

Structure-section along line A-B

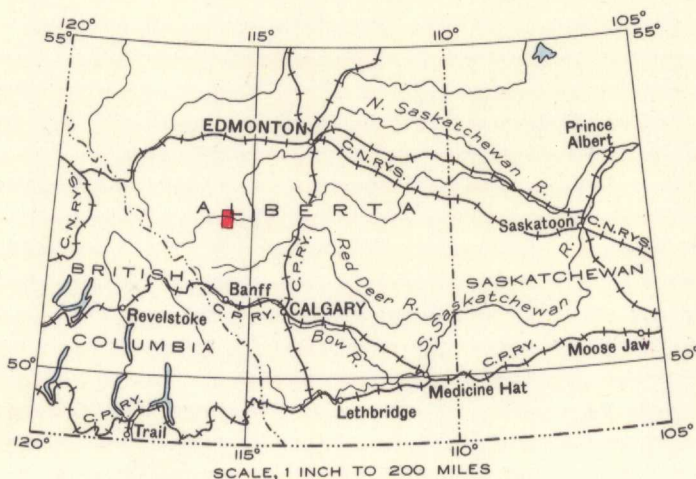
LEGEND

- MESOZOIC (?) AND CENOZOIC**
- CRETACEOUS (?) AND TERTIARY**
UPPER CRETACEOUS (?) AND PALEOCENE
- 9 Sandstone, shale, conglomerate, volcanic ash, coal seams
- CRETACEOUS**
UPPER CRETACEOUS
- 8 BIGHORN FORMATION: siliceous sandstone, sandy shale, grit, pebble-conglomerate. Only lower part exposed
- 7 BLACKSTONE FORMATION: chiefly black marine shale; sandy shale; ferruginous limestone concretions
- LOWER CRETACEOUS**
- 6 LUSCAR AND MOUNTAIN PARK FORMATIONS: black and grey carbonaceous shale, grey and green sandstone and sandy shale, conglomerate; coal seams in Luscar
- 5 CADOMIN FORMATION: chiefly chert and quartzite pebble-conglomerate
- JURASSIC AND CRETACEOUS**
- 4 FERNIE GROUP (Jurassic): dark, cherty phosphatic limestone; black shale, sandstone; some limy sandstone beds at the base may be of pre-Fernie age; NIKANASSIN FORMATION (Lower Cretaceous): chiefly grey, buff weathering sandstone; some shale
- CENOZOIC**
- CARBONIFEROUS**
MISSISSIPPIAN and (?) PENNSYLVANIAN
- 3 RUNDLE FORMATION: light grey and buff weathering, dense to porous limestone; argillaceous and dolomitic limestone, chert
- MISSISSIPPIAN**
- 2 BANFF FORMATION: chiefly thin-bedded, brown-grey, shaly limestone; cherty bands in lower part
- DEVONIAN**
- 1 Hard, grey, buff-weathering limestone; grey, shaly limestone; drab, porous, saccharoidal dolomite; brown-grey, silty and calcareous, light-weathering shale; uppermost few feet is black, fissile shale of Esshaw formation. In structure-section only

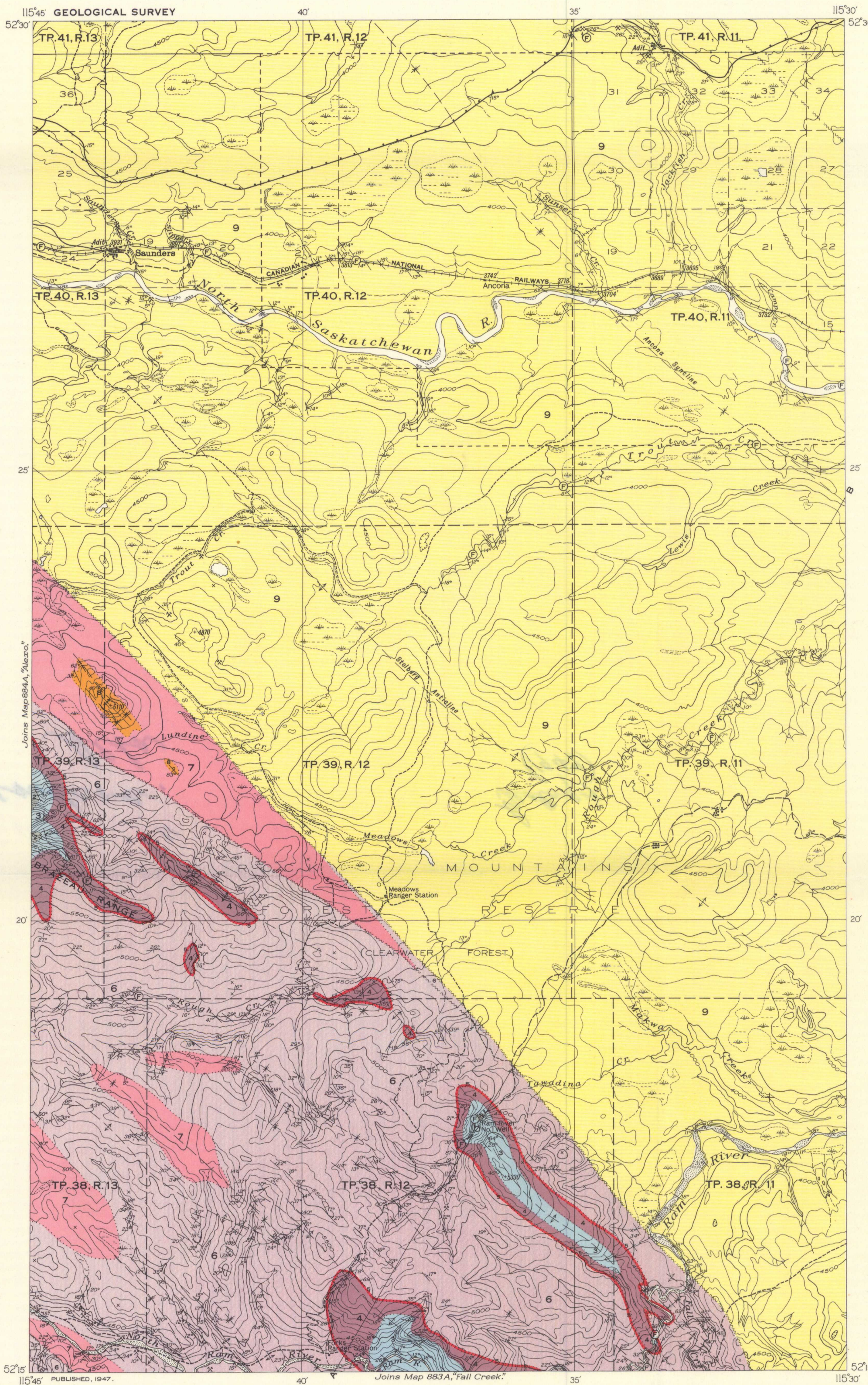
- Rock outcrop (bedding not determinable) X
Bedding (horizontal, inclined, vertical, overturned) +XXX
Fault - - - - -
Anticlinal axis - - - - -
Synclinal axis - - - - -
Coal outcrop (seam 1 foot or more thick) X
Coal mine adit X
Well drilled for oil and gas (abandoned) X
Fossil locality X
- Road and buildings - - - - -
Road not well travelled - - - - -
Trail - - - - -
School - - - - -
Post Office - - - - -
Abandoned building - - - - -
Power transmission line - - - - -
Power transmission line along road - - - - -
Forest Reserve boundary - - - - -
Township boundary (surveyed) - - - - -
Township boundary (unsurveyed) - - - - -
Section line - - - - -
Stream (position approximate) - - - - -
Intermittent stream - - - - -
Marsh - - - - -
Sand or gravel - - - - -
Contours (interval 100 feet) - - - - -
Depression contour - - - - -
Height in feet above mean sea-level 5300

Geology by O.A. Erdman, 1944.

Base-map compiled by the Topographical Survey, 1941, from original surveys and from information supplied by Federal Government Department, Cartography by the Drafting and Reproducing Division, 1946.



SCALE, 1 INCH TO 200 MILES



MAP 885A

SAUNDERS
WEST OF FIFTH MERIDIAN
ALBERTA

Scale, 63,360 or 1 Inch to 1 Mile
Miles

Approximate magnetic declination, 25° 30' East.

DESCRIPTIVE NOTES

Saunders map-area lies in the outer Foothills Belt of west-central Alberta, about 80 miles north of Banff, and nearly an equal distance west of Red Deer. The maximum relief is about 2,800 feet, and elevations within the northeastern three-quarters of the map-area are less than 5,000 feet above sea-level. Brazeau Range, a prominent topographic feature to the west in Alexo map-area, terminates in the southwestern part of the Saunders area. The relationship of topography to the structure and lithology of exposed formations is well demonstrated: the closely folded, northwest-trending, older rocks of the southwest quarter of the map-area form high, parallel ridges, whereas the low-dipping, soft, younger rocks to the northeast have contributed to the development of a relatively low-lying area of little relief. The marked topographic change is localized near a large overthrust fault, which brings Lower Cretaceous rocks on the southwest in contact with younger rocks on the northeast. During Pleistocene time ice from the Cordilleran region completely covered the map-area, and the lowland in the northeast part abounds in glacial features such as boulder clay deposits, gravel ridges, kettle-holes, and undrained depressions.

Formations exposed in the map-area range from Mississippian to Paleocene in age. A part of the Bighorn formation, all of the Wapiabi formation, and an indeterminate part, perhaps all, of the Brazeau formation are lacking at the surface, having been overridden by a large thrust fault. The Wapiabi formation, consequently, does not appear on the map legend, and such Upper Cretaceous, Brazeau strata as may be present have been mapped with the Paleocene rocks. Upper Devonian beds were encountered in Ram River No. 1 well on Tawadina Creek, and appear only in the structure-section. The approximate thicknesses of the various formations are as follows: Devonian, 2,300 feet; Banff, 575 to 626 feet; Rundlie, 620 feet; Fernie (Jurassic) and Nikanassin (Lower Cretaceous), 350 to 440 feet; Cadomin, 25 to 80 feet; Luscar, 1,175 feet; Mountain Park, 700 to 750 feet; Blackstone, 1,300 feet; Bighorn, 275 to 320 feet; Wapiabi, 1,400 feet; Brazeau, 4,700 feet. Rocks of Paleocene age underlie most of the map-area northeast of the main thrust fault, but beds of late Upper Cretaceous age may be present in the vicinity of the Stolberg anticline. The rocks in this part of the area could not be differentiated into separate formations. Altogether they are represented by a thickness of 4,500 to 5,000 feet of beds on the southwest limb of the Stolberg anticline, along Ram River. Plant fossils collected a few hundred feet below the commercial coal seam at Saunders indicate a Paleocene age.

The thicknesses given above for the Devonian rocks, and for the Bighorn, Wapiabi, and Brazeau formations have been adopted from neighbouring map-areas. The Fernie and Nikanassin beds, as well as those of the Luscar and Mountain Park formations, could not be separated in the field and have been mapped together.

Saunders map-area may be divided conveniently into two major structural units, separated by a thrust fault that brings Lower Cretaceous and lower Upper Cretaceous rocks, on the southwest, against beds of Paleocene age on the northeast. The southwestern structural unit consists of a series of prominent folds, with small associated faults, and at the surface involves formations of mainly Lower Cretaceous age. Where competent Paleozoic rocks outcrop, the associated anticlines are generally asymmetrical, and much broader than those involving Mesozoic rocks. The northeastern structural unit, occupying three-quarters of the map-area, comprises the broad, gentle Stolberg anticline, and the associated Ancona syncline to the northeast.

The thrust fault that separates the two structural units has a throw of about 10,000 feet in Ram River Valley. A low, southwest dip of between 10 and 15 degrees is indicated from data on the Ram River No. 1 well, which passed from Devonian to Paleocene strata at a depth of 1,235 feet. Another large fault, dipping southwest, is shown in the extreme northeast corner of the map-area. This fault is exposed in a railway cut about 5 miles east of Saunders map-area.

The southwestern structural unit is unfavourable for oil reservoirs. Most of it is structurally low, and in the few places where structural highs occur, the Rundlie formation, a possible oil reservoir, is either denuded or under very thin cover. The large thrust fault would be encountered at shallow depths for a considerable distance southwest of its surface trace, as indicated in Ram River No. 1 well, in SW 1/4 sec. 26, T. 38, R. 12, W. 5th mer., which is located on the west limb and near the north-west-plunging nose of a doubly plunging anticline. The well was abandoned in 1939 at a depth of 1,346 feet, having passed from Upper Devonian rocks to those of Paleocene age.

Within the northeast part of the map-area is a possible oil structure, the Stolberg anticline. Toward the southeast, the dips on both limbs of the structure become progressively shallower, and the southwest limb broadens, so that along Ram River the southwest limb is about 4 miles wide. The dips on both limbs in this vicinity are generally uniform, and less than 15 degrees. Imperial-Shell-Stolberg No. 1 well is drilling at or near the crest of the Stolberg anticline, about 25 miles northwest of Ram River, in an area of somewhat steeper dips, and the following abridged log, as determined by the Petroleum and Natural Gas Conservation Board of Alberta, is reproduced through the courtesy of Imperial Oil Limited and the Shell Oil Company of Canada:

"Brazeau to Wapiabi, 4020 feet; fault, Wapiabi to Brazeau, 4,630 feet; Brazeau to Wapiabi, 4,850 feet; Wapiabi to Bighorn, 6,580 feet; Bighorn to Blackstone, 7,240 feet; 'grit', 9,580 feet; Blackstone to Mountain Park, 9,840 feet; Mountain Park to Luscar, 10,160 feet; Luscar to Cadomin, 11,635 feet; Cadomin to Nikanassin, 11,645 feet; Nikanassin to Fernie (top of Brown sand), 11,725 feet; Fernie to Rundlie, 12,218 feet; fault, Rundlie to Fernie, 12,475 feet; and Fernie to Rundlie, 12,826 feet."

Outcrops of coal seams 1 foot or more thick are shown on the map. Those of Luscar coal occur wholly southwest of the main fault, where the beds have low to moderate dips. One seam on North Ram River is about 12 feet thick. The rank of the coal is believed to conform with that mined at Nordegg, which is low volatile, bituminous.

Thick coal seams of high volatile, bituminous rank occur in Paleocene measures on the northeast limb of the Stolberg anticline and the northeast limb of the Ancona syncline. At Saunders, a seam about 4 1/2 feet thick is mined by Bighorn and Saunders Creek Collieries, Limited, production in 1945 amounting to 33,325 tons. Dips there range between 6 and 10 degrees northeast. In the northeast corner of the map-area, a seam 6 feet thick, with a shale parting near the base, outcrops in a tributary of Jackfish Lake. The Jack Fish Lake coal mine, in this vicinity, was abandoned in 1941. Dips at the surface vary from 25 to 30 degrees southwest.

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