

# **Schedule of Wells**

Newfoundland and Labrador Offshore Area

April - 2009

## Introduction

The Schedule of Wells is a summary of the results of all wells drilled offshore Newfoundland and Labrador, within the area of jurisdiction of the Canada-Newfoundland and Labrador Offshore Petroleum Board. The information contained herein has mainly been compiled from well history reports submitted by industry operators in accordance with section 228 of the *Canada Oil and Gas Drilling Regulations* prior to proclamation of the *Canada-Newfoundland Atlantic Accord Implementation Acts*, and in accordance with requirements established by the Board thereafter.

Information is released from confidential status in accordance with subsection 119(5) of the *Canada-Newfoundland Atlantic Accord Implementation Act*, and subsection 114(5) of *The Canada-Newfoundland Atlantic Accord Implementation (Newfoundland Act)*, which stipulate that most information or documentation may be disclosed as follows:

- in respect of an **exploratory well**, two years following the termination date of that well.
- in respect of a **delineation well**, the later of two years following the termination date of the relevant exploratory well and ninety days following the termination date of the delineation well.
- in respect of a **development well**, the later of two years following the termination date of the relevant exploratory well and sixty days following the termination date of the development well.

The “data release date” is provided in the information posted for individual wells and is referenced to the “well termination date” posted for the well.

Information which is obtained from development wells subsequent to the termination date is not released from confidential status (i.e. production logging, abandonment of a perforated zone or reperforation). Should the status of a development well change (i.e. abandonment of the entire well or the conversion from a producer to an injector) only the change of status will be noted in the Schedule of Wells. Occasionally, with the drilling of additional wells and the acquisition of new data there may be a change in the formation tops pick. Formation tops and other data for previously released wells may be revised at this

later date. There is a date posted in the upper right corner of each well ‘ticket’. This date reflects the timing of the latest update to that well information.

The wells in the Schedule have been classified as exploratory, delineation or development, as defined in subsection 119(1) of the *Canada-Newfoundland Atlantic Accord Implementation Act*. This subsection defines an exploratory well as “a well drilled on a geological feature on which a significant discovery has not been made”; a delineation well as “a well that is located in relation to another well penetrating an accumulation of petroleum that there is reasonable expectation that another portion of that accumulation will be penetrated by the first-mentioned well and that the drilling is necessary in order to determine the commercial value of the accumulation”; and a development well as “a well that is so located in relation to another well penetrating an accumulation of petroleum that it is considered to be a well or part of a well drilled for the purpose of production or observation or for the injection or disposal of fluid into or from the accumulation”.

Where a well is classified as a “delineation well” or a “development well”, and that well has an exploration or delineation component associated with its approval, then data associated with the “exploration” or “delineation” component will be treated as “privileged data” to be released accordingly.

In this Schedule, wells are arranged by chronological order of spud date. Information for wells drilled prior to January 1, 1979 is reported in both SI and Imperial units. Information for wells drilled subsequently is reported in SI units only.

The Schedule of Wells provides comprehensive data for all wells drilled offshore Newfoundland and Labrador, including casing, coring, testing and formation information. The location data for the wells have been converted from the NAD27 to the NAD83 geographic datum.

The Unique Well Identifier (UWI) reflected in this schedule is a 16 digit code for standard well identification developed in 1978 by the Geoscience Data Committee of the Canadian Petroleum Association, more recently replaced by the Canadian Association of Petroleum Producers (CAPP).

The UWI designations represent a modified approach to assigning UWI's to East Coast Canada offshore wells. This approach is captured in the recently revised draft (December 2000) to the original UWI document (The Canadian Unique Well Identifier - July 1978).

The 1<sup>st</sup> digit in the 16 digit code is a '3' reflecting the 'Federal Survey System' which is in use for all offshore Newfoundland wells. The 2<sup>nd</sup> and 3<sup>rd</sup> digits indicate the sequence in which wells were drilled within a common Unit/Section, with '00' representing the first well, '02' (skipping '01') representing the 2<sup>nd</sup> well, '03' representing the 3<sup>rd</sup> well, etc. Digits 4 through 6 represent the Unit and Section number of the grid in which the well is located. Digits 7 through 15 represent the latitude (digits 7-10) and longitude (digits 11-15) in degrees and minutes of the upper right corner of the grid in which the well was spudded (i.e., surface location). The last or 16<sup>th</sup> digit represents the event sequence code and is used for the expressed purpose of identifying new wellbore, i.e. the use of a '0' represents the original wellbore and '1' represents the 1<sup>st</sup> side track of the well or deepening of the well beyond that approved with '2' representing the 2<sup>nd</sup> sidetrack etc..

The Schedule of Wells also lists all other information pertaining to the well, including casing size and set depth, well testing information, coring activity information, wellbore perforation intervals and geological information. However, it should be noted that any testing, coring, perforation and geological information will only be listed in accordance to the data release guidelines discussed earlier.

### Source of Geological Information

Unless otherwise stated, formation tops used in this Schedule of Wells were selected by staff of the Canada-Newfoundland and Labrador Offshore Petroleum Board, on the basis of industry lithologic and wireline logs, biostratigraphic and lithostratigraphic data from industry reports and reports from Geological Survey of Canada and available publications.

Development wells (unlike Exploration and Delineation wells) are frequently highly deviated and consequently require both a Measured Depth value and a True Vertical Depth value. Frequently the upper portion of the well is logged while drilling (LWD and MWD data) and the reservoir section of the well is logged by wireline and/or pipe conveyed logging tools. Due to the different methods for acquiring the logging data

there are frequently large differences in the depths to formation tops from one logging run to another or from one logging method to another. One final log will be designated the "primary depth control log" and all detailed calculations should be referenced to this log. In this publication, the relevant log has been indicated as the reference log but it is not necessarily the "primary depth control" log. For this reason, the user is cautioned to ensure that any calculations based on different logs or different logging methods are referenced back to the "primary depth control" log and the relevant directional survey.

Publications are listed below:

### **LABRADOR SHELF**

#### [Lithostratigraphic Chart](#)

#### Selected Bibliography:

Balkwill, H.R., McMillan, N.J., MacLean, B., Williams, G.L. and Srivastava, S.P. 1990. Geology of the Labrador Shelf, Baffin Bay and Davis Strait. In: Keen, M.J. and Williams, G.L. (Eds.), Geology of the continental margin of Eastern Canada. Geological Survey of Canada, Geology of Canada Series, No. 2, p. 293-348 (also Geological Society of America, The Decade of North American Geology, v. I-1).

Barss, M.S., Bujak, J.P. and Williams, G.L. 1979. Palynological zonation and correlation of sixty-seven wells, Eastern Canada. Geological Survey of Canada, Paper 78-24.

Bell, J.S. (Co-ordinator) 1989. East Coast Basin Atlas Series Labrador Sea. Geological Survey of Canada Frontier Geoscience Program.

McWhae, J.R.H., Elie, R., Laughton, K.C. and Gunther, P.R. 1980. Stratigraphy and petroleum prospects of the Labrador Shelf. Bulletin of Canadian Petroleum Geology, v. 28, No. 4, p. 460-488.

Miller, P.E. and D'Eon, G.J. 1988. Labrador Shelf paleoenvironments. Geological Survey of Canada, Open File Report.

Umpleby, D.C. 1979. Geology of the Labrador Shelf, Geological Survey of Canada, Paper 79-13.

## SOUTH GRAND BANKS

### [Lithostratigraphic Chart](#)

#### Selected Bibliography:

Amoco Canada Petroleum Company Limited and Imperial Oil Limited 1973. Regional geology of the Grand Banks. Bulletin of Canadian Petroleum Geology, v. 21, p. 479-503.

Barss, M.S., Bujak, J.P. and Williams, G.L. 1979. Palynological zonation and correlation of sixty-seven wells, Eastern Canada. Geological Survey of Canada, Paper 78-24.

Jansa, L.F. and Wade, J.A. 1975. Geology of the continental margin off Nova Scotia and Newfoundland. In: van der Linden, W.J.M. and Wade, J.A. (Eds.), Offshore geology of Eastern Canada. Geological Survey of Canada, paper 74-30, v. 2, p. 51-105.

McAlpine, K.D. 1990. Mesozoic stratigraphy, sedimentary evolution and petroleum potential of the Jeanne d'Arc Basin, offshore Newfoundland. Geological Survey of Canada, Paper 89-17.

McIver, N.L. 1972. Cenozoic and Mesozoic stratigraphy of the Nova Scotia shelf. Canadian Journal of Earth Sciences, v. 9, No. 1, p. 54-70.  
McWhae, J.R.H. 1981. Structure and spreading history of the northwestern Atlantic region of the

Scotian Shelf to Baffin Bay. In: Kerr, J.W. and Ferguson, A.J. (Eds.), Geology of the North Atlantic Borderland. Canadian Society of Petroleum Geologists, Memoir 7, p. 299-332.

Swift, J.H., Switzer, R.W. and Turnbull, W.F. 1975. The Cretaceous Petrel limestone of the Grand Banks, Newfoundland. In: Yorath, C.S., Parker, E.R. and Glass, D.J. (Eds.), Canada's continental margins and offshore petroleum exploration. Canadian Society of Petroleum Geologists, Memoir 4, p. 181-194.

Wade, J.A. and McAlpine, K.D. 1990. The continental margin around Newfoundland. In: Keen, M.J. and Williams, G.L. (Eds.), Geology of the continental margin off eastern Canada. Geological Survey of Canada, Geology of Canada Series, No. 2, p. 239-292 (also Geological Society of America, The Decade of North American Geology, v. I-1).

## NORTHEAST NEWFOUNDLAND SHELF AND NORTH GRAND BANKS

### [Lithostratigraphic Chart](#)

#### Selected Bibliography:

Amoco Canada Petroleum Company Limited and Imperial Oil Limited 1973. Regional geology of the Grand Banks. Bulletin of Canadian Petroleum Geology, v. 21, p. 479-503.

Arthur, K.R., Cole, D.R., Henderson, G.G.L. and Kushnir, D.W. 1982. Geology of the Hibernia discovery. In: Halbouty, M.T. (Ed.). The deliberate search for the subtle trap. American Association of Petroleum Geologists, Memoir 32, p. 181-195.

Barss, M.S., Bujak, J.P. and Williams, G.L. 1979. Palynological zonation and correlation of sixty-seven wells, Eastern Canada. Geological Survey of Canada, Paper 78-24.

Enachescu, M.E. 1987. The tectonic and structural framework of the Northeast Newfoundland continental margin. In: Beaumont, C. and Tankard, A.J. (Eds.), Sedimentary basins and basin-forming mechanisms. Canadian Society of Petroleum Geologists, Memoir 12, p. 117-146.

Grant, A.C., McAlpine, K.D. and Wade, J.A. 1986. The continental margin of Eastern Canada: Geological framework and petroleum potential. In: Halbouty, M.T. (Ed.), Future petroleum provinces of the world. American Association of Petroleum Geologists, Memoir 40, p. 177-205.

Harding, S. 1988. Facies interpretation of the Ben Nevis Formation of the North Ben Nevis M-61 well, Jeanne d'Arc Basin, Grand Banks of Newfoundland. In: James, D.P. and Leckie, D.A. (Eds.), Sequences, Stratigraphy, Sedimentology: Surface and Subsurface, Canadian Society of Petroleum Geologists, Memoir 15, p. 291-306.

Hiscott, R.N., Wilson, R.C.L., Gradstein, F.M., Pujalte, V., Gracia-Mondéjar, J., Boudreau, R.R. and Wishart, H.A. 1990. Comparative stratigraphy and subsidence history of Mesozoic rift basins of North Atlantic. Bulletin of American Association of Petroleum Geologists, v. 74, p. 60-76.

Hurley, T. J., Kreisa, R.D., Taylor, G.G. and Yates, W.R.L. 1992. The reservoir geology and geophysics of the Hibernia Field, offshore Newfoundland. In: Halbouty, M.T. (Ed.), Giant

Oil and Gas Fields of the Decade 1977-78,  
American Association of Petroleum Geologists  
Memoir 54, p. 35-54.

Jansa, L.F. and Wade, J.A. 1975. Geology of the continental margin off Nova Scotia and Newfoundland. In: van der Linden, W.J.M. and Wade, J.A. (Eds.), Offshore geology of Eastern Canada. Geological Survey of Canada, Paper 74-30, v. 2, p. 51-105.

McAlpine, K.D. 1990. Mesozoic stratigraphy, sedimentary evolution and petroleum potential of the Jeanne d'Arc Basin, offshore Newfoundland. Geological Survey of Canada Paper 89-117.

McIver, N.L. 1972. Cenozoic and Mesozoic stratigraphy of the Nova Scotia shelf. Canadian Journal of Earth Sciences, v. 9, No. 1, p. 54-70.

Sinclair, I.K. 1988. Evolution of Mesozoic-Cenozoic sedimentary basins in the Grand Banks area of Newfoundland and comparison with Falvey's (1974) rift model. Bulletin of Canadian Petroleum Geology, v. 36, No. 3, p. 255-273.

Sinclair, I.K. 1993. Tectonism: the dominant factor in mid-Cretaceous deposition in the Jeanne d'Arc Basin, Grand Banks. Marine and Petroleum Geology, v. 10, p. 530-549.

Sinclair, I.K., Shannon, P.M., Williams, B.P.J., Harker, S.D. and Moore, J.G. 1994. Tectonic control on sedimentary evolution of three North Atlantic borderland Mesozoic basins. Basin Research, v. 6, p. 193-218.

Tankard, A.J. and Welsink, H.J. 1987. Extensional tectonics and stratigraphy of Hibernia oil field, Grand Banks, Newfoundland. Bulletin of American Association of Petroleum Geologists, v. 71, No. 10, p. 1210-1232.

Tankard, A.J. and Balkwill, H.R. (Eds.) 1989. Extensional Tectonics and Stratigraphy of the North Atlantic Margins, American Association of Petroleum Geologists Memoir 46, 641 pp.

## WESTERN NEWFOUNDLAND

### Lithostratigraphic Chart

#### Selected Bibliography:

Cooper, M., Weissenberger, I.J., Knight, I., Hostad, D., Gillespie, D., Williams, H., Burden, E., Porter-Chaudhry, J., Rae, D. and Clark, E., 2001, Basin evolution in Western Newfoundland: AAPG Bulletin, v. 85, p. 393-418.

Fowler, M.G., Hamblin, A.P., Hawkins, D., Stasiuk, L.D. and Knight, I. 1995. Petroleum Geochemistry and hydrocarbon potential of Cambrian and Ordovician rocks of western Newfoundland. Bulletin of Canadian Petroleum Geology, 43, 187-213.

Hamblin, A.P., Fowler, M.G., Utting, J., Hawkins, D. and Riediger, C.L. 1995. Sedimentary, palynology and source rock potential of Lower Carboniferous (Tournaisian) rocks, Conche Area, Northern Peninsula, Newfoundland. Bulletin of Canadian Petroleum Geology, 43, 1-19.

Hamblin, A.P., Fowler, M.G., Utting, J., Langdon, G.S. and Hawkins, D. 1997. Stratigraphy, palynology and source rock potential of lacustrine deposits of the Lower Carboniferous (Visean) Rocky Brook Formation, Deer Lake Sub-basin, Newfoundland. Bulletin of Canadian Petroleum Geology, 45, 25-53.  
James, N.P., Stevens, R.K., Barnes, C.R., and Knight, I., 1989, Evolution of a Lower Paleozoic continental margin carbonate platform, northern Canadian Appalachians. Society of Economic

Paleontologists and Mineralogists Special Publication no. 44, p. 123-146.

Knight, I. 1983. Geology of the Carboniferous Bay St. George Sub-basin western Newfoundland. Newfoundland Department of Mines and Energy Memoir 1.

Knight, I. And Cawood, A. 1992. Palaeozoic geology of western Newfoundland: An exploration of a deformed Cambro-Ordovician passive margin and foreland basin, and Carboniferous successor basin. Centre for Earth Resources Research, Memorial University of Newfoundland, St. John's, 1 & 2.

Langdon, G.S. and Hall, J. 1994. Devonian-Carboniferous Tectonics and Basin Deformation in the Cabot Strait area, Eastern Canada. Bulletin

of the American Association of Petroleum Geologists, 78, 1748-1774.

## Geologic Tops Format

Tops are presented, as below, using the following conventions:

<b>Geologic Tops</b>	<b>RT (m)</b>
Dawson Canyon	1759
Petrel Member	1846 - 1875
Cenomanian Unconformity	2061
Nautilus	2061
Ben Nevis	2377
Aptian Unconformity	2713
Avalon	2713
'A' Marker member	2974 - 2981
Whiterose	2981
Catalina Member	3536 - 4168
'B' Marker member	4168 - 4257
Hibernia	4257
Fortune Bay	4875
Jeanne d'Arc	5264
Rankin	5562

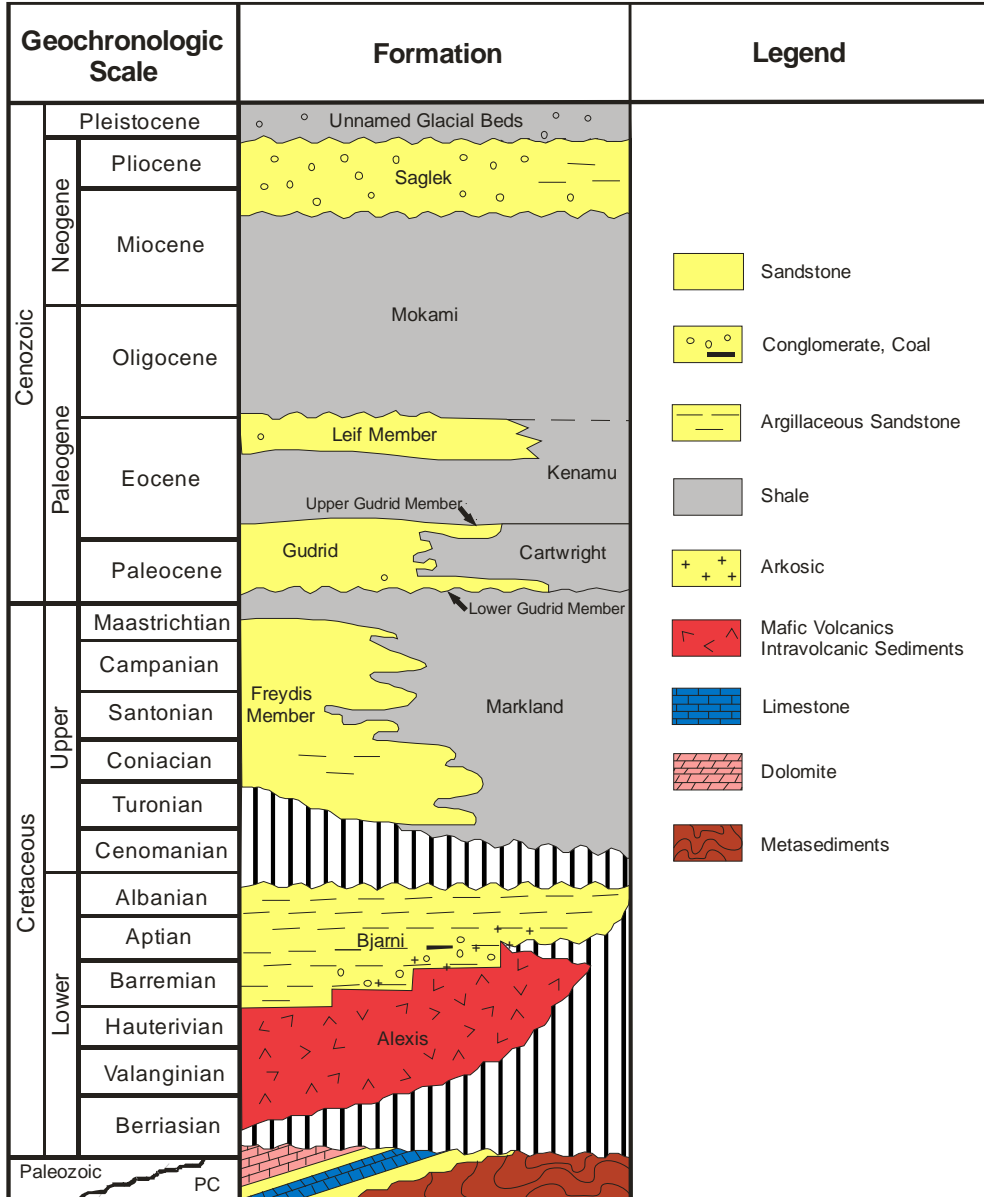
Formation names are listed from shallowest to deepest (i.e. Dawson Canyon, Nautilus, etc.). Lower ranks, such as members, lenses, etc., are indented below the formation of which they are a part (i.e. Petrel Member of the Dawson Canyon Formation). In accordance with the International Stratigraphic Guide, the first letters of all words used in the names of formal lithostratigraphic units are capitalized (i.e. Petrel Member). The first letter of informal lithostratigraphic units is not capitalized (i.e. 'A' Marker member). Each formation extends from the top given to the top of the next lower formation (i.e. the Dawson Canyon Formation extends from 1759-2061 mRT). Each member or lens extends from the top given to the top of the next lower unit (i.e. the 'A' Marker extends from 2874 to 2981 mRT) or else the upper and lower limits of the unit are given (i.e. the Petrel extends from 1846 to 1875 mRT). Unconformities are named after the age of the oldest sediments known to occur above the surface of the unconformity or its lateral equivalent. Faults, where recognized, are noted at their intersection in the well bore or at their approximate location as indicated by seismic data.

Lithostratigraphic nomenclature of the Labrador Shelf is after McWhae et al. (1980), for the Jeanne d'Arc Basin is after Sinclair (1988 and 1993), and for Western Newfoundland is after James et al. (1989) and Cooper et al. (2001).

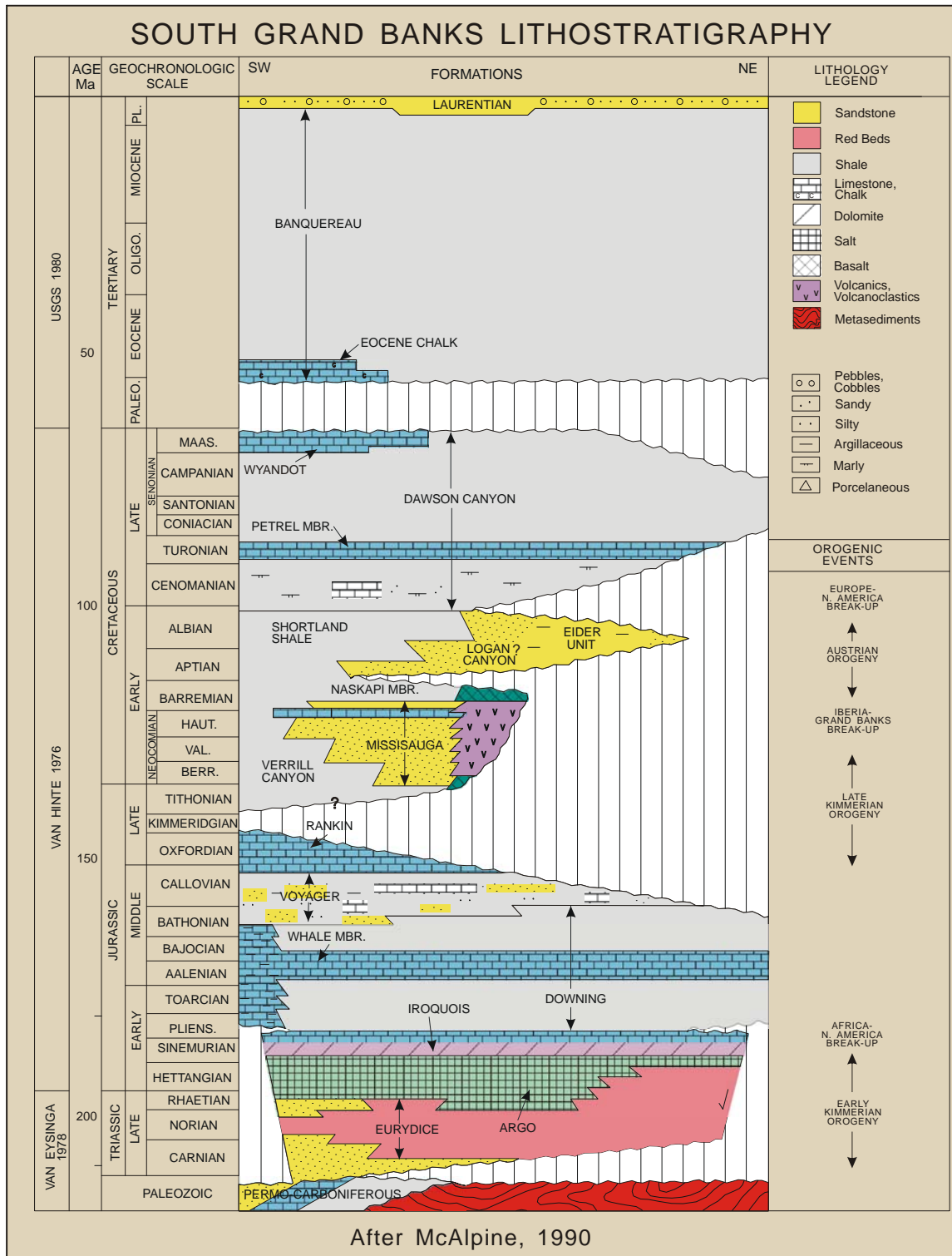
## ABBREVIATIONS

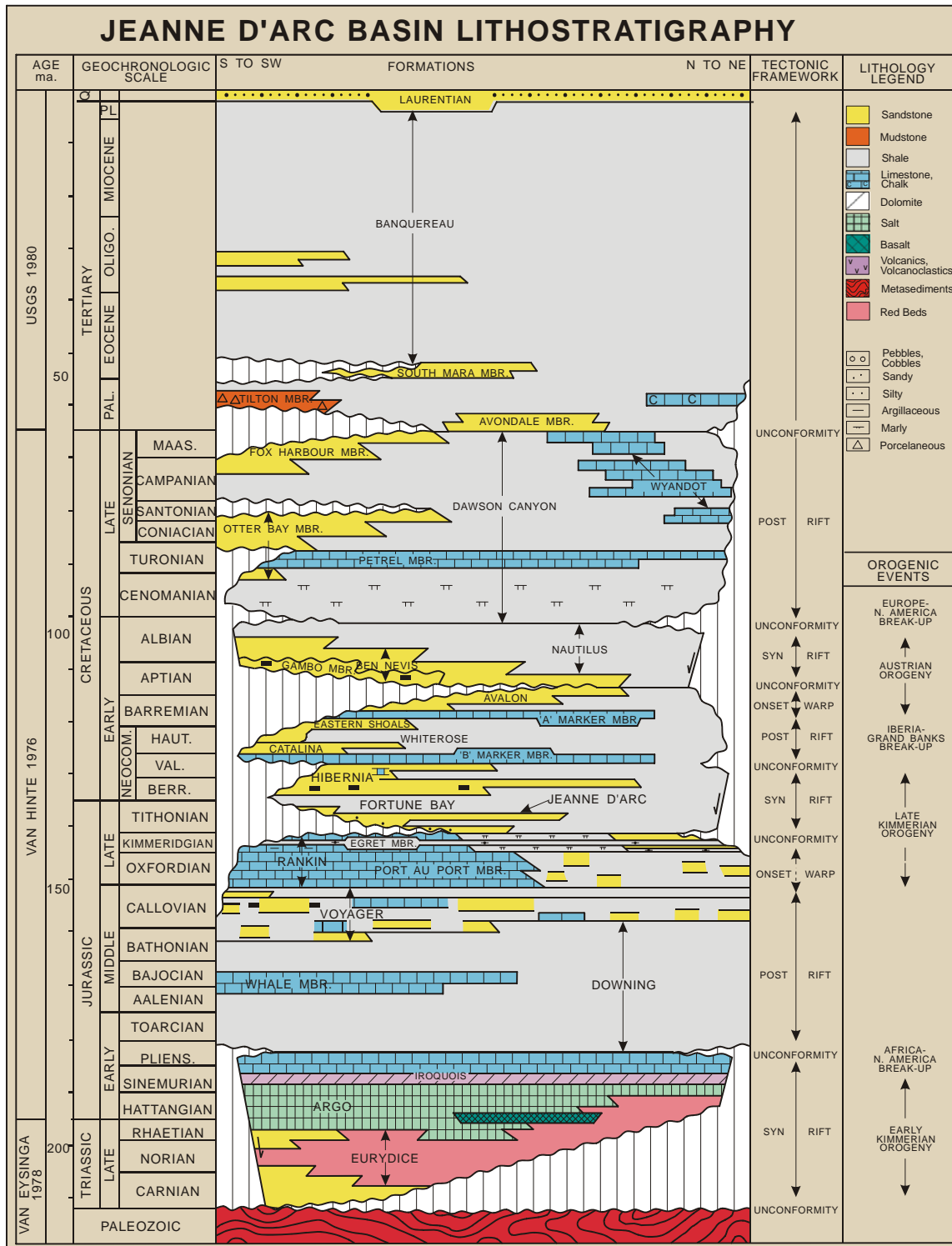
API .....	American Petroleum Institute
BPD .....	barrels per day
Cl .....	chlorides
DST .....	drill stem test
FIT .....	Formation Interval Tester
FMT .....	Formation Multi-Tester
KB .....	kelly bushing
m .....	metres
mm .....	millimetres
MCF/D .....	thousand cubic feet per day
MMCF/D .....	million cubic feet per day
N .....	north
NFTS .....	no flow to surface
ppm .....	parts per million
RFS .....	Repeat Formation Sampler
RT .....	rotary table
TSTM .....	too small to measure
W .....	west

## Labrador Shelf Stratigraphy



After McWhae et al 1980





Modified after Sinclair, 1992

# Western Newfoundland Lithostratigraphy

