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SOQUIP - PALEOGEOGRAPHY OF NORTHERN GULF OF ST-LAWRENCE (REFERENCE GUIDE TO REPORT #14068 (1982TD000-03)) - REPORT #14068A

PALEOGEOGRAPHY

OF

NORTHERN GULF OF ST-LAWRENCE

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Information contained in these annexes were used in the paleogeographic reconstruction of the Northern Gulf of St-Lawrence

ANNEX 1

Technical Sheets

1) Gaspesia Area

2) Anticosti Island Area

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Technical Sheets

Introduction :

For each of the three major geological areas a set of technical sheets were assembled and listed in alphabetical order.

These technical sheets list the age, the thickness, the lithology, the sedimentary environment and sediment source, reservoir potential, and source rock potential for the most important geological formations.

The figure number following the formation name refers to the paleogeographic reconstruction map to which this formation is associated.

GASPESIA AREA

Regions 1 to 5

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ANSE CASCON FORMATION (FIG. 10)

1- Age: Lower Silurian-Llandovery C

2- Thickness: 43-750 m

3- Lithology:

Medium to coarse grained, quartz arenite, with calcite cement. Thick bedded with crossbedding, highly bioturbated.

4- Source:

No current direction is noted.
Second cycle quartz grains?

5- Environments:

Nearshore, sand bars (?) shallow marine (intertidal) with lagoon facies and beach facies.

6- Reservoir potential:

Bourque (1981) indicated that the Anse Cascon Fm. has good reservoir characteristics. It is a mature sand, locally porous.

7- Source rock potential: Poor.

AWANTJISH FORMATION (FIG. 10)

1- Age: Lower Silurian-Llandovery C

2- Thickness: 600 - 2000' (182 - 610 m)

3- Lithology:

This Formation consists of dark greenish gray mudstone, interbedded with greenish-gray siltstone. Occasionnally, reddish beds occur. The lowermost 500' (150 m) contains fine-grained arkosic sandstones and greenish gray siltstones. Quartz grains are mature and at least second cycle probably derived from pre-existing sandstones.

4- Source:

In the Squatec-Cabano area, the granulometry decreases from the southwest to the northwest suggesting a southwest source.

5- Environment:

The Awantjish Formation is transgressive from southwest to northwest, and it thins in the same direction. The formation grades upward into the mature Val Brillant quartz sandstone. It appears that the Awantjish Formation was deposited in a shallow, oxygenated environment (Lajoie 71).

6- Reservoir potential:

The Awantjish Formation was encountered in two wells and it is a poor reservoir.

7- Source rock potential:

INRS-Petrole studies have showed a fair source rock potential.

BURNT JAM BROOK FORMATION (FIG. 10)

1- Age: Lower Silurian-Llandovery C

2- Thickness: 380 - 950 m (25 % volcanics dykes and sills)

3- Lithology:

Fine clastics sequence with shales and siltstones, olive green, locally red, and sometimes calcareous.

4- Source:

Same that Anse Cascon, it constitutes a lateral distal facies of the Mann and Anse Cascon Formation.

5- Environments:

Distal marine, offshore turbidites or slope facies.

6- Reservoir potential: Poor

7- Source rock potential: Poor

CABANO FORMATION (FIG. 9)

1- Age: Lower Silurian-Llandovery A and B

2- Thickness: 4000' - 8000' (1220 - 2439 m)

3- Lithology:

3 units :

1. The lower unit is composed of thick bedded conglomerates, sandstones, and gray shales (locally greenish). The conglomerates are composed of different lithic fragments derived from Cambro-Ordovician rocks.

2. The middle unit is composed of siltstones, light to dark gray, fine to coarse grained, locally laminated and cross-bedded.

3. The upper unit contains mostly fine bedded and laminated siltstones with calcareous or dolomitic cement. Sandstones are light gray, very fine grained, with calcareous cement. Some times cross-bedded.

4- Source:

Local emergent areas following the Taconic orogeny.

5- Environment:

Two different hypothesis were suggested for the Cabano. Lesperance (69) concluded that the Cabano was deposited in deep water as a result of turbidity currents. Lajoie (71) for his part suggested a rapidly sinking delta.

6- Reservoir potential: Unknown

7- Source rock potential: Unknown

CLEMVILLE FORMATION (FIG. 9)

1- Age: Lower Silurian-Llandovery A

2- Thickness: 105 to 600 m

3- Lithology:

The basal unit is composed of grey yellowish quartzitic fine grained sandstones. The upper unit contains thick bedded greenish gray mudstones. We observe locally thin cross-bedded beds of calcilutites and siltstones.

4- Source:

Emergent land masses to the south.

5- Environment:

Marine transgressive sequence. (Bourque 81).

6- Reservoir potential: Unknown

7- Source rock potential: Poor

CLORIDORME GROUP (FIG. 7)

1- Age: Middle and Upper Ordovician-Caradocian

2- Thickness: Approx. 6 100 m

3- Lithology:

This group is composed of 4 formations which are from base to top :

Manche d'Épée :	argillite and calcareous shales with dolomite beds;
Gros Morme :	argillite with graywake beds;
St-Pierre :	calcisiltite;
Rocher Penché :	Graywake with shales.

4- Source:

Destruction of the Taconic belt.

5- Environment:

Flysch sequence.

6- Reservoir potential: Poor.

7- Source rock potential: Poor.

GASCONS FORMATION (FIG. 13)

1- Age: Upper Silurian - Wenlockian to Pridolian.

2- Thickness: 200 - 1200 m (Black-Cape area)

3- Lithology:

Greenish gray mudstone to fine grained sandstone with calcareous and sometimes dolomitic cement, thick bedded with fair sedimentary structure. At the base some levels consist of conglomerates containing carbonate fragments.

4- Source: Local.

5- Environment:

Generally proximal marine facies, deposited below wave base. In the Baie des Chaleurs area it was deposited as a back reef facies behind the West Point.

6- Reservoir potential: Poor.

7- Source rock potential: Poor.

INDIAN POINT FORMATION (FIG. 13)

1- Age: Upper Silurian - Pridolian.

2- Thickness:
Approx. 555 m (Baie des Chaleurs)
200 - 657 m (Northern outcrop belt)
800 m (Mont-Alexandre Syncline)
1500 m (Restigouche area)

3- Lithology:

Gray to greenish gray mudstones to fine grained sandstones. It contains deformed carbonate fragments and slumped beds derived from the West Point.

4- Source:

Available information indicate a south-easterly source for the clastics.

5- Environment: Deltaic facies (Bourque 80).

6- Reservoir potential: Unknown.

7- Source rock potential: Poor.

LAFORCE (FIGS. 11 AND 12)

LAFORCE A

1- Age: Lower to Upper Silurian - Llandovery C6 to Wenlockian.

2- Thickness: 15 - 260 m West of St-Jean River

3- Lithology:

85 % sandy calcarenites to gray calcareous sandstones containing locally about 50 % quartz, volcanic, chert and lithic fragments.

15 % conglomeratic calcarenites

Locally laminated and cross bedded.

Note : See following page for rest of information.

LAFORCE (FIGS. 11 AND 12)

LAFORCE B (North Belt)

1- Age: Same as Laforce A.

2- Thickness: 40 m.

3- Lithology:

60 % thick bedded laminated and cross bedded gray to brownish sandy calcarenites.

40 % calcarenites with varying sand content.

The Laforce B is distinguished from the Laforce A by the lack of volcanic and chert fragments in the Laforce B.

LAFORCE A AND B

4- Source:

Land areas were still present from which the clastic and lithic components of these calcarenites were derived.

5- Environment: High energy, shallow marine

6- Reservoir potential: Presence of fracture porosity, very low matrix porosity.

7- Source rock potential: Unknown.

LA VIEILLE FORMATION (FIGS. 11 AND 12)

1- Age: Lower to Upper Silurian - Llandovery C6 to Wenlockian.

2- Thickness: 200 - 450 m (Western Grand Pabos area)

3- Lithology: Three units are recognized

- The lower and upper units are constitued of nodular and argillaceous calcilutite with some calcareous mudstones. Near the top of the upper unit a crinoidal calcarenite bed is encountered.
- The middle unit is composed of carbonates characterized by oncolithic, stromatolitic and algal laminites structures.
- Bioherms are locally encountered.

4- Source: Biogenic

5- Environments: Near shore facies grading to reefal assemblages.

6- Reservoir potential:

Possibility for intra and interparticle porosity development. Fracture porosity is also developped.

7- Source rock potential: Probably nil.

MANN FORMATION (FIGS. 9 AND 10)

1- Age: Lower Silurian - Llandovery

2- Thickness: 230 - 680 m

3- Lithology:

Homogeneous units of fine grained argillaceous and calcareous gray sandstones. Some intervals are crossbedded and show convolute bedding. Bioturbation is frequently observed.

4- Source: Possible mature, southerly source area.

5- Environments:

Transitional facies between the Anse Cascon bar facies and Burnt Jam Brook distal marine environment.

6- Reservoir potential: Poor.

7- Source rock potential: Unknown.

MATAPEDIA GP. (FIGS. 8 AND 9)

1- Age: Caradocian or Ashgillian to Llandoverian (Lower Silurian).

2- Thickness: 400 - 2800 m

3- Lithology:

This group is composed of an interbedded argillaceous limestone, soft shaly limestone; minor arenaceous limestons, calcareous shale, "lithic" limestone, and sandstone.

4- Source: Biogenic and local emergent land masses.

5- Environments: Shelf to distal marine (deep basin).

6- Reservoir potential: Nil.

7- Source rock potential: Unknown.

ROBITAILLE FORMATION (FIG. 12)

1- Age: Upper Silurian - Wenlockian to Ludlowian

2- Thickness: 1500' - 2500' (457 - 762 m)

3- Lithology:

The Robitaille Formation consists of varicolored quartz sandstones and siltstones. the base of the formation consists of quartz pebble conglomerates interbedded with quartz arenites. Red siltstones and conglomerates are encountered locally.

4- Source:

Measurements on current lineation indicators show a west or northwest source area.

5- Environment:

The Robitaille Formation is highly fossiliferous; its fauna is that of a normal marine, well oxygenated, shallow water, nearshore environment of high energy (Lajoie 71).

6- Reservoir potential: Unknown.

7- Source rock potential: Unknown.

SAYABEC (FIG. 12) AND WEST POINT (FIG. 13) FORMATIONS

1- Age: Upper Silurian
- West Point : Wenlockian - Ludlowian
- Sayabec : Pridolian

2- Thickness: 325 m (northern outcrop belt) to 700 m (Baie des Chaleurs).

3- Lithology:

Up to 21 distinct lithofacies have been described during the various studies of these two reef complexes. In outcrop they are predominantly composed of limestone.

4- Source: Biogenic

5- Environment:

Typical back reef - reef - fore reef assemblage.

6- Reservoir potential:

Although indurated in outcrops, the Sayabec and West Point should be considered as important exploration objectives in the sub-surface.

7- Source rock potential: Unknown.

SOURCES FORMATION (FIG. 10)

1- Age: Lower Silurian - Llandovery C

2- Thickness: 9 m

3- Lithology:

Dark brownish gray limestone calcilutite interbedded with gray calcareous shales locally very fossilliferous. Boucot (70) compares this Formation with the Jupiter Formation of Anticosti Island. At the Cap Chat River the Sources is interfingered with the Awantjish Formation.

4- Source: Biogenic

5- Environment: Distal marine ?

6- Reservoir potential: Unknown.

7- Source rock potential: Unknown.

ST-LEON FORMATION (FIG. 13)

1- Age: Upper Silurian - Ludlowian to Pridolian.

2- Thickness: 1350 m

3- Lithology:

The St-Leon Fm. is composed of 3 members each with their own particular assemblages.

Ruisseau Louis Mb:
Homogeneous sequence of gray siltstones and fine grained, calcareous sandstones, cross bedded and laminated. It contains abundant graptolite.

Owl Capes Mb: Lower unit
40 % light greenish gray calcareous siltstones
30 % sandstones with volcanic fragments
30 % sandy calcarenites

Upper unit
90 % conglomerates with volcanic fragments

Cedar Barns Mb:
60 % volcanic rocks
40 % sandstone with volcanic fragments

4- Source:

Generally from the south. Volcanic fragments are derived from the Ristigouche, Cedar Barns and Lac McKay Volcanics.

5- Environment: Proximal basin environment.

6- Reservoir potential: Poor.

7- Source rock potential: Poor.

VAL BRILLANT FORMATION (FIG. 11)

1- Age: Lower to Upper Silurian - Llandovery C6 to Wenlockian.

2- Thickness:

Cabano area:	300 - 600' (91 - 182 m)
Matapedia area:	500' (152 m)
Gaspe area:	40' (12 m)

3- Lithology:

The Val Brillant Formation is composed of white to pink sometimes gray, fine to medium grained, well sorted orthoquartzites with siliceous sometimes calcareous cement.

4- Source:

Available information indicates multiple source areas for this sandstone and reworking of previously deposited sediments.

5- Environment:

The Val Brillant was deposited in a stable well oxygenated, marine, environment. It possibly represents beach deposits associated with a prograding sand bar system.

6- Reservoir potential:

Locally this sandstone show porosities as high as 20 %.

7- Source rock potential: Nil.

WEIR FORMATION (FIGS. 9 AND 10)

1- Age: Lower Silurian - Llandovery

2- Thickness: 30 - 660 m (New Richmond area)

3- Lithology:

Dark green feldspathic fine grained sandstones and siltstones. This sequence is interbedded with medium to coarse grained quartz sandstones. Locally some gray, silty, fossilliferous limestones are encountered.

4- Source:

No mention of sedimentary structures or current direction indicators to show source area. Probably derived from local emergent areas to the SW.

5- Environment: Nearshore marine.

6- Reservoir potential:

Poor to fair porosities have been observed.

7- Source rock potential: Poor.

ANTICOSTI ISLAND AREA

Region No.6

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Ellis Bay -22

Gun River -23

Jupiter -24

Macasty -25

Mingan -26

Romaine -27

Vaureal -28

BECSCIE (FIG. 9)

1- Age: Lower Silurian - Llandovery A and B

2- Thickness:

173 m in outcrops. In Arco Anticosti No.1 it is approximately 460 m thick.

3- Lithology:

Shelf limestones (packstones to grainstones) with some mudstones.

4- Source: Biogenic.

5- Environment: Shallow to deep subtidal.

6- Reservoir potential: Poor.

7- Source rock potential: Poor.

CHICOTTE (FIG. 11)

1- Age: Lower Silurian - Llandovery C6

2- Thickness:

75 m at surface. It is indifferentiated from the Jupiter Fm. in the sub-surface where they are approximately 420 m thick.

3- Lithology:

Thick bedded, massive crinoidal lime calcarenites.

4- Source: Biogenic.

5- Environment: Shallow subtidal.

6- Reservoir potential: Unknown.

7- Source rock potential: Unknown.

ELLIS BAY (FIG. 8)

1- Age: Upper Ordovician - Ashgillian

2- Thickness:

75 m at surface and in the NACP No.1 well, but thickens to more than 300 m in the Arco No.1 well.

3- Lithology:

Sub-nodular to nodular, lime mudstones to argillaceous wackestones, with interbedded shales. The top of the formation contains reef sediments of biohermal and biostromal origin. In the sub-surface the Ellis Bay Fm. is included with the Vaureal Fm. in the paleogeographic reconstruction.

4- Source: Biogenic.

5- Environment: Intertidal to shallow subtidal.

6- Reservoir potential: Poor.

7- Source rock potential: Poor.

GUN RIVER (FIG. 10)

1- Age: Lower Silurian - Llandovery C

2- Thickness: Approx. 146 m at surface.

3- Lithology:

In outcrops the Gun River is similar to the Becscie but contains more lime mudstones and it is more argillaceous at the top.

4- Source: Biogenic.

5- Environment: Shallow to deep subtidal.

6- Reservoir potential: Poor.

7- Source rock potential: Poor.

JUPITER (FIG. 10)

1- Age: Lower Silurian - Llandovery C

2- Thickness:

171 m at surface. in the Arco No.1 well the Jupiter and Chicotte Fm. are approximately 420 m thick.

3- Lithology:

Echinoderm, bryozoa and brachiopod bearing lime packstones to grainstones interbedded with lime mudstones and greenish gray shales.

4- Source: Biogenic.

5- Environment:

Intertidal lagoon to subtidal back-reef environment.

6- Reservoir potential: Poor.

7- Source rock potential: Poor.

MACASTY (FIG. 7)

1- Age: Middle to Upper Ordovician - Caradocian.

2- Thickness: 82 m LGPL No.1
30 m NACPA No.1
173 m ARCO Anticosti No.1

3- Lithology: Bituminous shales.

4- Source: Destruction of Taconic belt.

5- Environment: Deep marine - Foreland Basin.

6- Reservoir potential: None.

7- Source rock potential: Probably high.

MINGAN (FIGS. 6 AND 7)

1- Age: Middle Ordovician - Llanvirnian (Fig. 6) to Caradocian (Fig. 7).

2- Thickness:
47 m Mingan Island
320 m NACPA No.1
396 m LGOR No.1
548 m ARCO No.1

3- Lithology:

Very fossilliferous lime wackstones to packstones with shale or mudstone interbeds. At the base it contains a dolomitic sandstone, locally conglomeratic.

4- Source:

- Biogenic.
- Clastics are probably derived from the Precambrian shield to the North.

5- Environment:

1. Sandstone : probably represents a basal transgressive sequence.
2. Carbonate sequence : shallow to deep water shelf with back reef facies.

6- Reservoir potential:

Porosities ranging from 3 to 7 % have been encountered in wells.

7- Source rock potential: Unknown.

ROMAINE (FIG. 5)

1- Age: Lower to Middle Ordovician - Arenigian.

2- Thickness: 80 m Mingan Island
792 m ARCO Anticosti No.1
456 m LGOR No.1

3- Lithology:

Thick bedded cream coloured, sometimes gray crystalline to micro-crystalline dolomites. Occasional bituminous shales and limestones beds are encountered.

4- Source: Biogenic.

5- Environment:

Shallow water, intertidal to supratidal.

6- Reservoir potential:

Fair, with 5 to 10 % porosities commonly encountered.

7- Source rock potential: Unknown.

VAUREAL (FIG. 8 GROUPED WITH ELLIS BAY FM.)

1- Age: Upper Ordovician - Ashgillian.

2- Thickness: 463 m on surface
1097 m in ARCO Anticosti No.1

3- Lithology:

At the top, the Vaureal is composed of lime wackestones to grainstones with shale interbeds. Silty limestones with mudstones and calcisiltites become more abondant in the basal sequence.

4- Source:

The clastic component of this formation may be derived from a southerly source.

5- Environment:

Basal sequence : subtidal.

Upper sequence : intertidal sedimentation.

6- Reservoir potential: Poor

7- Source rock potential: Unknown.

WESTERN NEWFOUNDLAND AREA

Region No.7

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BRADORE (FIG. 3)

1- Age: Lower Cambrian.

2- Thickness: Bradore : 91,4 m
Cloud Mountains : 178,3 m

3- Lithology:

Thin basal conglomerates with granite and quartzite pebbles, overlain by pinkish coarse quartzitic sandstones. At the top, a thin conglomeratic bed is encountered.

4- Source:

Derived from the Precambrian basement.

5- Environment:

Deposited as transgressive beaches and sheet sands.

6- Reservoir potential:

The basal Bradore shows intergranular porosity ranging from 5 to 15 % (INRS 75).

7- Source rock potential: Unknown.

CLAM BANK (FIG. 13)

1- Age: Upper Silurian - Ludlowian to Pridolian.

2- Thickness: 457 m (Rogers 1965)
518 m (Schubert and Dunbar 1934)
572 m (Sullivan 1940)

3- Lithology:

Red sandstones and mudstones with siltstones and shales and some limestone beds.

4- Source: No information.

5- Environment: Continental and shallow marine.

6- Reservoir potential:

According to Corkin (1965) the Clam Bank shows excellent reservoir characteristics. This remains unverified.

7- Source rock potential: Unknown.

CODROY GP. (NOT MAPPED)

1- Age: Mississippian.

2- Thickness: Unknown.

3- Lithology:

Assemblage of green to maroon and reddish green micaceous sandstones. Some red conglomeratic limestones and brown fossiliferous limestones are encountered interbedded with gypsum beds. (Corkin 1965).

(Equivalent of the Horton and Windsor Gps - Baird and Côté 1964).

4- Source: Unknown.

5- Environment: Probably continental.

6- Reservoir potential: Unknown.

7- Source rock potential: Unknown.

FORTEAU (FIG. 3)

1- Age: Lower Cambrian.

2- Thickness: min.: 56,3 m
max.: 213,0 m (Douglas and tremblay 1975).

3- Lithology:

3 units are encountered. (Fong, PhD thesis)

A) Base : grayish red bioturbated dolomites characterised by the occurrence of some archeocyathides.

B) Middle : alternance of greenish gray shales and dark gray fossilliferous limestones.

C) Top : gray, fossilliferous, oolithic limestones overlain by archeocyatides reef assemblages.

4- Source: Biogenic.

5- Environment:

Lagoonal and back reef with patch reef development. (N.P. James 1978).

6- Reservoir potential: Unknown.

7- Source rock potential: Unknown.

KIPPENS (FIG. 3)

1- Age: Lower to Middle Cambrian.

2- Thickness: 61 m

3- Lithology:

Characterised by greenish gray calcareous shales, and by some fossilliferous limestone beds. Bituminous shales and some sandstones have been observed (Corkin 1965).

4- Source: Unknown.

5- Environment: Distal facies of Forteau.

6- Reservoir potential:

Porous sandstone associated with bituminous shale (Corkin 1965). Unverified.

7- Source rock potential:

Bituminous shale (Corkin 1965). Unverified.

LONG POINT (FIG. 7)

1- Age: Middle to Upper Ordovician - Llandeilian to Ashgillian.

2- Thickness: 600 m (Fahraeus 1972).
762 m (Rogers 1965).

3- Lithology:

2 members have been described.

- Lourdes (60 m) : (Base) — A basal unit of light gray sandstones overlain by light gray limestones, with shales (Fahraeus, 1973).

- Winterhouses : (Top) — Limestones - shales and siltstones at the base overlain by mostly sandstones with shales and siltstones at the top.

4- Source:

Lourdes : Biogenic.

Winterhouses : Unknown.

5- Environment:

Regressive sequence from shallow subtidal (Lourdes) to shallow marine, fluvio-deltaïc (Winterhouses). Fahraeus 1973.

6- Reservoir potential: Unknown.

7- Source rock potential: Unknown.

MAINLAND (MENTIONNED ON FIG. 7)

1- Age: Middle Ordovician - Llanvirnian to Llandeilian.

2- Thickness: variable, max.: 1815 m ?

3- Lithology:

Green, slightly calcareous quartz sandstones with some bluish - black calcareous shales. (Klappa - Opalinski - James, 1980).

4- Source:

Destruction of the Humber Arm and Hare Bay klippens. (Stevens 70).

5- Environment:

Delta fronts to deep sea turbidites (Stevens 70). Similar depositional environment as the Cloridorme Gp. in Gaspesia.

6- Reservoir potential:

Porosity with oil stains (J. Fleming 70)
Gas and oil shows at Persons Pond Well No.1-65

7- Source rock potential: Unknown.

MARCH POINT (FIG. 4)

1- Age: Middle to Upper Cambrian.

2- Thickness: 197 m to 275 m (Douglas - Tremblay, 1975)
(Riley 1962)

3- Lithology:

A) Base : Finely laminated to thick bedded and massive gray-white, red and green quartz arenites.

B) Middle : Thin bedded, oolitic and conglomeratic gray limestones interbedded with shales. Changes to the west to gray-black siltstones.

C) Top : Thin bedded, light gray dolomites. Interbedded with calcareous or dolomitic sandstones and thin shales. Dessication cracks have been observed in this interval.

4- Source:

Clastics would be derived from the Precambrian basement.

5- Environment: Probably nearshore.

6- Reservoir potential:

7 % primary, intergranular porosities have been observed (INRS 75).

Corkin (1965) mentions the occurrence of vuggy porosity in dolomites.

7- Source rock potential: Unknown.

PETIT JARDIN (FIG. 4)

1- Age: Upper Cambrian.

2- Thickness: 151 m (Douglas - Tremblay, 1975)

3- Lithology:

A) Base : Thin bedded, gray, lime mudstones at the top, interbedded with argillaceous shales, changes to the West to argillaceous black-gray siltstones.

B) Top : Thinly bedded light gray dolomites interbedded at the base with more argillaceous intervals.

4- Source: Biogenic.

5- Environment: Probably nearshore.

6- Reservoir potential:

Secondary porosity (vugs) (Corkin 1965).

7- Source rock potential: Unknown.

ST-GEORGE (FIG. 5)

1- Age: Lower Ordovician - Tremadocian to Arenigian.

2- Thickness: 156 m (H.M. Kluyver 1974) to 336 m (Douglas - Tremblay, 1975)

3- Lithology:

From Kluyver (1974) the St-George is composed of 3 units as follows:

- Barbace Point (21 m) : Dense dolostones, showing diagenetic solution features.
- Catoche (100 m) : Well bedded limestones, locally dolomitised, with a conglomeratic level.
- Port-au-Choix (35 m) : Massive sugary dolostones grading into silty dolostones, with diagenetic solution features.

4- Source: Biogenic.

5- Environment: Open marine, intertidal to subtidal.

6- Reservoir potential:

Diagenetic solutions features (Kluyver 1974).

7- Source rock potential: Unknown.

TABLE HEAD (FIG. 6)

1- Age: Middle Ordovician - Llanvirnian.

2- Thickness: 539 m (Klappa - Opalinski - James 1980)
545 m (Klappa - James 1980)

3- Lithology: 4 formations

Table Point (256 m) : bioturbated, fossilliferous, gray limestones and minor dolostones (Sponge bioherm).

Table Cove (94 m) : interbedded lime mudstones and gray-black calcareous shales.

Black Cove (9 m) : black graptolitic shales.

Cap Cormorant (180 m) : interbedded terrigenoclastic and calcareous sandstones, siltstones, and shales, with intercalations of massive thick-bedded lime megabreccias.

4- Source: Biogenic.
Clastics are derived from the East (Taconic destruction).

5- Environment:

Table Point : intertidal to subtidal

Table Cove : slope of platform margin

Black Cove : restricted circulation by suspension settling of fine clastic material

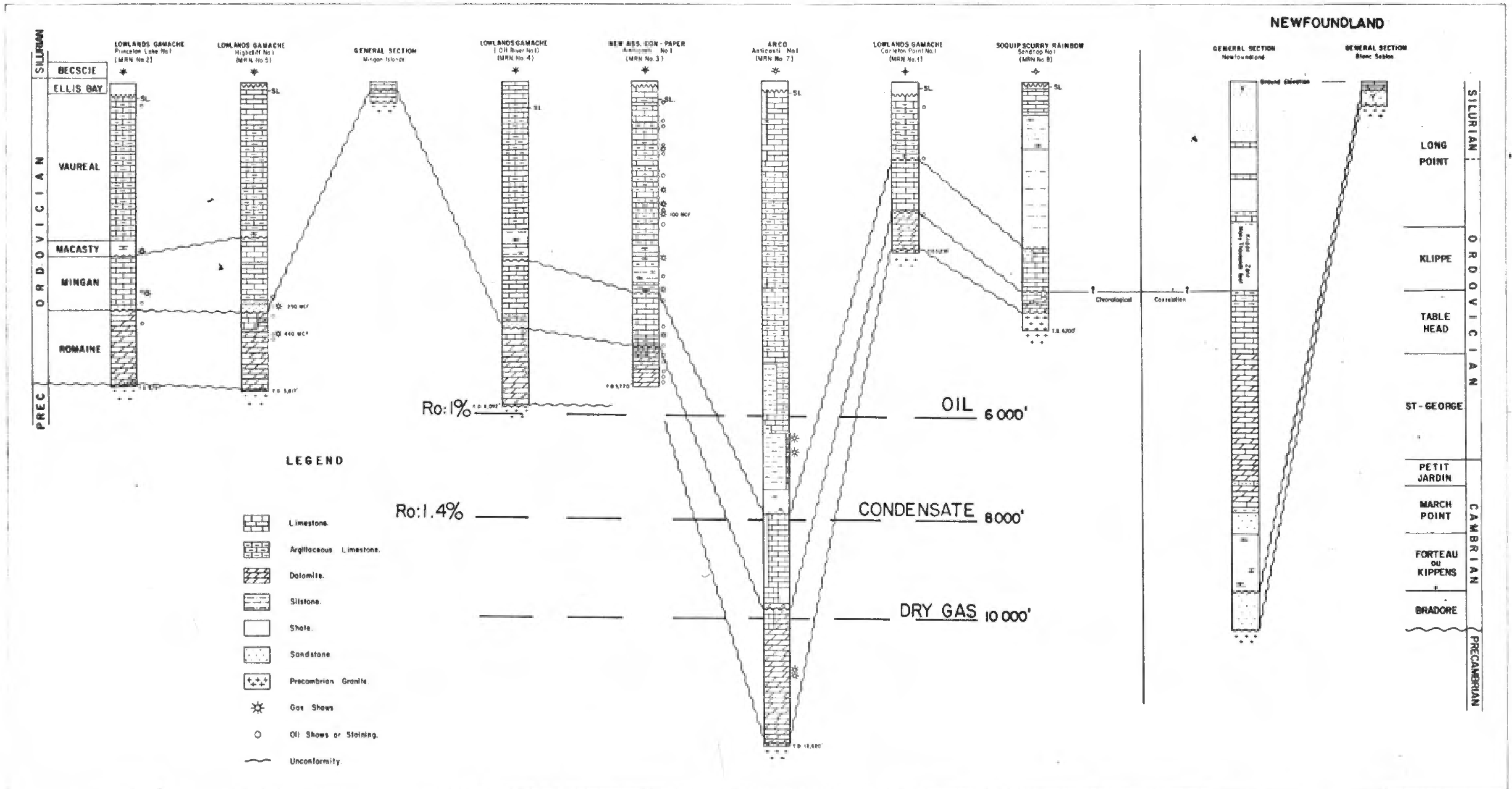
Cap Cormorant : destruction of the Taconic allochthonous.

6- Reservoir potential: Unknown.

7- Source rock potential: Unknown.

ANNEX 2

General information



RO: REFLECTANCE DATA.

SOQUIP

ANTICOSTI NEWFOUNDLAND

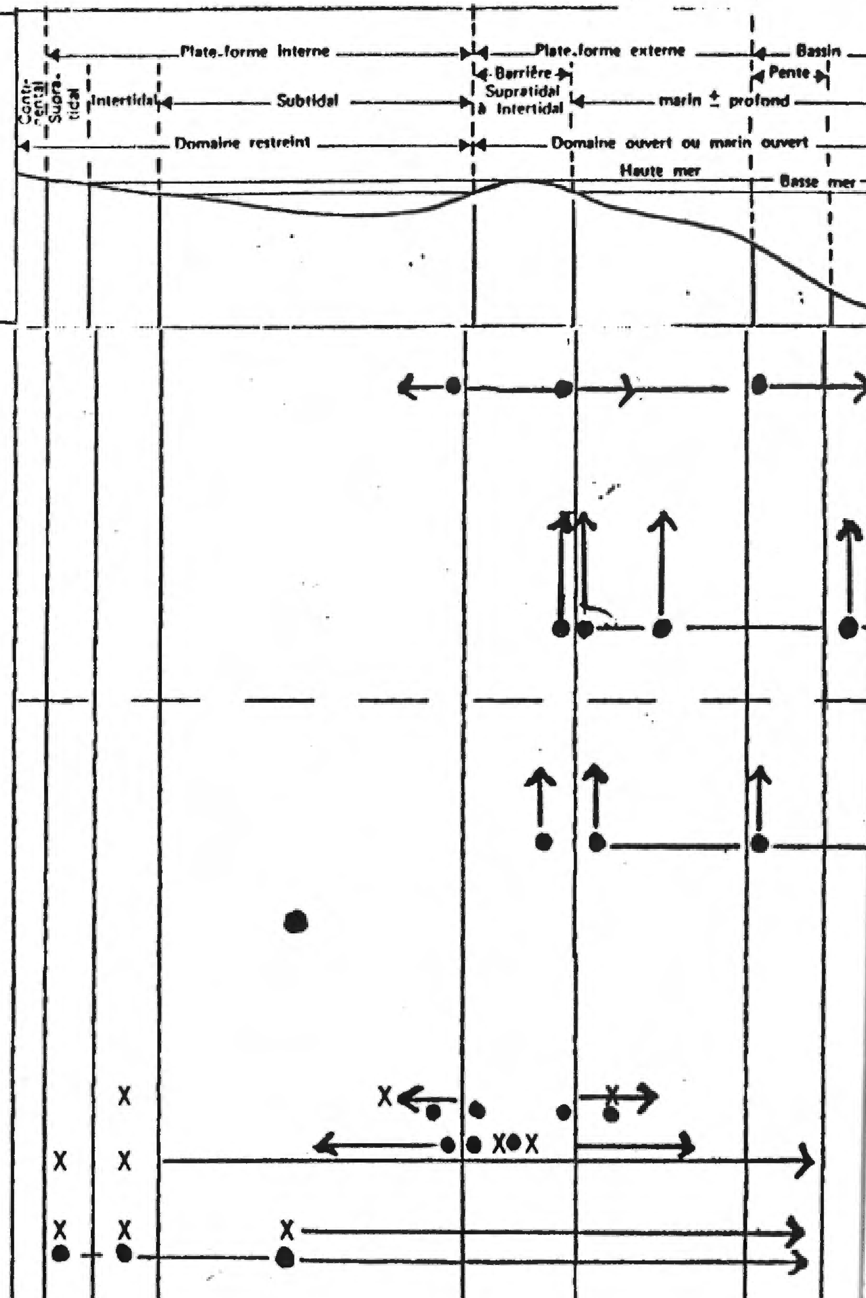
STRATIGRAPHIC CORRELATION AND GEOCHEMICAL DATA

PREP BY: J. Boudreault | SCALE:
DATE: Nov. 1981

C-1351-1A

FORMATIONS	NOM DES PUITS ILE D'ANTICOSTI						
	LGPL	LGH	LGOR	NACPA	AÀ	LGCP	SANDTOP
JUPITER-CHICOTTE					●		
GUN RIVER					↑		
BECSCIE					●		
Limite Ordovicien - Silurien							
ELLIS BAY					↑		
VAUREAL					●		
MACASTY					●		
MINGAN							
TRENTON	X			X	●	X	
CHAZY	X			X	●		
ROMAINE	X			X	●	X	

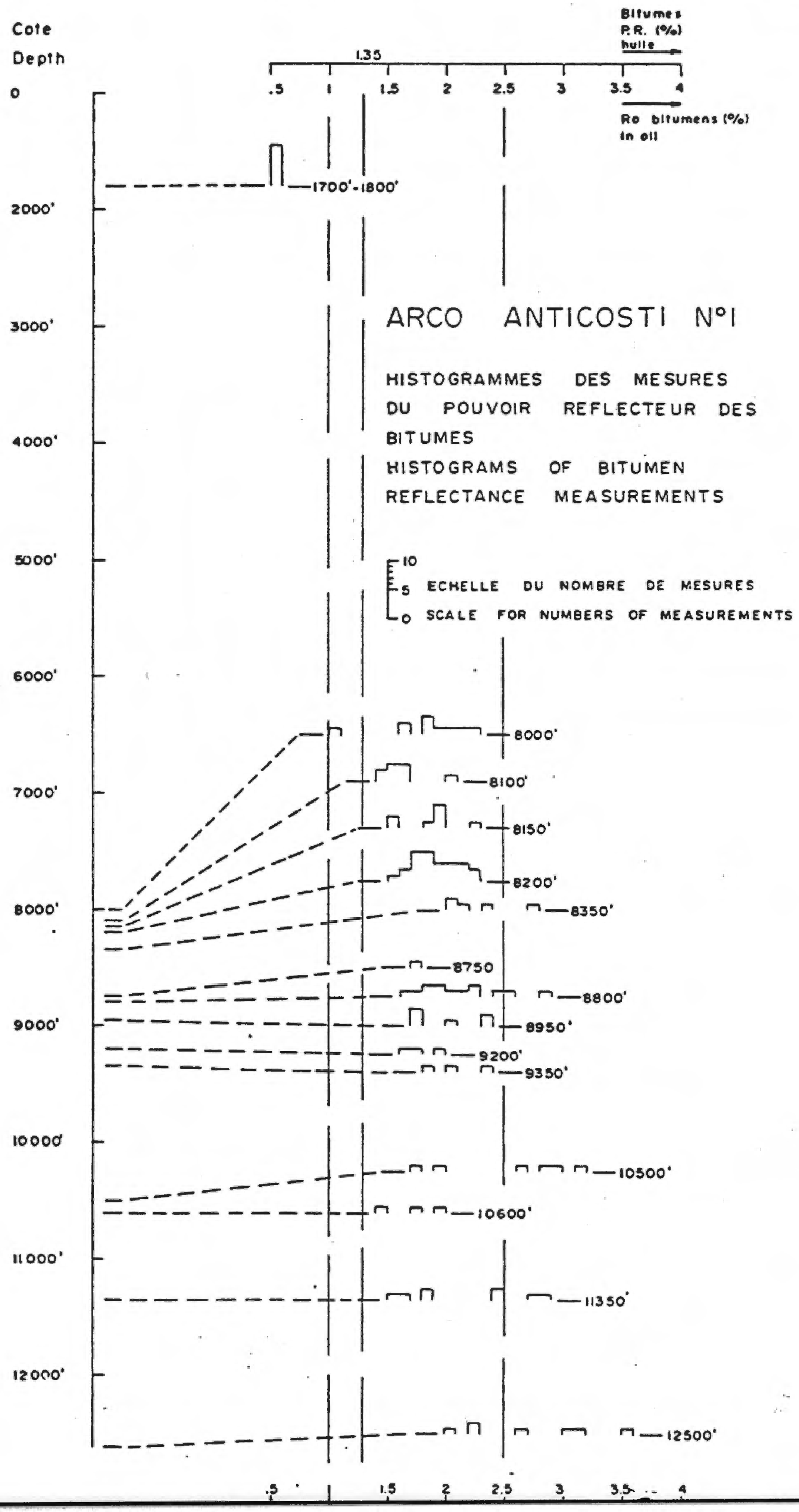
MILIEU DE SEDIMENTATION



Source, INRS 74, 75

Tableau résumant l'environnement sédimentaire des Formations de l'Ile d'Anticosti.

Fig. 5


Cote
Depth
Bitumes
P.R. (%)
huile
1.35
.5
1
1.5
2
2.5
3
3.5
4
Ro bitumens (%)
in oil
0
2000'
3000'
4000'
5000'
6000'
7000'
8000'
9000'
10000'
11000'
12000'
1700'-1800'
ARCO ANTICOSTI N°1
HISTOGRAMMES DES MESURES DU POUVOIR REFLECTEUR DES BITUMES
HISTOGRAMS OF BITUMEN REFLECTANCE MEASUREMENTS
10
5
0
ECHELLE DU NOMBRE DE MESURES
SCALE FOR NUMBERS OF MEASUREMENTS
8000'
8100'
8150'
8200'
8350'
8750
8800'
8950'
9200'
9350'
10500'
10600'
11350'
12500'

ANTICOSTI ISLAND

RESERVOIR DATA

WELL NAME	FORMATION	LITHO.	DEPTH ft	Ø(Ø̄-AVERAGE)	K md	NO. OF DSTS	REMARKS	REFERE
New Associated consolidated Paper Anticosti No. 1	Mingan	LMST/SS	4955-5056	.03 Ø̄		NIL	Vaureal Formation gas blowing at 2307 to 2340; 100 mcf/D decreasing to 10 mcf/D after 12 hours. Many oil and gas showings	1
	Romaine	DOL	5203-5719	.09 Ø̄	.01-14	NIL		1,2
Lowland Gamache Highcliff No. 1	Mingan	LMST SS	3077-3277 4216-4286	50' of .05 16' of .05 Ø̄		2	4258-4288, 250 Mcf/D dec. to 27 Mcf/D after 60 mins	3
	Romaine	DOL	4820-4826 5200-5350	6' of .08 18' of .06 Ø̄		3	4795-4832,440 Mcf/D dec. to 120 Mcf/D after 60 mins	3
Lowland Gamache Oil River No. 1	Mingan	LMST SS	3667-3690 4642-4693	10' of .04 7' of .05 Ø		2 1 misrun	4515-4640, recupered 40' of slightly gas cut mud.	3
	Romaine	DOL	5260-5280 5516-5531	18' of .05 15' of .09 Ø		4 3 misrun	5200-5342 recupered 100' mud and 540' salt water	3
Lowland Gamache Carleton Point No.1	Mingan	LMST				NIL		
	Romaine	DOL		78' of .05 Ø̄	15'with K 14	NIL		4
ARCO Anticosti No.1	Vaureal	LMST	6935-6940	4' of .04 Ø		NIL		3
	Mingan	SS	9738-9855	10' of .07 Ø		NIL		3
	Romaine	DOL	10838-11115 11218-11230	49' of .05 8' of .10 Ø̄		1	11206-11297', REC.1250'MUD and 450' very slightly gas cut mud	3 3
Lowland Gamache Princeton Lake No.1	Mingan Romaine	LMST/SS DOL	4178-4231	.01 Ø̄		NIL	Light oil weeping and staining, salt water	Drilli repor
SANDTOP NO. 1	Mingan Romaine	LMST DOL				1	Tight Vaureal Formation	

Remarks: Porosity into the Romaine Formation is secondary (vugs and intergranular) and fractures.

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2. Core Laboratories Ltd.
3. Cole Engineering Ltd. - Log analyses
4. Roliff W.A., 1968 - Oil and Gas Expl. Vol. 19

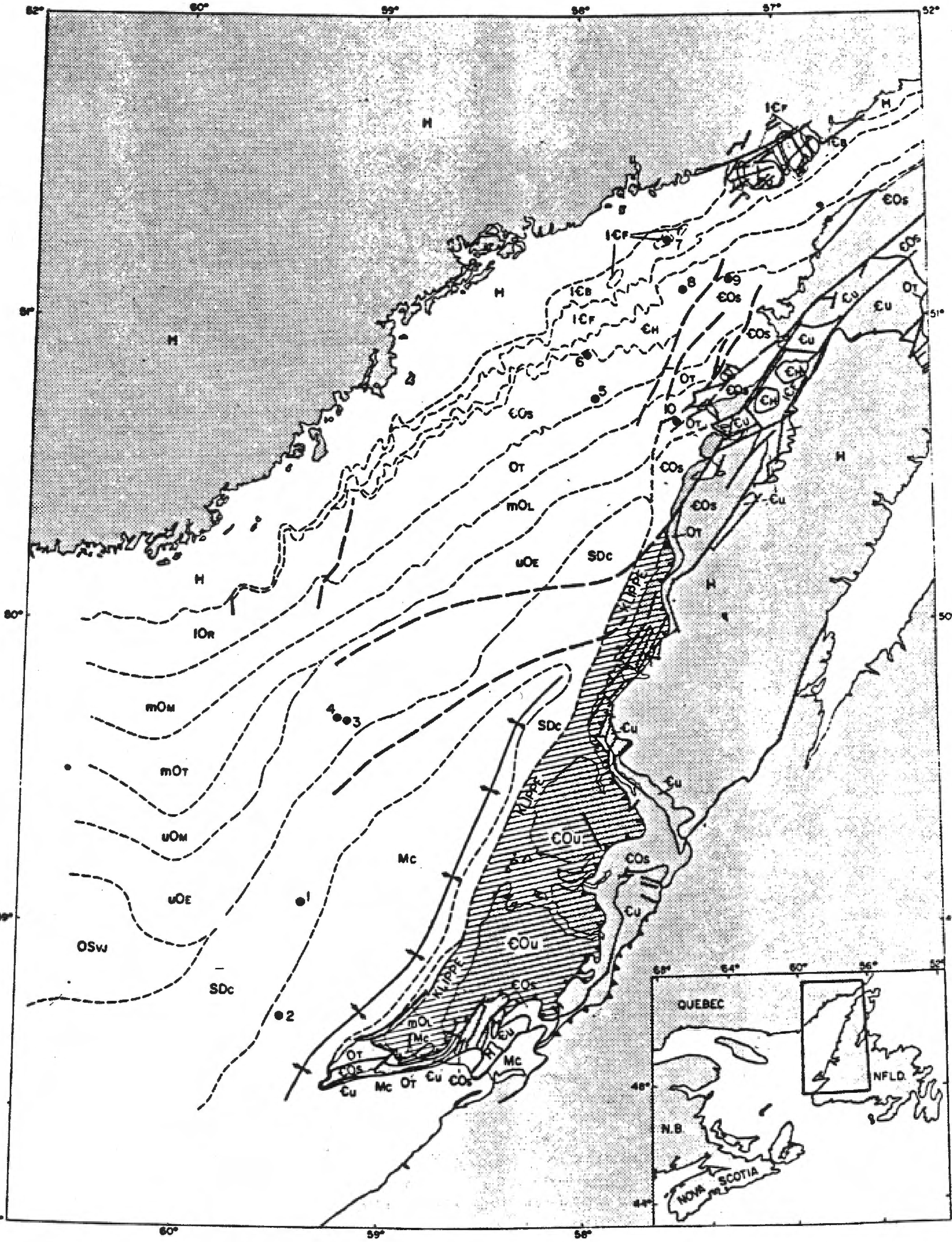

Figure 1.3. Geological map, northeastern Gulf of St. Lawrence. Key to map is on opposite page. Scale 1: 2 000 000.

LEGEND

MISSISSIPPIAN

Mc	CODROY GROUP: grey and red sandstone, siltstone, shale and conglomerate (may include undifferentiated ANGUILLE FORMATION).

SILURIAN AND DEVONIAN

UPPER SILURIAN AND LOWER DEVONIAN

SDc	CLAM BANK FORMATION: red sandstone, siltstone and shale, succeeded by grey, finely crystalline fossiliferous limestone.

ORDOVICIAN AND SILURIAN

UPPER ORDOVICIAN, LOWER AND MIDDLE SILURIAN

OSvj	VAUREAL, ELLIS BAY, BECSCIE, GUN RIVER AND JUPITER RIVER FORMATIONS undivided: limestones with interbedded shales.

ORDOVICIAN

UPPER ORDOVICIAN

uOE	ENGLISH HEAD FORMATION: grey, micaceous, fissile shale with interbeds of grey argillaceous to silty fossiliferous limestone.
uOM	MACASTY FORMATION: black shale with interbeds of limestone.

MIDDLE ORDOVICIAN

mOT	TRENTON AND BLACK RIVER GROUPS: limestone and shale.
mOL	LONG POINT FORMATION: limestone, succeeded by siltstone and shale.

LOWER AND MIDDLE ORDOVICIAN

mOM	MINGAN FORMATION: limestone with minor sandstone and shale.
OT	TABLE HEAD FORMATION: brown, argillaceous limestone and brecciated limestone.

CAMBRIAN (?) AND LOWER ORDOVICIAN

lOR	ROMAINE FORMATION: brown and tan, fine to medium crystalline dolomite.
ꞒOS	ST. GEORGE GROUP: brown and tan, fine to coarsely crystalline dolomite, and brown micritic limestone (includes OT southeast of klippe).

CAMBRIAN AND ORDOVICIAN

ꞒOU	UNDIVIDED: slate, greywacke, quartzite, limestone conglomerate and ophiolitic rocks.

CAMBRIAN

LOWER AND MIDDLE CAMBRIAN

ꞒH	HAWKE BAY FORMATION: grey fine to coarse grained ortho-quartzitic sandstone, succeeded by grey, fine crystalline dolomite and limestone, with interbeds of grey shale.
lꞒF	FORTEAU FORMATION: brown, finely crystalline algal limestone with interbeds of grey shale.
lꞒB	BRADORE FORMATION: red, medium to coarse grained sandstone and conglomerate succeeded by grey, fine grained sandstone.
ꞒU	CAMBRIAN UNDIVIDED: sandstone, dolomite, shale and slate.

HELIKIAN OR OLDER

H	Grenville terrain consisting of gneissic and granitic rocks.

—┼—	Synclinal axis	
— — — —	Lineament	(assumed fault)
——— — —	Fault	(defined, approximate)
——— – – – –	Geological boundary	(defined, seismic, assumed)
⊕	Core Hole	(GSC)
●	Core Hole	(Other agencies)

Geology by B.V. Sanford and R.T. Haworth

ANNEX 3

BIBLIOGRAPHY

1) Gaspesia Area

2) Anticosti Island Area

3) Newfoundland Area

GASPESIA AREA

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