNELLY CREEK FORMATION: channelized sandstone bodies and shale; common wood, plants and coaly fragments in sandstone; minor coquina (gastropods)*

(**Kdw**, **Klb**, **Kcc** — **Kby** — *BELLY RIVER GROUP- undivided*)

ALBERTA GROUP

- **Kbu** — *PAKOWKI FORMATION: recessive dark greenish grey marine shale, minor sandstone (formation less then 10 m thick, absent locally)*; *BURMIS FORMATION: light grey, crossbedded arenite; minor brown weathering, concretionary and iron-bearing calcareous sandstone and magnetite-bearing sandstone*
- **Kll** — *LEES LAKE FORMATION: dark grey marine shale, light grey sandstone*
- **Kwp** — *WAPIABI FORMATION: dark grey marine shale and minor thin siltstone, fine grained sandstone and calcareous sandstone*

(**Kby**, **Kbu**, **Kll**, **Kwp** — **Kab** — *ALBERTA AND BELLY RIVER GROUPS, undivided*)

LOWER CRETACEOUS

- **Kbl** — *BLAIRMORE GROUP undivided: basal quartzose sandstone; green, grey and maroon shale; grey limestone; green, arkosic sandstone*

PROTEROZOIC

MESOPROTEROZOIC
PURCELL SUPERGROUP
UPPER PURCELL (HSh-HI)

- **HI** — *Gabbro intrusion*
- **HGw** — *GATEWAY FORMATION: argillite, red and green; quartzite, grey*
- **HSh** — *SHEPPARD FORMATION: dolomite, grey, brown weathering; argillite*

LOWER PURCELL (HW-HPI)

- **HPI** — *PURCELL LAVA: basalt, dark purplish green, amygdaloidal; submarine*
- **HSy** — *SIYEH FORMATION: limestone and dolomite; grey, green and red argillite; algal limestone*
- **HGr** — *GRINNELL FORMATION: argillite, green and red; quartzite and conglomerate*
- **HAp** — *APPEKUNNY FORMATION: argillite, green and red; quartzite and sandy dolomite*

ALTYN FORMATION: (HAI1-HAI2)

- **HAI2** — *upper part: dolomite, light grey, sandy and gritty; dolomite, algal; argillite, black, fissile*
- **HAI1** — *lower part: dolomite, grey, finely laminated; dolomite, mottled*
- **HWt** — *WATERTON FORMATION: dolomite, red, green and grey; limestone, grey and algal; argillite, green and fissile, grey*

MAP SYMBOLS

Outcrop (small, large, scattered, debris)
Geological boundary (defined, approximate, assumed)
Geological boundary (assumed projection under younger deposits)

LOCAL STRUCTURES

PLANAR STRUCTURES

Bedding, tops known (horizontal, inclined, overturned)
Bedding, tops unknown (inclined, vertical, dip unknown)
Cleavage, first phase (inclined)
Minor fault (reverse motion and inclined)
Shear (reverse motion and inclined)
Fold axial plane (inclined)
Joint (inclined)
Vein (inclined, vertical)

LINEAR STRUCTURES

Intersection lineation (L_1^2)
Fold axis (anticline, syncline, Z-fold, S-fold)
Fault striation

REGIONAL STRUCTURES

Thrust fault (teeth indicate dip direction; defined, approximate, assumed)
Thrust fault (assumed projection under cover of younger deposits)
Anticline (upright, overturned; approximate position)
Syncline (upright, overturned; approximate position)

OTHERS

Well (gas [producer, suspended or abandonned]; dry and abandoned; oil abandonned; water disposal [active or abandonned])
Abandoned mine
Sand and gravel pits
Fossil locality

Geology by D. Lebel, R.J.W. Douglas and D.K. Norris.
Geology of the Mesozoic based on fieldwork and studies of vertical air photographs by D. Lebel (1993,1994) with contributions from Douglas (1952).
Geology of the Proterozoic based on fieldwork and studies of vertical air photographs by R.J.W. Douglas (1950,1951 and 1977) compiled and revised by D.K. Norris (1993).

REFERENCES

Douglas, R.J.W. - 1952. Waterton. Geological Survey of Canada, Preliminary Map 52-10.
Douglas, R.J.W. - 1977. Waterton Lakes National Park. In: Gordy, P.L., Frey, F.R. and Norris, D.K.- 'Geological Guide to the C.S.P.G. 1977 Waterton-Glacier Park Field Conference'; Canadian Society of Petroleum Geologists, pp. 35-38.

Geological cartography by D. Lebel and J. Sharp with contributions by G. Sasklw

Any revisions or additional geological information from the user would be welcomed by the Geological Survey of Canada

Base map at the same scale published Surveys and Mapping Branch in 1971

Copies of the topographical edition of this map area may be obtained from the Canada Map Office, Department of Natural Resources, Ottawa, Ontario

Elevations values unavailable in the digital file used for this map at press time, please refer to an original topographical map (contours interval 100 feet)

SCHEDULE OF WELLS

(ordered by released date)

1- LWID 100163000130W4 0, ROCKY MOUNTAIN DEVELOPMENT COMPANY 1, surface location: uncertain
2- LWID 100103000130W4 0, ROCKY MOUNT WATERTON L 10-30-1-30, surface location: uncertain
3- LWID 100100400230W4 0, WESTERN OIL & COAL NO. 3, surface location: uncertain
4- LWID 100123200130W4 0, WESTERN OIL & COAL NO. 1, surface location: uncertain
5- LWID 100093000130W4 0, ROCKY MOUNTAIN DEVELOPMENT COMPANY 3, surface location: uncertain
6- LWID 102122300130W4 0, WESTERN OIL & COAL NO. 2, surface location: uncertain
7- LWID 100142900130W4 0, PINCHER CK WATERTON LAKES 14-29-1-30, surface location: uncertain
8- LWID 100012000329W4 0, TWIN BUTTE N.W. CO. 2, surface location: uncertain
9- LWID 100033400329W4 0, ALTA GAS & FUEL LOOKOUT 3-34-2-29, surface location: 3-34-2-29W4
10- LWID 103163000130W4 0, OIL CITY ROYALITIES #1, surface location: uncertain
11- LWID 100152400329W4 0, PINCHER CREEK NO. 1, surface location: 15-24-3-29W4
12- LWID 100043500329W4 0, FRED SCHREMP'P NO. 1, surface location: 4-35-3-29W4
13- LWID 100112500329W4 0, MACLEOD-KRAUSE NO. 1, surface location: 11-25-3-29W4
14- LWID 100062800330W4 0, SHELL NO. 3 WATERTON 6-28-3-30, surface location: 6-28-3-30W4
15- LWID 100132500329W4 0, B.A. PINCHER CREEK 13-3-5-29, surface location: 13-5-3-29W4
16- LWID 100081600330W4 0, SHELL 6 WATERTON 7-16-3-30, surface location: 7-16-3-30W4
17- LWID 100143100128W4 0, SOLEX LOOKOUT BUTTE 14-31-1-28, surface location: 11-31-1-28W4
18- LWID 100104003329W4 0, BA PINCHER CREEK 10-24-3-29, surface location: 10-24-3-29W4
19- LWID 100061900328W4 0, B.A. PINCHER CREEK 6-19-3-28, surface location: 6-19-3-28W4
20- LWID 100100100229W4 0, GULF LOOKOUT BUTTE 11-1-2-29, surface location: 11-1-2-29W4
21- LWID 100072000128W4 0, SHELL CHIEF MOUNTAIN 7-20-1-28, surface location: 7-2-1-28W4
22- LWID 100082500329W4 0, B.A. PINCHER CREEK 8-25-3-29, surface location: 8-25-3-29W4
23- LWID 100041300229W4 0, SOLEX LOOKOUT BUTTE 4-13-2-29, surface location: 4-13-2-29W4
24- LWID 100072500329W4 2, B.A. PINCHER CREEK 8-25-3-29, surface location: 8-25-3-29W4
25- LWID 100021800328W4 0, B.A. PINCHER CREEK 2-18-3-28, surface location: 2-18-3-28W4
26- LWID 100072900128W4 0, SOLEX LOOKOUT BUTTE 7-29-1-28, surface location: 3-29-1-28W4
27- LWID 100161500329W4 0, B.A. LOOKOUT BUTTE 9-15-2-29, surface location: 9-15-2-29W4
28- LWID 100130800328W4 0, B.A. PINCHER CREEK 12-8-3-28, surface location: 12-8-3-28W4
29- LWID 100043600329W4 0, B.A. PINCHER CREEK 4-36-3-29, surface location: 4-36-3-29W4
30- LWID 100101800328W4 0, B.A. PINCHER CREEK 10-18-3-28, surface location: 10-18-3-28W4
31- LWID 100150500328W4 0, B.A. PINCHER CREEK 15-5-3-28, surface location: 15-5-3-28W4
32- LWID 100082300229W4 0, B.A. LOOKOUT BUTTE 7-23-2-29, surface location: 07-23-2-29W4
33- LWID 100041000329W4 0, B.A. LOOKOUT BUTTE 4-10-3-2-29, surface location: 04-10-3-2-29W4
34- LWID 100141600128W4 0, SOLEX LOOKOUT BUTTE 14-16-1-28, surface location: 12-16-1-28W4
35- LWID 100120900330W4 0, SHELL 22 WATERTON 8-9-3-30, surface location: 8-8-3-30W4
36- LWID 100043200128W4 0, B.A. UNIT LOOKOUT BUTTE 4-32-1-28, surface location: 1-31-1-28W4
37- LWID 100043200128W4 2, B.A. UNIT LOOKOUT BUTTE 4-32-1-28, surface location: 1-31-1-28W4
38- LWID 100060600328W4 0, SOLEX LOOKOUT BUTTE 6-6-2-28, surface location: 6-6-2-28W4
39- LWID 100132100128W4 0, SOLEX LOOKOUT BUTTE 13-21-1-28, surface location: 16-20-1-28W4
40- LWID 100071600128W4 0, SOLEX LOOKOUT BUTTE 7-16-1-28, surface location: 3-16-1-28W4
41- LWID 102122900330W4 0, SHELL 25 WATERTON 8-8-3-30, surface location: 8-8-3-30W4
42- LWID 100130600329W4 0, SOLEX LOOKOUT BUTTE 13-6-2-28, surface location: 9-1-2-29W4
43- LWID 100161200229W4 0, SOLEX LOOKOUT BUTTE 16-12-2-29, surface location: 10-12-2-29W4
44- LWID 100111100229W4 0, AMOCO BUTTE 11-11-2-29, surface location: 11-11-2-29W4
45- LWID 100052100128W4 0, SOLEX LOOKOUT BUTTE 5-21-1-28, surface location: 4-21-1-28W4
46- LWID 100093100128W4 0, SOLEX LOOKOUT BUTTE 9-31-1-28, surface location: 10-31-1-28W4
47- LWID 100060200128W4 0, SHELL CHEVRON CHERMT 4-8-1-28, surface location: 4-2-1-28W4
48- LWID 100111000127W4 0, GPD DOME CARWAY 11-10-1-27, surface location: 5-10-1-27W4
49- LWID 100050900330W4 0, SHELL 31 WATERTON 8B-8-3-30, surface location: 8-8-3-30W4
50- LWID 100150100229W4 2, GULF LOOKOUT BUTTE 11-1-2-29, surface location: 11-1-2-29W4
51- LWID 103129900330W4 0, SHELL 35 WATERTON 12-9-3-30, surface location: 12-9-3-30W4
52- LWID 100112900128W4 0, GULF UNIT LOOKOUT BUTTE 11-29-1-28, surface location: 12-29-1-28W4
53- LWID 100081200229W4 0, GULF UNIT LOOKOUT BUTTE 8-12-2-29, surface location: 2-12-2-29W4
54- LWID 100033200228W4 0, NBU ET AL LOOKOUT BUTTE 3-32-2-28, surface location: 4-32-2-28W4
55- LWID 100140100229W4 0, GULF LOOKOUT BUTTE 14-1-2-29, surface location: 13-1-2-29W4
56- LWID 100041500330W4 2, SHELL 45 WATERTON 4-15-3-30, surface location: 4-15-3-30W4
57- LWID 100061500330W4 0, SHELL 45 WATERTON 4-15-3-30, surface location: 4-15-3-30W4
58- LWID 100131800328W4 0, MOBIL PINCHER CREEK 13-18-3-28, surface location: 16-13-3-29W4

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SOUTHERN ALBERTA NATMAP PROJECT

GEOLOGY

WATERTON LAKES

ALBERTA

Scale 1:50 000 Échelle 1/50 000

Kilometres 1 0 1 2 3 Kilomètres

Universal Transverse Mercator Projection
Projection transverse universelle de Mercator

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MAP 5-1959	82G/8	82H/5	82H/6
Beaver Mines MAP 1838A	MAP 739A	Pincher Creek GSC Pap. 51-22	Raley
	82G/1	82H/4	82H/3
Sage Creek GSC Pap. 61-24		Waterton Lakes GSC O.F. 2855 GSC Pap. 52-10	Cardston GSC O.F. 2854 GSC Pap. 49-3

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

NOTE: Base map and geology have been transformed from NAD27 to NAD83

Recommended citation:
Lebel, D., Douglas, R.J.W. and Norris, D.K. 1994. Waterton Lakes (82H/4), Alberta-Geology (preliminary); Geological Survey of Canada, Open File map 2855, scale 1:50 000.