CATALOGUE OF BOREHOLES 1 - SCIENTIFIC GEOTHERMAL HOLES

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Crustal Studies
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THE SCIENTIFIC GEOTHERMAL DRILLING PROGRAMME

From 1962 to 1969 the Geothermal Service of the Dominion Observatory (later renamed Earth Physics Branch) drilled seventeen holes for geothermal research, as part of the Upper Mantle Project. These holes provided an excellent nucleus of the heat flow and heat generation research programme, and results from these holes have been invariably good and well above the average for geothermal research. Four of the holes were drilled in association with universities and provided research facilities that would not otherwise have been available to the universities concerned. Three of these were located on campus, at Dalhousie University, Halifax, University of Western Ontario, London, and University of Manitoba, Winnipeg. The fourth was drilled north of Montreal in association with McGill University. In 1985 an eighteenth hole was drilled in cooperation with the Geothermal Energy Programme, at a site that was of interest to both Programmes.

The sites of all holes were chosen for the optimum quality of geothermal measurements. Other interests were considered where known and where not in conflict with the prime purpose. Other users have been encouraged, of both the holes and the cores, and for this reason they have been preserved wherever possible. However, because of space limitations, some of the cores have been abbreviated, and because of new construction, some of the holes have been destroyed.

The high quality geothermal measurements provided by these eighteen holes have been supplemented by many more measurements in holes drilled for other purposes, mainly for ore mineral or oil and gas exploration. This has permitted a large Canadian geothermal data-base to be assembled, but the nature of the borrowed holes leaves many areas of the country unsampled. From about 1975 onwards the applied programmes of geothermal energy research and northern transportation research have provided further opportunities for scientific data-gathering in holes drilled for these new special purposes. These Programmes will continue to work together for mutual benefit, but the question of the scientific and national benefits of a research drilling programme are evident and will continue to be discussed by proponents of all geophysical and geological disciplines.

This report gives data of the eighteen holes drilled within the Geothermal Programme. Use of holes or core by earth scientists is encouraged. Similar lists of holes of commercial origin may follow, but the extent to which these remain available for use by others is considerably more limited.

Details of measurements in these holes and others have been published in the following papers:

- Jessop, A.M., Three measurements of heat flow in Eastern Canada. Can.J.Earth Sci.,5,61-68,1968.
 Hole 2.
- Beck, A.E. and Judge, A.S., Analysis of heat flow data detailed observations in a single borehole.

 Geophys.J.R.Astr.Soc., 18,145-158,1969.

 Hole 4.
- Jessop, A.M. and Judge, A.S., Five measurements of heat flow in southern Canada. Can.J.Earth Sci.,8,711-716,1971.

 Holes 1, 3 and 7.
- Cermak, V. and Jessop, A.M., Heat flow, heat generation, and crustal temperature in the Kapuskasing area of the Canadian Shield.

 Tectonophysics, 11, 287-303, 1971.

 Holes 11. 12 and 13.
- Jessop, A.M. and Lewis, T.J., Heat flow and heat generation in the Superior Province of the Canadian Shield.
 Tectonophysics,50,55-77,1978.
 Holes 14, 15, 16 and 17.
- Jessop, A.M., Souther, J.G., Lewis, T.J. and Judge, A.S., Geothermal measurements in northern British Columbia and southern Yukon Territory. Can.J.Earth Sci., 21,599-608,1984.

 Holes 8, 9 and 10.

Ottawa Name:

Number: 1

Location:

45 23.7N 75 42.9W

18 5026900 444000

Elevation:

84 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop

Drilling Company: Canadian Longyear

3 - SIZE AND DEPTH

Total depth:

602 m

Angle:

-90

Diameter:

50 mm to 334 m, 47.6 mm to TD

Casing:

AX to 34 m

4 - DATES OF OPERATIONS

Dates of drilling:

13.10.62 to 22.11.62

Dates of logging:

Many

Last visit:

Recent

Present condition:

Cleaned to TD in 1983 and preserved

5 - CORES AND SAMPLES

Core taken:

Total

Location of core: EPB storage, Ottawa

Condition of core:

In 0.6 m cardboard boxes, varied.

Geological summary:

Ottawa 14 m, Rockliffe 82 m. Oxford 129 m. March 200 m, Nepean 209 m, Precambrian 240 m.

Measurements made:

Conductivity

6 - AVAILABILITY OF HOLE

Accessibility

Accessible to road vehicle

Notes for finding:

On site of Earth Physics Br., Observatory Crescent,

Ottawa.

Further information:

A. M. Jessop 613-995-5478

Name: Halifax

Number

Location:

44 38.3N 63 35.5W

20 4942700 453100

Elevation:

46 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop, R. Blais

Drilling Company: Logan Brothers

3 - SIZE AND DEPTH

Total depth: 366 m

Angle:

-90 at 0 m, deviating to -45 at TD

Diameter:

47.6 mm

Casing: AX to 1.5 m

4 - DATES OF OPERATIONS

Dates of drilling: 13.01.63 to 24.02.63

Dates of logging: 26.02.63, 12.05.65

Last visit: 12.05.65, (xx.09.66, J. Wright)

Present condition: Destroyed by new building construction

5 - CORES AND SAMPLES

Core taken: Total

Location of core: EPB storage, Ottawa

Condition of core: Good

Geological summary: Cambrian slate 1 m to TD

Measurements made: Conductivity, core description

6 - AVAILABILITY OF HOLE

Accessibility: destroyed

Notes for finding:

Name:

Penticton

Number

3

Location:

49 19.8N 119 37.6W

11 5467200 309200

Elevation:

552 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop

Drilling Company:

Boyles Brothers

3 - SIZE AND DEPTH

Total depth:

611 m

Angle:

-90

Diameter:

50 mm to 329 m, 38 mm to TD

Casino:

AX to 329 m, EX to TD

4 - DATES OF OPERATIONS

Dates of drilling: 07.03.63 to 29.03.63

Dates of logging:

30.05.63, 14.06.65, 04.08.67, 30.07.68

Last visit:

30.07.68

Present condition:

Capped and preserved, small water flow from collar

5 - CORES AND SAMPLES

Core taken:

Total

Location of core:

EPB storage, Ottawa

Condition of core:

Good

Geological summary:

White Lake 3 m, Marron 597 m

Measurements made:

Conductivity

6 - AVAILABILITY OF HOLE

Accessibility

Accessible to road vehicle

Notes for finding:

Near the boundary of the site of the Penticton Astrophysical Observatory, in low area to right of

road as approaching Observatory from north.

Name:

London

Number

Location:

43 00.6N B1 16.3W

17 4761700 477900

Elevation:

248 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop

Drilling Company: Canadian Longyear

3 - SIZE AND DEPTH

Total depth:

594 m

Angle:

-90

Diameter:

46 mm

Casing:

BXW rods to 442 m

4 - DATES OF OPERATIONS

Dates of drilling: 18.09.63 to 21.10.63

Dates of logging:

Many

Last visit:

Recent, by UWO personnel

Present condition: Blocked near surface

5 - CORES AND SAMPLES

Core taken:

Total

Location of core:

Univ. Western Ontario, London.

Condition of core:

Good

Geological summary:

Devonian 34 m, Silurian 329 m, Ordovician 472 m

Measurements made: Conductivity, heat generation

6 - AVAILABILITY OF HOLE

Accessibility

Accessible to road vehicle

Notes for finding:

Close to Dept. of Geophysics, U.W.O.

Further information:

A. M. Jessop or A. E. Beck (U.W.O.)

613-995-5478 519-679-3142

Name:

St. Jerome

Number

Location:

45 49.0N 74 00.8W

18 5073900 576700

Elevation:

140 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop

Drilling Company:

Heath & Sherwood

3 - SIZE AND DEPTH

Total depth:

760 m

Angles

-90

Diameter:

47.6 mm

Casing:

AX to 6.7 m

4 - DATES OF OPERATIONS

Dates of drilling: 08.02.64 to 13.04.64

Dates of logging:

Several by McGill Univ., 01.11.74

Last visit:

01.11.74

Present condition:

Preserved

5 - CORES AND SAMPLES

Core taken:

Total

Location of core:

McGill University

Condition of core:

Unknown

Geological summary:

Precambrian

Measurements made:

Conductivity, heat generation

6 - AVAILABILITY OF HOLE

Accessibility

Accessible to 4WD vehicle, 100 m from road.

Notes for finding:

In grounds of Jesuit seminary, at foot of hill to

right of road as approaching seminary. Access by permission of head of seminary.

Further information:

A. M. Jessop 613-995-5478

Name:

Roberval

Number

Location:

48 31.8N 72 15.2W

18 5378600 702800

Elevation:

149 m

2 - DRILLING OPERATIONS

Drilling Superviser:

R. Blais

Drilling Company:

Heath & Sherwood

3 - SIZE AND DEPTH

Total depth:

611 m

Angle:

-90

Diameter:

47.6 mm

Casing:

AX to 61 m

4 - DATES OF OPERATIONS

Dates of drilling:

19.02.64 to 23.03.64

Dates of logging:

18.05.65, 03.11.67

Last visit:

03.11.67

Present condition:

Unknown

5 - CORES AND SAMPLES

Core taken:

Total

Location of core:

EPB storage, Ottawa

Condition of core:

Good

Geological summary:

Precambrian

Measurements made:

Conductivity

6 - AVAILABILITY OF HOLE

Accessibility

Accessible to road vehicle

Notes for finding:

On rock outcrop to right of approach road to

Roberval Airport

Further information:

A. M. Jessop 613-995-5478

Name: Winnipeg Number 7

Location: 49 48.7N 97 07.9W 14 5519100 634400

Elevation: 232 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop

Drilling Company: Midwest

3 - SIZE AND DEPTH

Total depth: 610 m

Angle: -90

Diameter: 47.6 mm

Casing: NX to 166 m, BX to 188 m, AX to 193 m

4 - DATES OF OPERATIONS

Dates of drilling: 24.05.64 to 24.07.64

Dates of logging: Many

Last visit: 20.07.81

Present condition: Preserved

5 - CORES AND SAMPLES

Core taken: Total, except for Winnipeg sandstone

Location of core: Provincial storage, Winnipeg

Condition of core: Unknown

Geological summary: Red River 18 m, Winnipeg 133 m, Precambrian 190 m

Measurements made: Conductivity, heat generation, core description

6 - AVAILABILITY OF HOLE

Accessibility Accessible to road vehicle

Notes for finding: Close to door of Geology Building, University

of Manitoba.

Further information: A. M. Jessop or D. Hall

613-995-5478, 204-474-9371

Name: Dease Lake

Number

8

Location:

58 38.9N 130 00.6W

09 6501100 441400

Elevation:

829 m

2 - DRILLING OPERATIONS

Drilling Superviser:

A. M. Jessop

Drilling Company:

Midwest

3 - SIZE AND DEPTH

Total depth:

291 m

Angle:

-90

Diameter:

47.6 mm

Casing:

AX to TD

4 - DATES OF OPERATIONS

Dates of drilling:

05.06.66 t0 12.07.66

Dates of logging:

06.08.66, 18.07.67, 30.07.68

Last visit:

30.07.68

Present condition:

Unknown

5 - CORES AND SAMPLES

Core taken:

Total

Location of core:

GSC storage, Vancouver

Condition of core:

Abbreviated

Geological summary:

Permian Phyllites, 3 m to TD

Measurements made:

Conductivity, heat generation, core description

6 - AVAILABILITY OF HOLE

Accessibility

Accessible within 100 m by road vehicle

Notes for finding:

East of Hwy 37 and North of Half Moon Creek. Take trail off road at top of rise from bridge, for approx. 100m and walk down bank towards creek.

Further information:

A. M. Jessop, T. J. Lewis, or J. G. Souther 613-995-5478, 604-656-8210, 604-666-0528

Name:

Hotailuh

Number

Locations

58 09.6N 129 51.9W

09 6446600 449100

Elevation:

1170 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop

Drilling Company:

Midwest

3 - SIZE AND DEPTH

Total depth:

427 m

Anale:

-90

Diameter:

47.6 mm

Casing:

AX to TD

4 - DATES OF OPERATIONS

Dates of drilling: 18.07.66 to 07.09.66

Dates of logging: 11.09.66, 24.07.67, 30.07.68, 09.09.72

Last visit:

09.09.72

Present condition: Unknown

5 - CORES AND SAMPLES

Core taken:

Total

Location of core: GSC storage, Vancouver

Condition of core:

Abbreviated

Geological summary:

Granitic intrusives of Hotailuh Batholith

Measurements made: Conductivity, heat generatio, core description

6 - AVAILABILITY OF HOLE

Accessibility

Accessible within 100 m by road vehicle

Notes for finding:

About 100 m west of Hwy 37, 7 km south of

Gnat Lakes.

Further information:

A. M. Jessop, T. J. Lewis or J. G. Souther 613-995-5478, 604-656-8210, 604-666-0528

Name:

Buckley Lake

Number 10

Location:

57 53.6N 130 51.3W

09 6418100 390000

Elevation:

899 m

2 - DRILLING OPERATIONS

Drilling Superviser: T. J. Lewis

Drilling Company:

Midwest

3 - SIZE AND DEPTH

Total depth:

427 m

Angle:

-90

Diameter:

47.6 mm

Casino:

AX to TD

4 - DATES OF OPERATIONS

Dates of drilling: 25.08.66 to 15.09.66

Dates of logging: 19.07.67, 18.06.71

Last visit:

Present condition:

Unknown

5 - CORES AND SAMPLES

Core taken:

Total

Location of core:

GSC storage, Vancouver

Condition of core:

Abbreviated

Geological summary:

Andesitic breccias and Greywackes

Measurements made: Conductivity, heat generation, core decription

6 - AVAILABILITY OF HOLE

Accessibility

Accessible by helicopter or by aircraft to Buckley

Lake and trail for approx 3 km.

Notes for finding:

In clearing 50 m NW of small lake on saddle 2 km W of SW corner of Buckley Lake. 2 km ENE of Stinking Lake

Further information:

A. M. Jessop, T. J. Lewis or J. G. Souther 613-995-5478, 604-656-8210, 604-666-0528

Name: Cochrane Number 11

Location: 46 06.2N 80 56.6W 17 5438700 504100

Elevation: 250 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop

Drilling Company: Heath & Sherwood

3 - SIZE AND DEPTH

Total depth: 474 m

Angle: -90

Diameter: 47.6 mm to TD

Casino: EX to 469 m

4 - DATES OF OPERATIONS

Dates of drilling: 28.10.67 to 21.11.67

Dates of logging: 30.05.69

Last visit: 30.05.69

Present condition: Unknown

5 - CORES AND SAMPLES

Core taken: Total

Location of core: EPB storage, Ottawa

Condition of core: Good

Geological summary: Gneisses of the Superior Province

Measurements made: Conductivity, heat generation

6 - AVAILABILITY OF HOLE

Accessibility Close to road, closest approach by vehicle

through field.

Notes for finding: Leave Cochrane on Hwy 574, east for 1 km, north

for 4 km, east for 4.5 km, on north side of road,

at top of small rise and in corner of field

Name: Kapuskasing Number 12

Location: 49 25.0N 82 22.8W 17 5474500 399900

Elevation: 230 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop

Drilling Company: Heath & Sherwood

3 - SIZE AND DEPTH

Total depth: 607 m

Angle: -90

Diameter: 47.6 mm to TD

Casing: Surface casing to 2 m

4 - DATES OF OPERATIONS

Dates of drilling: 25.11.67 to 12.01.68

Dates of logging: 19.07.68, 28.05.69

Last visit: 28.05.69

Present condition: Unknown

5 - CORES AND SAMPLES

Core taken: Total

Location of core: EPB storage, Ottawa

Condition of core: Good

Geological summary: Gneisses of the Superior Province

Measurements made: Conductivity, heat generation

6 - AVAILABILITY OF HOLE

Accessibility By walking through private farm. Ground wet.

Notes for finding: Apply at farm 1.5 km east of Brunetville crossroad.

Hole is about 500 m south of road in bush covered

area.

Name: Hearst Number 13

Location: 49 41.4N B3 32.1W 17 5507000 317200

Elevation: 260 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop

Drilling Company: Heath & Sherwood

3 - SIZE AND DEPTH

Total depth: 658 m

Angle: -90

Diameter: 47.6 mm

Casino: EX to TD

4 - DATES OF OPERATIONS

Dates of drilling: 17.01.68 to 08.03.68

Dates of logging: 20.07.68, 29.05.69

Last visit: 29.05.69

Present condition: Unknown

5 - CORES AND SAMPLES

Core taken: Total

Location of core: EPB storage, Ottawa

Condition of core: Good

Geological summary: Gneisses of the Superior Province

Measurements made: Conductivity, heat generation

6 - AVAILABILITY OF HOLE

Accessibility On private land, accessible to vehicle through

light bush.

Notes for finding: Drive east on Hwy 11 from Hearst for 8.2 km

beyond river, north for 2 km and west for 1 km. Hole is on gentle rise, 100-200 m north of road.

Name: Jackfish Number 14

Location: 48 51.5N 86 58.5W 16 5411400 501800

Elevation: 280 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop

Drilling Company: Heath & Sherwood

3 - SIZE AND DEPTH

Total depth: 611 m

Angle: -90

Diameter: 47.6 mm

Casing: EX to TD

4 - DATES OF OPERATIONS

Dates of drilling: 19.03.68 to 18.05.68

Dates of logging: 22.07.68, 01.06.69, 16.08.70

Last visit: 16.08.70

Present condition: Unknown

5 - CORES AND SAMPLES

Core taken: Total

Location of core: EPB storage. Ottawa

Condition of core: Good

Geological summary: Gneisses of the Superior Province

Measurements made: Conductivity, heat generation

6 - AVAILABILITY OF HOLE

Accessibility Accessible to vehicle

Notes for finding: Driving west on Hwy 17, 6 km beyond power line

near Jackfish Lake, turn north on bush road. Hole is in small clearing on right after about 100 m.

Name: Otoskwin River Number 15

Location: 51 49.5N 89 35.9W 16 5744500 320900

Elevation: 340 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop

Drilling Company: Heath & Sherwood

3 - SIZE AND DEPTH

Total depth: 612 m

Angle: -90

Diameter: 47.6 mm

Casing: EX to TD

4 - DATES OF OPERATIONS

Dates of drilling: 29.11.68 to 20.01.69

Dates of logging: 03.06.69, 14.08.70

Last visit: 14.08.70

Present condition: Unknown

5 - CORES AND SAMPLES

Core taken: Total

Location of core: EPB storage, Ottawa

Condition of core: Good

Geological summary: Gneisses of the Superior Province

Measurements made: Conductivity, heat generation

6 - AVAILABILITY OF HOLE

Accessibility Within 100 m by vehicle

Notes for finding: Follow Hwy 99 north from Pickle Lake junction

about 55 km to Otoskwin River crossing. Hole is about 30 m to left of road, 100 m beyond bridge.

Name:

Minchin Lake

Number 16

Location:

50 42.7N 90 28.8W 15 5620600 677900

Elevation:

395 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop

Drilling Company: Heath & Sherwood

3 - SIZE AND DEPTH

Total depth: 610 m

Anale:

-90

Diameter:

47.6 mm

Casing:

EX to TD

4 - DATES OF OPERATIONS

Dates of drilling: 01.02.69 to 12.03.69

Dates of logging: 04.06.69, 13.08.70

Last visit:

13,08.70

Present condition:

Believed to have been destroyed by road

reconstruction

5 - CORES AND SAMPLES

Core taken:

Total

Location of core: EPB storage, Ottawa

Condition of core:

Good

Geological summary:

Gneisses of the Superior Province, komatiite layer

Measurements made: Conductivity, heat generation

6 - AVAILABILITY OF HOLE

Accessibility Destroyed

Notes for finding:

Name:

English River

Number 17

Location:

49 38.6N 91 19.3W

15 5500100 621200

Elevation:

420 m

2 - DRILLING OPERATIONS

Drilling Superviser: A. M. Jessop

Drilling Company: Heath & Sherwood

3 - SIZE AND DEPTH

Total depth:

614 m

Angle:

-90

Diameter:

47.6 mm

Casing:

EX to TD

4 - DATES OF OPERATIONS

Dates of drilling: 16.03.69 to xx.04.69

Dates of logging:

05.06.69, 15.08.70

Last visit:

15.08.70

Present condition:

Unknown

5 - CORES AND SAMPLES

Core taken:

Total

Location of core:

EPB storage, Ottawa

Condition of core:

Good

Geological summary: Gneisses of the Superior Province

Measurements made: Conductivity, heat generation

6 - AVAILABILITY OF HOLE

Accessibility

Within 100 m by vehicle

Notes for finding:

Hole is in trees to west of Hwy 99, about 1 km south of the English River bridge, down road embankment and into an area of young trees (1969).

Further information:

A. M. Jessop 613-995-5478

Name: Wedgeport Number 18

Location: 43 45.4N 66 00.0W 20 4849000 258500

Elevation: 25 m

2 - DRILLING OPERATIONS

Drilling Superviser: J. A. Leslie, under contract

Drilling Company: Logan Drilling Ltd.

3 - SIZE AND DEPTH

Total depth: 483 m

Angle: -90

Diameter: 60 mm

Casing: NW to 3 m

4 - DATES OF OPERATIONS

Dates of drilling: 03.01.85 to 16.01.85

Dates of logging: 16.01.86, 17.01.86, 29.01.86, 13.02.86

Last visit: 13.02.86

Present condition: Preserved

5 - CORES AND SAMPLES

Core taken: Total

Location of core: N.S.D.M.E. storage, Stellarton, N.S.

Condition of core: Good

Geological summary: Granites of the Wedgeport batholith

Measurements made: none so far

6 - AVAILABILITY OF HOLE

Accessibility Accessible to vehicle

Notes for finding: South on Hwy 334 about 8 km from junction of Hwy 3,

west on Black Pond Road for about 700 m. Hole is

to south of road, 10 m from centre line.

Further information: M. J. Drury or J. A. Leslie

613-995-5478, 902-835-5009