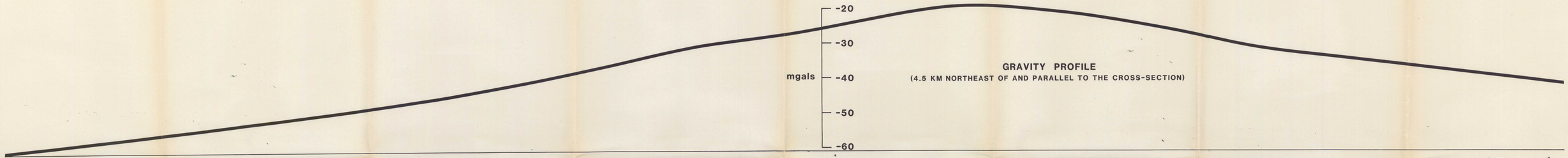
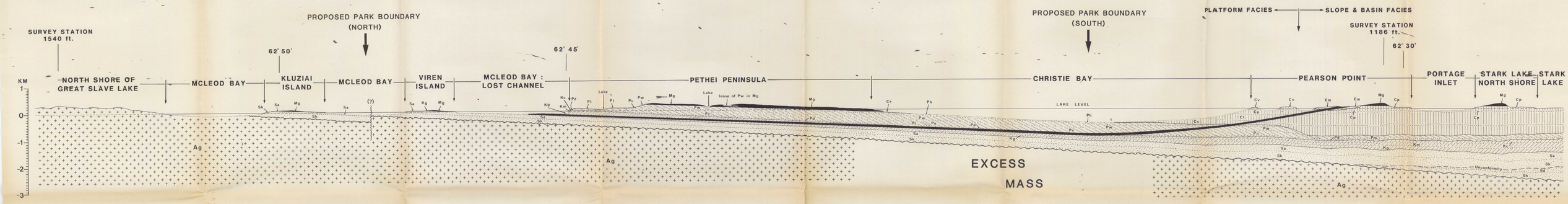
GEOLOGICAL SURVEY OF CANADA COMMISSION GEOLOGIQUE DU CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES
MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES





CROSS-SECTION A B

GEOLOGICAL SECTION ACROSS KLUZIAI ISLAND - PETHEI PENINSULA - PEARSON POINT, EAST ARM OF GREAT SLAVE LAKE (NTS 75 L10 and 15)

By S.S. Gandhi
1984

SCALE

HORIZONTAL AND VERTICAL 1:50000

0 5 10 KM

NO VERTICAL EXAGGERATION

SOURCES :

GEOLOGICAL SECTION :

C.H. Stockwell, 1936a and 1936b
P.F. Hoffman, 1968, 1974 and 1977
P.F. Hoffman, I.R. Bell, R.S. Hildebrand and L. Thorstad, 1977
S.S. Gandhi, 1983 Fieldwork(traverses along the section on Kluziai Island, Viren Island and Pethei Peninsula)

GRAVITY PROFILE : Earth Physics Branch, 1982, O.F. 82-27

LEGEND

HELIKIAN

Md — **Mackenzie Dyke Swarm:** north-northwest trending, vertical gabbro (diabase) dykes (K-Ar dates: 1250 Ma).

Mp — **Christie Bay gabbro (diabase) sheets:** (K-Ar dates: 1250 Ma).

LATE APHEBIAN

Et-Then Group

Ep — **Preble Formation:** not encountered in this section;elsewhere up to 3500 m of predominantly red to buff, lithic to arkosic sandstone.

Em — **Murky Formation:** ~200 m in this section,up to 1000 m elsewhere; fanglomerate with minor red sandstone and siltstone, and a number of intercalated basaltic flows (Rb-Sr date: 1869 ± 82 Ma).

Cm — **Monzonitic Intrusions:** not exposed in this section but occur close to southeast end of the section, commonly laccolithic bodies at the base of Stark Formation. (U-Pb date 1865 Ma; K-Ar dates 1845, 1795, 1630 Ma).

Christie Bay Group

Cv — **Pearson Formation:** >165 m of basaltic flows, columnar jointed with intercalated grey to dark grey mudstone.

Cp — **Portage Inlet Formation:** ~210 m of silty mudstone, red, thin bedded, ripple marked, with halite and gypsum clasts;type section on north shore of Portage Inlet ~ 5 km west of this section, preserved only in the area of Stark Lake.

Ct — **Tochatwi Formation:** ~650 to 700 m of red feldspathic sandstone; increasing in thickness to the southeast, up to 800 m, in Stark Lake area; 570 m thick on an island near north shore of Stark Lake ~6 km east of this section.

Cs — **Stark Formation:** thickness difficult to estimate due to brecciation on large scale all through the formation; probably ~ 700 m thick; (a) upper part - from top red mudstone ~40 m, stromatolitic carbonate ~35 m, red mudstone ~45 m, stromatolitic carbonate ~25 m. (b) lower part ~ 500 m of brecciated red mudstone with carbonate blocks (not derived from older formations). Formation well exposed a few km to the southeast along the section in the type area of Stark Lake.

Pethei Group

Ph — **Hearne Formation:** not exposed in this section, but its lower part is exposed at other places on Pethei and Douglas Peninsulas beneath a gabbro sill; ~50 to 100 m of thick bedded limestone with stromatolitic dolomite at top.

Pw — **Wildbread Formation:** ~90 m of limestone with stromatolitic and oolitic beds; well exposed on Pethei and Douglas Peninsulas; type section south of west end of Wildbread Bay, 1.6 km west of the Gap is~60 m thick; up to 200 m thick in basinal facies.

Pu — **Utsingi Formation:** ~75 m of thick bedded limestone, with stromatolitic beds; well exposed on Pethei and Douglas Peninsulas; type section at Utsingi Point is 70 m thick, which is minimum for the formation; significantly thicker (~ 200 m) where the Taltheilei Formation is absent viz. south of Pethei Peninsula in this section and extending to the northeast and southwest from it, with an abrupt increase in thickness; up to 330 m thick.

Pt — **Taltheilei Formation:** ~130 m of dolomite, stromatolitic; well exposed from this section to the Taltheilei Narrows area on the north side of Pethei Peninsula; type section 28 km to the west of this section and 7 km east of the Narrows is ~130 m thick; passes laterally with abrupt facies change into the Utsingi Formation 5 km northeast of this section on northside of the Peninsula; the facies change occurs along a southwest-trending boundary.

Pp — **Pekanatui Formation:** ~100 m of thin evenly bedded limestone, with dark shale partings, rare dolomite turbidite beds, thickness range of 75 to 105 m, thicker towards southeast.

Pb — **Blanchet Formation:** ~300 m of greywacke turbidite increasing in thickness towards southwest from Snowdrift; absent northeast of Snowdrift and on this section

Pm — **McLean Formation:** ~120 m of thin bedded marlstone, red brown to green grey, some stromatolites; type section is on this section in Stark Lake~5 km southeast from north shore, and is 120 m thick.

Pd — **Douglas Formation:** ~30 m of marlstone, red, fissile; a marker unit for both the platform and trough facies of Pethei Group; upper part, ~0 m thick, is exposed at this cross-section on the north-facing steep slope of Pethei Peninsula, and the lower part is exposed 1 to 2 km to the west; estimated thickness on the cross-section: ~5 m; typically thinly laminated red siltstone-shale intercalated with disrupted buff calcareous beds a few centimetres thick; upper and lower boundaries are commonly sharply defined, but in some places gradations over a few metres are observed;~10 m thick at the east end of Wildbread Bay.

Platform Facies

Slope to Basinal Facies

Kahochella Group

Kc — **Charlton Bay Formation:** dark green to grey shale or argillite, with a few maroon-red beds and thin pale green beds; finely laminated; calcareous concretions abundant and up to 30 cm in long diameter parallel to bedding; well exposed at many places on Kahochella Peninsula and on north shore of Pethei and Douglas Peninsulas; ~ 30 m thick in this cross-section based on complete exposures of the formation 1 to 2 km to the west on north shore of Pethei Peninsula; thins to 10 m to the northeast at the east end of Wildbread Bay and to the west in the Taltheilei Narrows area; thickens to >150 m to the southwest on the Keith and Blanchet Islands; at type locality at Charlton Bay, ~40 m thick.

Km — **McLeod Bay Formation:** red shale with calcareous concretions, intraformational concretion conglomerate, minor dark green argillite; only the uppermost few metres of it is exposed in this cross-section, and its estimated thickness is~75 m; type section is ~30 km to the southwest near Taltheilei Narrows and is ~165 m (?) thick; in the trough to the southwest the thickness is ~3100 m; thinnest to the northeast ~15 m.

Kg — **Gibraltar Formation:** red shale, a few thin granular hematitic iron-formations and some thin pale green uraniferous shale beds; incompletely exposed at the cross-section and in its vicinity; intraformational conglomerate, marlstone beds; stromatolites and gypsum casts present in upper parts at some places named after Gibraltar Point 8 km northeast of the cross-section where ~40 m thick incomplete stratigraphic section is exposed; thinner in the Taltheilei Narrows area to the west; thickens to the east and near the east end of Kahochella Peninsula it is up to 200 m thick; thicker in the basin, up to 1050 m on Keith Island 50 km south of Taltheilei Narrows.

Ks — **Seton Formation:** Andesitic and rhyolitic flows, tuffs and minor sediments; apparently restricted to the Taltheilei Narrows area 25 km southwest of the cross-section and in the basin to the southeast, hence the formation not extended to the cross-section; up to 1400 m thick; interbedded with the Akaitcho River, Gibraltar and McLeod Bay formations at Taltheilei Narrows, which are therefore of variable thickness there and generally thinner than elsewhere on the platform.

Sosan Group

Sa — **Akaitcho River Formation:** thin-bedded red micaceous siltstone and shale, with minor buff sandstone and rare conglomerate, in the type section on the Kluziai Island where only basal 50 m thickness is exposed; the upper part is exposed on Viren Island on this section, and also at Gibraltar Point 10 km to the east; thickness ~125 m in the section interpreted on the basis of a possible fault between the two islands as shown here and striking at high angle to the cross-section line AB; if the fault does not exist, then the formation may be nearly twice as thick and the gabbro sills that cap the two islands are separate sheets rather than parts of a single sheet as shown here; red sandstone and glauconitic white sandstone beds occur in the formation to the south and northeast of the cross-section.

Sk — **Kluziai Formation:** sandstone, fine to medium grained, pink to white, cross-bedded, generally uniform formation, some heavy mineral bands, and shale pebble conglomerate; named after Kluziai Island on the cross-section, where only its uppermost ~50 m thickness is exposed; below the lake level additional ~150 m thickness is projected from a vertical drill hole on shore at the west end of Sosan Island, 20 km to the southwest of this section, which intersected 1285 m of the formation and the basement granite below it; type section in basin, 58 km to the south-southeast of Kluziai Island, where full thickness of ~440 m is exposed.

Sd — **Duhamel Formation:** stromatolitic dolomite with some beds of cross-bedded sandstone and ripple laminated siltstone; extended to to the section as northwestwards thinning eroded wedge from the 275 m thick type section 15 km to the southeast.

Sh — **Hornby Channel Formation:** fluvial feldspathic granule-stone with some quartz pebbles, conglomerate, local dolomite and rare tuffaceous beds; projected on this section as a wedge thinning northwestwards; type section approximately 15 km to the south ~250 m thick.

Union Island Group

U — **Basal quartzite - quartz pebble conglomerate, dolomite,** carbonaceous mudstone, basaltic flows and tuffs, bedded dolomite, red and green laminated mudstone and red mudstones; not exposed in the cross-section but may be present below the Sosan Group.

Subalkaline to peralkaline intrusions: strongly differentiated very mafic to felsic phases; present 100 km to the southwest of the section, and may be present along the cross-section but concealed by younger rocks (K-Ar dates: 2200, 2170 and 2057 Ma).

APHEBIAN

Wilson Island Group

W — **Conglomerate, sandstone, siltstone, dolomite and mafic and felsic volcanics:** not exposed or projected in this cross-section because the group is apparently restricted to fault-bounded zone along trough axis; deformed and metamorphosed; <2300 Ma old because it imcludes red beds.

ARCHEAN

Basement Complex

Ag — **Undifferemtiated granitic gneiss and granite;** with some metasedimentary and metavolcanic remnants of the Archean Yellowknife Supergroup (K-Ar dates: 2575, 2555, 2485 Ma on granites from the trough on the southeast side of the section).

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