

The Upper Agrio, from 1000 m to 1317 m, consists mainly of medium light gray and light gray sandstones, moderately consolidated, fine to very fine, minor medium, subangular to subrounded, poor sorted, quartz, orange and greenish lithics, pyrite, coal traces and micro micaceous, argillaceous and tuffaceous matrix (washed away), locally calcareous cement, poor visual porosity. No oil shows were described in these sandstones. With levels of intercalations of siltstones to the bottom of the Upper Agrio; the siltstones are moderate brown, dark gray, dark greenish gray, moderately compact to compact, massive, irregular fracture, blocky to subplaty, micro micaceous and pyrite, with very fine sandy inclusions.

The lower section begins with the Avilé Member, which consists of very light gray and medium light gray sandstones, moderately consolidated, fine to medium, occasionally very fine, subrounded to subangular, poor sorted, quartz, orange and greenish lithics, pyrite, micro micaceous, coal traces, tuffaceous matrix, poor visual porosity. No oil shows were described in these sandstones. With levels intercalations of siltstones, claystones and calcareous sandstones. The siltstones are medium dark gray and dark gray, moderately compact, massive, irregular fracture, blocky to subblocky, micro micaceous and pyrite disseminated. The claystones are very dusky red and grayish brown, soft to moderately compact, massive, irregular fracture, subplaty; and the calcareous sandstones are medium gray and medium light gray, moderately consolidated, fine to medium, subrounded, fair sorted, quartz, greenish lithics, tuffaceous matrix, poor visual porosity. No oil shows were described in these sandstones.

Mulichinco Formation:

From: 1706 m MD to bottom Top: - 1115.46 m TVDSS

This formation has been divided into three members:

Upper Mulichinco

From: 1706 m MD to 1728 m MD Top: - 1115.46 m TVDSS

Mainly composed by medium light gray and medium gray calcareous sandstones, moderately consolidated, medium to fine, subangular to subrounded, well sorted, mainly quartz, with grayish and greenish lithics, scarce orange lithics, tuffaceous matrix, poor visual porosity. No oil shows were described in these sandstones. With levels of intercalations of siltstones dark gray and medium dark gray, moderately compact, massive, irregular fracture, subblocky to subplaty, pyrite, with very fine sandy inclusions.

Middle Mulichinco

From: 1728 m MD to 1754.8 m MD Top: - 1137.47 m TVDSS

The Middle Mulichinco is composed mainly by very light gray and light gray sandstones, moderately consolidated, medium to fine, occasionally coarse, subangular to subrounded, fair sorted, quartz, orange and greenish lithics, tuffaceous matrix, scarce calcareous cement, poor visual porosity. In part isolated black dead Oil Stain NDF, NCF. These sandstones are interbedes with siltstones. The siltstones are dark gray, dark greenish gray, moderately compact, massive, irregular fracture, blocky to subblocky, pyrite, with very fine sandy inclusions.

Lower Mulichinco

From: 1754.8 mMD to 1777 m MD Top: - 1164.18 m TVDSS

Consist of sandstones very light gray and light greenish gray, moderately consolidated, fine to medium, subrounded to subangular, well sorted, quartz, greenish and scarce orange lithics, tuffaceous matrix, poor visual porosity. No oil shows were described in these sandstones. With levels of intercalations of siltstones dark greenish gray and dark gray, moderately compact, massive, irregular fracture, blocky to subblocky.

Quintuco Formation

From: 1777 m MD to bottom Top: - 1186.47 m TVDSS

This unit is composed mainly by light grey, greenish gray sandstones, fine to medium grained, poorly sorted, subangular, subrounded, calcareous cement, greenish and orange lithics, pyrite inclusions and locally micromica; interbedded with

green, greenish gray, dark greenish gray silty claystones, massives, compact, subplaty fracture, locally micromica, slightly calcareous. NO oil shows were described in this section.

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13. PETROPHYSICAL ANALYSIS & HYDROCARBON EVALUATION



TUG-ST Geological End of Well Report - GEWR. Created with Gravitas Report Generator - RepGen.

13 Petrophysical Analysis and Hydrocarbon Evaluation

13.1 Petrophysical Analysis and Hydrocarbon Evaluation Summary

The well log interpretation is based on a Multimineral model performed on GEOLOG6 software (Paradigm product). In order to get a simple, robust and stable model the follow parameters have been selected:

- 4 minerals: Quartz, Feldspar Potassic, Calcite and Shale.
- 2 fluids: Gas and Water.
- Sw: Dual water model.
- Rw: 0.033
- Temp: 140 °F
- a: 1, m: 1.8 / 2, n: 2
- CEC Shale: 0.15

The logs used in this interpretation were: GR, Cali, Resistivity logs, Density, Neutron, Sonic, Pef and the curves supplied by CMR.

This model have been calibrated with severals non-logs data (CCA, SCAL's, tests, Mud log data, etc.) belonging to wells of Aguada Pichana field drilled by Total Austral and YPF.

CutOff

Phi > 8%

Vsh > 40%

Sw > 70%

13.2 Log Interpretation Parameters

Zone Name : UPPER (UM - SB1)

Top : 1706.10 mMD

Bottom : 1728.10 mMD

Zone Name : MIDDLE (SB1- SBM)

Top : 1728.10 mMD

Bottom : 1754.80 mMD

Zone Name : LOWER (SBM - UQ)

Top : 1754.80 mMD

Bottom : 1775.90 mMD

13.3 Reservoir Chart

Zone Name	Res(MD)			Res(TVDSS)			Fluid Type	Gross Interval	Net Reservoir	Net Pay	Avg			Hhc	Reservoir Type		Layer (MD)		Layer(TVDSS)	
	Top	Bot		Top	Bot						Vcl	PHI	Sw				Top	Bot	Top	Bot
Upper Mulichinco	1706.10m	1728.10m		-1115.50m	-1137.49m		Gas	22	1.2	1.2	21	13.5	29	0.1	Calcareous Sandstone		1706.10m	1728.10m	-1115.50m	-1137.49m
Middle Mulichinco	1728.10m	1754.80m		-1137.49m	-1164.19m		Gas	26.7	21.2	18.6	11.6	12.9	59	1	Sandstone		1728.10m	1754.80m	-1137.49m	-1164.19m
Lower Mulichinco	1754.80m	1775.90m		-1164.19m	-1185.28m		Gas	21.1	11.4	10.7	11.1	10.8	52.7	0.5	Sandstone		1754.80m	1775.90m	-1164.19m	-1185.28m

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14. DRILL STEM TESTING



TUG-ST Geological End of Well Report - GEWR. Created with Gravitas Report Generator - RepGen.

14 Drill Stem Testing

14.1 Drill Testing Summary

This services was not performed in this well

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15. ENCLOSURES



TOTAL

TUG-ST Geological End of Well Report - GEWR. Created with Gravitas Report Generator - RepGen.

ENCLOSURE 1 : List of Operation Codes

Geology : Productive Operations	
G1	Bottom Hole Coring and Associated Connections
G2	All tripping associated before or with Coring Operations including circulation, i.e. pulling out for coring purposes as the drilling bit is usually pulled specially for coring, core tripping
G2c	Handling BHA, Core barrel pick-up and control, Core barrel and Core recovery
G3	Hole opening / Well conditioning after coring
G4	Geological Circulation : after drilling break, for cuttings...
G5	Electrical Logging Operations for Formation Testing : pressure measurements, formation sampling (Side-Wall Coring) or fluid sampling (RFT, MDT), including rigging-up and down and testing requisite equipment
G6	Electrical Logging operations for Formation Appraisal, End of Well Trajectory Survey including rigging-up and down and testing for requisite equipment
G7	Other measurements for Geological Evaluation : VSP
G8	Specific LWD/FEWD operations : e.g. slow running for evaluating the formations with the LWDFEWD Tool. If the slow run occurs due to failure of the FEWD Tool, the operation will be coded as lost time GN6c
G9	Other Planned Operations during Geology evaluation phase non productive Time for Geology phase
Geology : Non Productive Operations	
GN1a	Auxiliary operations to electrical logging : Well Conditioning, wiper trip, tripping and circulations required for electric operations
GN1c	Any tool and/or wire lines stuck during electric logging operations as well as consequent fishing operations (e.g. cut and thread operations, etc...)
GN1d	Well Conditioning while coring : unscheduled wiper trips, reaming...
GN1e	Mud Conditioning while coring : unscheduled circulation
GN1f	Fishing during Coring phase (stuck pipe/core barrel...)
GN2	Down Time due to Kick Control or Losses Coring
GN3	Down Time due to Rig Coring String Failure
GN6a	Identified Lost Time due to Coring Service Company : Equipment, Personnel and Service
GN6b	Down Time due to Electrical Service Company : Equipment, Personnel and Service
GN6c	Lost Time due to FEWD Operations including pulling and running new tool
GN6d	Down Time due to Well Seismic Service Company (VSP) : Equipment, Personnel and Service
GN7	Down Time due to Rig Equipment Failure
GN8	Waiting on weather during Geology Evaluation Phase
GN9a	Miscellaneous stand-by due to operator/due to a change of programme/waiting on orders or equipment provided by operator
GN9b	Other Down Time due to Drilling Contractor
GN9c	Down Time due to other Services Companies Productive Time for Reservoir Evaluation Phase
Testing	
W	Productive Operations
WN	Non Productive Operations
Drilling	
A	Moving
F	Drilling, Productive Operations
C	Casings, Cementing, Productive Operations
B	Recovery, Abandonment, Productive Operations
P	W.O., Completion, Productions
FN	Drilling, Non Productive Operations
CN	Casing, Cementing, Non Productive Operations
BN	Recovery, Abandonment, Non Productive Operations
PN	Drilling, Non Productive Operations