



# **BELLOY PETROLEUM CONSULTING LTD.**

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APACHE CANADA LTD.

**GEOLOGICAL REPORT**

APACHE PARAMOUNT LAC MAUNOIR E-35

<b>Prepared for:</b>	<b>Ross Pitman Pat McDonald NT-05-0035</b>
<b>A.F.E. #</b>	
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### WELL DATA SUMMARY

Well Name: APACHE PARAMOUNT LAC MAUNOIR E-35

U.W.I.# : -

Licence #: 1075

Well Location: E 35

Licensee: APACHE CANADA LTD. Field Name: Undefined  
Lahee Class: Exploratory AFE# : NT-05-0035

Elevation: Ground: 534.10 m  
Kelly Bushing: 539.30 m

Surface Co-ordinates: Lat: 67deg 14'27.628 / Long: 125deg 07'15.766"

Contractor: AKITA SAHTU Rig # 51

Spud Date: 05-02-26-1015

Hole Size: Conductor Barrel: 339.70 mm  
Surface: 311.00 mm  
Main: 216.00 mm

Conductor Casing: Set at 65.20 m K.B. 339.7 mm 101.3 kg/m  
Drilled Out: 05-02-26-09:45

Surface Casing: Set at 452.00 m K.B. 244.5 mm 59.53 kg/m  
Drilled Out: 05-03-05-0830

Production Casing: 177.8 mm; 43.16 Kg/m

Total Depth: 1011.00 m 05-03-08-1700

Cores: None NA

Drill Stem Tests: None on Penetration

Open Hole Logs:

<u>Run #</u>	<u>Schlumberger Tools Run</u>	<u>Norman Wells Intervals :</u>	<u>Scales:</u>
1	FMI, DSI, EMS, GR.	TD to Surface Casing, DSI and GR to Surface	1:240; 1:600
2	TLD, CNL, HRLA, CDT	TD to Surface Casing, Neutron and GR to Surface	1:240; 1:600

Well Status: Cased with 177.8mm Production Casing Rig release Date: 04-03-10-1200

Ditch Samples: 5.0 m intervals collected from Surface to T.D. washed & vialled for  
APACHE CANADA LTD. & PARAMOUNT RESOURCES LTD. & N.E.B.

APACHE PARAMOUNT LAC MAUNOIR E-35

GEOLOGICAL MARKERS

K.B. ELEVATION: 539.30 m

<u>Formation</u>	<u>Sample Depth (m)</u>	<u>Log Depth (m)</u>	<u>Log Subsea (m)</u>
Franklin Mtn - Cherty	15.0	15.00	524.3
Conductor	65.2		
Franklin Mtn - Rhythmic ?	193.0	185.00	354.3
Franklin Mtn - Cyclic ?	345.0	341.00	198.3
Surface Casing	452.0	451.50	87.8
Saline River - Upper Shale	520.0	505.00	34.3
Saline River - Upper Salt	558.0	552.00	-12.7
Saline River - Lower Shale	591.0	599.00	-59.7
Saline River - Lower Salt	604.0	603.0	-63.7
Mt. Cap - Upper Shale	699.0	775.0	-235.7
Mt. Cap - Middle Zone 1	711.0	782.0	-242.7
Mt. Cap - Middle Zone 2	747.0	814.0	-274.7
Mt. Cap_ Lower Shale	781.0	842.0	-302.7
Mt. Cap - Clastics	811.0	884.0	-344.7
Mt. Clarke_ "A" Sand	940.5	936.0	-396.7
Mt. Clarke_ "B" Sand	949.0	943.0	-403.7
Mt. Clarke_ "C" Sand	955.0	955.0	-415.7
Proterozoic	978.0	974.0	-434.7
Total Depth	1011.0	1010.7	-471.4

APACHE PARAMOUNT LAC MAUNOIR E-35

SAMPLE DESCRIPTIONS

Depth (m)

---- FRANLIN MTN – CHERTY 15.0 m ----

15-20

Dolomite (100%): cream to buff, varicolored, medium to light buff gray, off white, rare black, predominant very finely crystalline, occasional chalky, common silty, slightly cherty, trace lithographic grains, argillaceous, tight, occasional intercrystalline poor porosity to 3%, no visible fluorescence, no visible cut.

20-25

Dolomite (100%): buff, off white, medium to light gray, black, predominant very finely crystalline, occasional chalky, common argillaceous, silty in part, trace imbedded chert, tight, trace poor porosity to 5%, no visible fluorescence cut.

25-30

Dolomite (65%): buff, mottled off-white to trace dark gray, slightly chalky, predominant finely crystalline to very finely crystalline, slightly calcareous, dense, trace poor porosity to 3%, no visible fluorescence cut;  
Till (35%): as above, cavings in part (questionable).

30-40

Dolomite (100%): medium to light gray, medium brown, predominant very finely crystalline, occasional chalky, occasional microcrystalline, common argillaceous, common silty, occasional cherty, tight, no visible fluorescence, no visible cut.

40-45

Dolomite (100%): dark gray tan, medium gray, off white, black, occasional varicolored, predominant very finely crystalline, occasional chalky, common silty, slightly cherty, spotty lithic fragments, minor calcareous and argillaceous spots, predominantly tight, occasional intercrystalline poor porosity to 3%, trace pinpoint and fractured porosity to 1%, no visible fluorescence, questionable spotty cut.

45-50

Dolomite (100%): mottled gray, off white, cream, medium to light brown, occasional varicolored, predominant very finely crystalline, occasional microcrystalline, rare chalky, slightly silty, slightly cherty, trace lithographic grains, minor argillaceous patches, tight, occasional intercrystalline poor porosity to 2%, trace pinpoint porosity to 1%, no visible fluorescence cut.

SAMPLE DESCRIPTIONS

Depth (m)

50-60

Dolomite (100%): light gray, buff, becoming spotty brown gray to brown, predominant microcrystalline, rare dark brown to black, cryptocrystalline, mottled with white and glassy chert, occasional microcrystalline to very finely crystalline chert, local nodules and slightly argillaceous, dense, tight, no visible shows.

60-65

Dolomite (100%): amber, off-white, mottled white brown, microcrystalline, common very finely crystalline, minor chalky, trace sucrosic, part calcareous to 2%, silica in part to 1%, trace chert, rare spotty argillaceous patches, common very dense, predominantly tight with trace poor intercrystalline porosity, no visible shows.

---- CONDUCTOR 65.2 m ----

65-70

Dolomite (100%): buff very faint yellow, off white, light dull orange red, trace brown, trace very light mottled tan brown, trace medium gray, predominant very finely crystalline, occasional chalky, occasional microcrystalline, minor sucrosic, trace argillaceous and mudstone fragments, minor silty, occasional cherty with clear to varicolored chert grains or fragments, tight with trace poor intercrystalline porosity, no visible fluorescence cut.

70-75

Dolomite (100%): buff to tan yellow, off white, minor light gray, very finely crystalline, occasional slightly silty, trace mottled with white and glassy chert with occasional microcrystalline to very finely crystalline chert, minor mudstone patches, poor intercrystalline porosity, no visible shows.

75-80

Dolomite (100%): buff to dull yellow, occasional mottled gray, off-white, trace mottled black, very finely crystalline to weak microcrystalline, common sucrosic texture, minor calcareous material along fragments edges, minor thin scattered chert grains, rare argillaceous minute patches, occasional silica, occasional streaks of poor intercrystalline porosity to 3%, common tight, no visible shows.

APACHE PARAMOUNT LAC MAUNOIR E-35

SAMPLE DESCRIPTIONS

Depth (m)

80-85

Dolomite (100%): buff to light yellow, buff, light to medium brown gray, very finely crystalline, trace microcrystalline, occasional slightly silty, occasional mudstone or argillaceous patches, occasional clear calcareous fragments, minor grading to very fine grains dolomitic sandstone, poor intercrystalline porosity, poor intergranular porosity, no shows.

85-90

Dolomite (100%): off white, buff, light gray to cream, tan, dark gray, very finely crystalline to chalky, occasional microcrystalline, minor silty, minor calcareous, slightly cherty, trace angular off white chert fragments, tight, questionable fluorescence, questionable no visible cut.

90-100

Dolomite (100%): light gray to brown, part buff, occasional light gray, cryptocrystalline, matrix common microcrystalline with finely crystalline streaks, rare micro sucrosic, predominant clean with common rusty red to red orange Iron-Ferruginous to fragments, part mottled with white and glassy microcrystalline to finely crystalline chert, tight (1 to 2%) with streaks poor (2%), pinpoint intercrystalline and micro vuggy porosity, vugs are plugged with fine to medium crystalline glassy chert, predominant lined with very fine to fine cryptocrystalline calcareous to silica material, poor intercrystalline porosity, spotty very weak ribbon yellow fluorescence.

100-105

Dolomite (100%): off white, light gray buff, trace tan gray, cream, microcrystalline to very finely crystalline, occasional lower finely crystalline, minor silty, trace mudstone spots, trace chert, minor sucrosic, trace clear dolomite subhedral rhombs, common dull orange yellow ferruginous staining, minor dark medium gray dolomitic shale, poor with occasional good intercrystalline with minor spotty poor vuggy porosity, no shows.

105-110

Dolomite (100%): off white, light gray white, tan in part, predominant very finely crystalline, sandy in part, argillaceous in part, rare mudstone partings, spotty calcareous, trace scattered chert fragments, tight with streaks poor intercrystalline porosity, no fluorescence, no real visible cut.

APACHE PARAMOUNT LAC MAUNOIR E-35

SAMPLE DESCRIPTIONS

Depth (m)

110-115

Dolomite (100%): light gray, buff, minor spotty brown gray to brown, predominant microcrystalline, rare dark brown to black with mudstone partings, cryptocrystalline, mottled with white and glassy chert, occasional microcrystalline to very finely crystalline chert, common rusty red to red orange Iron-Ferruginous to stained fragments, dense, tight, no visible shows.

115-120

Dolomite (100%): off white, amber, light gray buff to cream, tan, dark gray, very finely crystalline to cryptocrystalline, occasional microcrystalline, minor silty, rare calcareous streaks, occasional cherty, trace angular off white chert fragments, tight intercrystalline porosity, no visible fluorescence cut.

120-125

Dolomite (100%): off-white to amber, white to light gray white, buff, trace translucent to bright white, predominant microcrystalline to occasional cryptocrystalline, trace very finely crystalline, trace clear to translucent with cryptocrystalline subhedral crystals, occasional chert fragments, fairly clean, tight, no visible fluorescence cut.

125-130

Dolomite (100%): cream to buff, trace light gray, predominant very finely crystalline to occasional microcrystalline, 5 to 10% varicolored yellow spotty iron stain, friable in part, rare mudstone spots, occasional very fine subhedral dolomite rhombs, spotty intercrystalline with trace vuggy porosity to 4%questionable, no visible shows.

130-135

Dolomite (100%): buff, off white, amber, predominant very finely crystalline with subangular sucrosic texture, common fossils, minor chert, rare silty, occasional cherty, occasional dolomitic subhedral rhombs, rare green shale mudstone partings, occasional good intercrystalline porosity to 8plus, trace pinpoint and fractured porosity to 2%, no visible petroleum stain, no visible fluorescence cut.

135-140

Dolomite (100%): buff, off white, amber, tan, predominant very finely crystalline with trace microcrystalline, common sucrosic texture, mottled with white and glassy chert, occasional microcrystalline to very finely crystalline chert, local nodules and slightly argillaceous, minor green shale partings, dense, occasional good porosity to 8plus %, no visible shows.

APACHE PARAMOUNT LAC MAUNOIR E-35

SAMPLE DESCRIPTIONS

Depth (m)

140-145

Dolomite (100%): buff, off white, amber, light buff gray, very fine grains sucrosic to micro sucrosic, very fine to finely crystalline, clean, trace mottled with white and glassy microcrystalline to finely crystalline chert, poor with trace good intercrystalline porosity to 12%, trace pinpoint intercrystalline and micro vuggy porosity, vugs are plugged with fine to medium crystalline glassy chert or lined with very fine to fine cryptocrystalline calcareous to silica (questionable) material, no visible fluorescence or cut.

145-150

Dolomite (100%): as above, in partial lost circulation zone, sparse sample.

150-155

Dolomite (100%): as above, poor sparse sample caught directly off the shaker.

155-160

Minimal Returns;

Dolomite (100%): buff, trace light gray, predominant very finely crystalline to finely crystalline with sucrosic texture, spotty iron stain, friable in part, occasional mudstone spots, trace very fine subhedral dolomite rhombs, spotty good intercrystalline with trace poor vuggy porosity, no visible shows.

---- FRANKLIN MTN – RHYTHMIC ? 193.0 m ----

---- FRANKLIN MTN – CYCLIC ? 345.0 m ----

---- SURFACE CASING 452.0 m ----

160-452

No Sample;

Lost Circulation, No Returns.

452-455

Dolomite (95%): buff, tan, trace light gray, predominant very finely crystalline, mottled with occasional buff white and glassy matrix and rare very finely crystalline anhydrite, locally laminations argillaceous patches, tight with trace scattered intercrystalline to sucrosic porosity to 5%, no visible shows, part grading to;

Shale (5%): light gray, part gray to green, part black, subfissile, dolomitic, rare scattered pyrite, minor silty streaks, rare glauconite.



SAMPLE DESCRIPTIONS

Depth (m)

455-460

Dolomite (85%): light to medium gray, tan, buff, occasional off white, very finely crystalline to microcrystalline, grading to dolomitic mudstone in part, minor pyritic, occasional silty, poor porosity, no shows;

Shale (15%): light to medium gray green gray, light gray, black, varicolored in part, platy to blocky, trace spotty pyritic, common dolomitic, as subangular marlstone in part.

460-465

Dolomite (65%): as above, trace pyritic, occasional calcareous laminations, predominant very finely crystalline, occasional chalky, occasional calcareous rims on dolomite fragments, part grading to dolomitic mudstone, predominantly tight, occasional intercrystalline poor porosity to 3%, no visible fluorescence, questionable even cut;

Shale (35%): light to medium green, varicolored, reddish in part, subfissile, spotty fine disseminated pyrite, dolomitic to very dolomitic, part grading to very shaly dolomite and marlstone.

465-475

Dolomite (75%): cream white to white buff, occasional light tan, very finely crystalline, trace crystalline chalky, trace microcrystalline, wackestone in part, poor intercrystalline porosity, no visible shows;

Mudstone (25%): light to medium green, varicolored, reddish in part, black, dense, common soft, calcareous in part, blocky.

475-485

Dolomite (75%): light gray, tan gray, medium gray, as microcrystalline mudstone in part, occasional very finely crystalline, rare pyritic, part silty, occasional grading to dolomitic siltstone, argillaceous in part, tight, no cut;

Shale (25%): light to medium green gray, medium gray, blocky, silty in part, dolomitic.

485-495

Shale (50%): red, dark gray, blocky in part, platy in part, fissile in part, part micromicaceous, common interbedded limestone, silty in part, argillaceous in part, common pyritic, moderately hard;

Dolomite (40%): off white, buff, amber, light gray white, slightly argillaceous, slightly anhydrite, poor porosity;

Shale (10%): varicolored, red, light to medium green, slightly argillaceous, dolomitic, calcareous in part, part micromicaceous, subfissile to fissile.

SAMPLE DESCRIPTIONS

Depth (m)

495-500

Shale (40%): red, dark gray, blocky to platy, rare micromicaceous, common interbedded limestone, silty in part, argillaceous in part, common pyritic, moderately hard;

Dolomite (40%): off white, buff, amber, light gray white, slightly argillaceous, slightly anhydrite, poor porosity;

Shale (20%): varicolored, red, light to medium green, slightly argillaceous, dolomitic, calcareous in part, part micromicaceous, subfissile to fissile.

500-510

Shale (50%): red, dark gray, blocky in part, platy in part, subfissile in part, part micromicaceous, rare calcareous, trace silty, argillaceous in part, moderately hard;

Shale (30%): light green, light gray, blocky to platy, very dolomitic, grading to shaly dolomite in part, grading to marlstone;

Dolomite (20%): light to medium buff, minor tan, occasional off white, microcrystalline to lower very finely crystalline, grading to dolomitic mudstone in part, tight porosity, no visible shows.

---- SALINE RIVER – UPPER SHALE 520.0 m ----

510-520

Shale (70%): red, mottled green red, trace light gray green, subfissile to blocky, argillaceous in part, sandy in part, trace dolomitic siltstone and sandy siltstone stringers;

Siltstone (20%): varicolored red to occasional green, very dolomitic, common as silty do, blocky, minor quartzitic, rare calcareous, no visible porosity, no shows;

Dolomite (10%): buff to tan, light gray, mottled gray black, tight intergranular porosity, no shows.

520-530

Shale (50%): green, light gray green, subfissile, spotty pyritic, slightly waxy, silty, dolomitic;

Siltstone (40%): light red, varicolored, blocky, quartzose, part to very dolomitic, tight;

Dolomite (10%): light red, off white, light gray, as above, occasional sucrosic texture, tight, no shows.

530-535

Siltstone (40%): light to medium red, rare white, occasional green, dolomitic, grading to silty dolomite in part, rare pyritic, no visible porosity, no shows;

Shale (40%): light to medium green, trace light to medium green gray, blocky;

SAMPLE DESCRIPTIONS

Depth (m)

Dolomite (20%): light red, mottled red green, predominant microcrystalline, part as dolomitic mudstone, occasional weak calcareous, medium slightly argillaceous, no visible intercrystalline or vuggy porosity, no visible shows.

535-540

Mudstone and Shale (70%): light to medium green, platy to blocky, dolomitic, dense;

Dolomite (25%): light red, mottled red white, trace light gray, part as dolomitic mudstone, dense, tight, no shows;

Siltstone (5%): white to light red, blocky, occasional quartzitic, dolomitic in part, tight.

540-545

Shale (60%): red, calcareous in part, trace pyritic, hard, cavings in part, blocky;

Siltstone (30%): red, gray, varicolored, anhydrite to dolomite, argillaceous in part, tight;

Dolomite (10%): mottled gray, cream, medium to light brown, varicolored and reddish in part, predominant very finely crystalline, occasional microcrystalline, occasional chalky, common silty, slightly cherty, trace lithic grains, argillaceous in part, tight, occasional intercrystalline poor porosity to 4%, trace pinpoint porosity to 1%, no visible fluorescence cut.

545-550

Shale (80%): light to medium green, platy to blocky, dolomitic, common as mudstone;

Siltstone (15%): red to white, blocky, occasional weak quartzitic, dolomitic in part, shaly in part, tight;

Dolomite (5%): light red, mottled red white, trace light gray, part as dolomitic mudstone, fossils in part, dense, tight, no shows.

550-555

Siltstone (60%): varicolored, red, weak anhydrite to dolomite, quartzose in part, tight;

Shale (30%): medium green, trace dark gray, trace black, common silty, trace black angular chert, blocky;

Dolomite (10%): buff, light brown, very finely crystalline, wackestone in part, packstone in part, occasional silty, occasional calcareous, predominant dense and tight, trace poor intercrystalline with trace vuggy porosity, no visible shows.

---- SALINE RIVER – UPPER SALT 558.0 m ----

555-560

Shale (35%): varicolored, light to medium greenish green, occasional mottled red green, slightly argillaceous, dolomitic, trace calcareous in part, part micromicaceous, subfissile to fissile and platy;

Siltstone (35%): red, gray, varicolored, anhydritic to dolomitic in part, quartzose in part, tight;

SAMPLE DESCRIPTIONS

Depth (m)

Dolomite (25%): off white, amber, light gray white, slightly argillaceous, slightly anhydrite, poor porosity;

Sandstone (5% to trace): light gray, rare varicolored, silty to lower fine grains, part quartzose, slightly cherty, dolomitic, tight to trace poor porosity, no visible fluorescence cut.

560-570

Shale (45%): medium green, occasional varicolored mottled (red and green), dark gray, fissile in part, part micromicaceous, dolomitic to slightly calcareous, argillaceous in part, moderately hard;

Siltstone (45%): red, gray, varicolored, anhydritic to dolomitic in part, quartzose in part, tight;

Dolomite (10%): mottled white, off-white, common tan, very finely crystalline, part calcareous to 5% calcareous fragments, rare silica grains, argillaceous to very argillaceous, predominant dense, poor porosity, no visible shows;

Salt (0 to 10%questionable?): clear, red to white, occasional light amber, predominant massive.

570-580

Siltstone (45%): red to pink, granular to gritty, poorly indurated, poor porosity, common dolomitic, occasional weak calcareous, slightly anhydrite, anhydrite filling pore throats, no visible effective porosity, no shows;

Shale (45%): medium to dark green, light green, varicolored, platy, trace disseminated and nodular pyritic;

Salt (10%questionable?): being dissolved by "gel slurry" mud system to chlorides high.

580-585

Siltstone (45%): red, light gray, dark gray, dolomitic in part, tight;

Shale (45%): red, medium gray, occasional light green gray, predominant platy;

Salt (10%questionable?): being dissolved by "gel slurry" mud system as chlorides are high.

585-590

Shale (40%): medium to light green, dark green, mottled green red in part, varicolored, platy;

Siltstone (40%): red, light gray, dark gray, dolomitic in part, anhydritic in part, tight;

Dolomite (10%): off-white, 50% mottled tan and white, very finely crystalline, to microcrystalline, trace chalky to minor sucrosic, argillaceous in part, no visible effective porosity, questionable fluorescence, no cut;

Salt (10%questionable?): clear, translucent with siltstone, trace calcareous patches, trace tan limestone stringers.

---- SALINE RIVER – LOWER SHALE 591.0 m ----

590-600

Shale (60%): light to medium green, platy to blocky, dolomitic, common as mudstone;

SAMPLE DESCRIPTIONS

Depth (m)

Siltstone (25%): red to white, blocky, occasional weak quartzitic, dolomitic in part, shaly in part, tight;

Dolomite (5%): light red, mottled red white, trace light gray, part as dolomitic mudstone, occasional anhydritic, fossils  
in part, dense, tight, no shows;

Salt (10%questionable?): clear, translucent with siltstone, trace calcareous patches, trace tan limestone stringers.

---- SALINE RIVER – LOWER SALT 604.0 m ----

600-610

Salt (60%): clear, translucent with siltstone, trace calcareous patches, anhydritic in part;

Shale (40%): medium to light green, dark green, mottled green red in part, varicolored, platy;

Siltstone (trace): red, light gray, dark gray, dolomitic in part, anhydritic in part, tight;

Dolomite (trace): off-white, 50% mottled tan and white, very finely crystalline, to microcrystalline, trace chalky to  
minor sucrosic, argillaceous in part, no visible effective porosity, questionable fluorescence, no cut.

610-620

Salt (70%): white, tan, interbedded with shale, cherty in part, trace anhydrite minute lense;

Shale (25%): dark gray, black, medium to light gray, trace varicolored, common interbedded salt and dolomite, silty in  
part, argillaceous in part, moderately hard to poorly indurated, mudstone in part;

Dolomite (5%): buff, off white, amber, light gray white, slightly argillaceous, slightly anhydrite, poor porosity.

620-625

Salt (75%): clear, translucent, trace scattered iron stain, massive;

Mudstone (25%): light gray, gritty, shaly in part, silty in part, poorly indurated, dolomitic, blocky.

625-640

Salt (60%): buff, white, trace yellow to orange, massive, dense, soft;

Siltstone (20%): varicolored, black to dark gray, granular to gritty, poorly indurated, poor porosity, common dolomitic,  
occasional weak calcareous, slightly anhydrite, anhydrite filling pore throats, no visible effective porosity, no  
shows;

Shale (20%): light green, black, varicolored, common interbedded salt and dolomite, cherty in part, platy.

640-645

Salt (75%): clear, translucent, trace scattered iron stain, massive;

SAMPLE DESCRIPTIONS

Depth (m)

Mudstone (25%): light green, light gray, gritty, shaly in part, silty in part, poorly indurated, dolomitic, anhydritic in part, blocky.

645-655

Salt (95%): dull white, red stain white, massive, sucrosic in part;

Shale (5%): as above, blocky.

655-660

Salt (60%): buff, white, trace yellow to orange, massive, dense, soft;

Shale (30%): green, black, varicolored, reddish in part, common interbedded salt and dolomite, platy;

Siltstone (10%): black to dark gray, granular to gritty, poorly indurated, poor porosity, common dolomitic, occasional weak calcareous, slightly anhydrite, anhydrite filling pore throats, no visible effective porosity, no shows.

660-670

Salt (70%): white, tan, interbedded with shale, cherty in part, trace anhydrite minute lense;

Shale (25%): green, dark gray, black, medium to light gray, trace varicolored, common interbedded salt and dolomite, silty in part, argillaceous in part, moderately hard to poorly indurated, mudstone in part;

Dolomite (5%): buff, off white, amber, light gray white, occasional spotty mudstone streaks, slightly argillaceous, slightly anhydrite, poor porosity, no visible shows.

670-675

Salt (70%): white, tan, interbedded with shale, cherty in part, trace anhydrite minute lense;

Shale (25%): dark gray, black, medium to light gray, trace varicolored, common interbedded salt and dolomite, silty in part, argillaceous in part, moderately hard to poorly indurated, mudstone in part;

Dolomite (5%): buff, off white, amber, light gray white, slightly argillaceous, slightly anhydrite, poor porosity.

675-685

Salt (95%): white, tan, off white, massive;

Shale (5%): medium gray green to black when wet with interbedded salt, medium green to medium gray when dry, part silty and gritty, poorly indurated, part as shaly dolomite, common platy to blocky.

685-690

Salt (80%): buff, white, trace yellow to orange, massive, dense, soft;

Shale (20%): black, varicolored, common interbedded salt and dolomite, cherty in part, platy.

SAMPLE DESCRIPTIONS

Depth (m)

690-695

Salt (80%): buff, white, trace yellow to orange, massive, dense, soft;

Shale (20%): black, varicolored, common interbedded salt and dolomite, cherty in part, platy;

Dolomite (trace): off white, slightly anhydritic, shaly in part, poor intercrystalline porosity, no shows;

Anhydrite (trace): white, trace light gray, dolomitic in part, occasional interbedded mudstone, tight.

---- MT. CAP – UPPER SHALE 699.0 m ----

695-700

Salt (50%): white to off white, trace tan to amber, predominant massive, occasional interbedded with shale, occasional dolomitic siltstone stringers material;

Shale (45%): varicolored, medium to dark gray, blocky, poorly indurated, mudstone in part;

Dolomite (5%): tan, gritty, part argillaceous, poor grading to dolomitic mudstone, part silty, occasional as dolomitic siltstone, very finely crystalline, part as mudstone, tight with trace poor fractured porosity, tight intercrystalline porosity, no visible shows;

Anhydrite (trace): white, varicolored, dolomitic, slightly calcareous, tight.

700-705

Shale (70%): dark to medium green, gray, minor red, dolomitic, occasional silty;

Siltstone (15%): light gray, rare light brown, trace grading to very fine dolomite sandstone, trace argillaceous, questionable bituminous, rare calcareous, predominant blocky, tight, no shows;

Dolomite (15%): light tan, light gray, microcrystalline to very finely crystalline, trace mudstone streaks, mottled in part, tight with trace poor intercrystalline porosity, poor vuggy porosity to 3%, no visible shows.

705-710

Shale (70%): medium to dark gray, black, dolomite in part, slightly calcareous, well indurated, blocky;

Dolomite (25%): light gray, tan, dark gray, very finely crystalline to chalky, occasional microcrystalline, common silty, slightly cherty, trace angular off white chert fragments, tight, no fluorescence cut;

Siltstone (5%): light gray, speckled, rare varicolored, dolomitic, weak calcareous in part, tight, no shows.

SAMPLE DESCRIPTIONS

Depth (m)

---- MT. CAP – MIDDLE ZONE '1' 711.0 m ----

710-715

Shale (40%): medium to dark gray, black, occasional dark to medium black green, very dolomite in part, rare calcareous, predominantly well indurated, common platy;

Dolomite (35%): predominant dark brown, dark gray, very finely crystalline to chalky, occasional microcrystalline, common subhedral dolomite crystals, minor subrounded white minute chert fragments, minor silty, predominant poor intercrystalline porosity, no fluorescence cut;

Siltstone (25%): light gray, speckled, rare varicolored, dolomitic, weak calcareous in part, no visible sand grains, as subangular sandy dolomitic limestone in part, predominantly tight, no visible shows.

715-725

Shale (45%): gray brown, greenish gray, 50% vitreous lustre, common earthy;

Dolomite (45%): brown to tan, brownish gray, very fine to finely crystalline, microcrystalline, slightly silty, minor calcareous, trace argillaceous, tight with trace poor vuggy and intercrystalline porosity, no shows;

Siltstone (10%): light gray, rare light brown, trace grading to very fine dolomite sandstone, trace argillaceous, questionable bituminous, rare calcareous, predominant blocky, tight, no shows.

725-740

Shale (75%): medium to dark greenish gray, black, black green in part, dolomitic, as above;

Dolomite (15%): light white gray, occasional tan brown, varicolored in part, very fine to crystalline, trace chalky to grainy, occasional sucrosic, occasional earthy, occasional very weak calcareous, poor porosity, no visible fluorescence cut;

Siltstone (10%): light gray, trace gray brown, minor greenish gray, earthy, part friable, sandy in part, calcareous to dolomitic, occasional slightly anhydritic, tight, no shows.

740-745

Shale (60%): medium to dark green gray, black, dark black green, common silky luster, dolomite in part, slightly calcareous, well indurated, common platy to occasional blocky;

Dolomite (35%): light gray, brown to tan, chalky white and dull, dark gray, very finely crystalline to chalky, occasional sucrosic, occasional silty, slightly cherty, only trace to minor angular brown chert fragments, trace anhydrite crystals, trace poor intercrystalline porosity in crystalline fragments to 3%, no visible fluorescence cut;

Siltstone (5%): light gray, speckled white reddish, dolomitic, weak calcareous on fragment edges, no visible porosity, no visible shows.



SAMPLE DESCRIPTIONS

Depth (m)

---- MT. CAP MIDDLE ZONE '2' 747.0 m ----

745-750

Shale (60%): medium to dark greenish gray, black, occasional dark to medium black green, very dolomite in part, rare calcareous, predominantly well indurated, common platy;

Dolomite (30%): predominant dark brown, dark gray, very finely crystalline to chalky, occasional microcrystalline, common subhedral dolomite crystals, minor subrounded white minute chert fragments, minor silty, predominant poor intercrystalline porosity, no fluorescence cut;

Siltstone (10%): light gray, speckled, rare varicolored, dolomitic, weak calcareous in part, no visible sand grains, as subangular sandy dolomitic limestone in part, predominantly tight, no visible shows.

750-760

Shale (60%): medium to dark gray, black, occasional dark to medium black green, very dolomite in part, rare calcareous, predominantly well indurated, common platy;

Dolomite (30%): predominant dark brown, dark gray, very finely crystalline to chalky, occasional microcrystalline, common subhedral dolomite crystals, minor subrounded white minute chert fragments, minor silty, predominant poor intercrystalline porosity, no fluorescence cut;

Siltstone (10%): light gray, speckled, rare varicolored, dolomitic, weak calcareous in part, no visible sand grains, as subangular sandy dolomitic limestone in part, predominantly tight, no visible shows.

760-765

Shale (65%): varicolored, blocky, dolomitic in part, silty to sandy in part;

Dolomite (30%): light to medium tan, buff, off white, very finely crystalline, silty to sandy in part, tight, no cut;

Siltstone (5%): light gray, blocky, occasional quartzose, dolomitic, occasional argillaceous, part shaly, tight intergranular porosity, no visible shows.

765-770

Shale (60%): dark to medium green, dark to medium gray, black, trace medium black green, common subvitreous lustre, occasional micromicaceous, platy to blocky, rare subfissile;

Dolomite (30%): as above, common sandy, tight with trace poor vuggy porosity to 3%, no visible shows;

Siltstone (10%): light gray, speckled, rare varicolored, dolomitic, weak calcareous in part, rare sand grains, tight, no visible shows.

SAMPLE DESCRIPTIONS

Depth (m)

770-775

Shale (80%): black, carbonaceous, part micromicaceous, subfissile to fissile;

Dolomite (10%): light gray to cream, medium gray, predominant very finely crystalline, common chalky, calcareous in part, part grading to dolomitic limestone, minor chert, tight, questionable fluorescence, no visible cut;

Siltstone (10%): light gray, speckled, rare varicolored, dolomitic, weak calcareous in part, trace loose sand grains, tight with inferred good porosity in sand grains, no visible fluorescence cut.

775-780

Shale (80%): dark to medium gray, common gray black, trace medium black green, common subvitreous lustre, occasional micromicaceous, common platy, occasional subfissile;

Siltstone (10%): light gray, blocky, trace sandy, trace imbedded sand grains, dolomitic, tight;

Dolomite (10%): off white, opaque, predominant as stringers material, common as dolomitic mudstone, slightly calcareous, no visible intercrystalline porosity, trace pinpoint and fractured porosity to 5%, no visible shows.

---- MT. CAP – LOWER SHALE 781.0 m ----

780-785

Shale (50%): medium to dark gray, black, dolomite in part, slightly calcareous, well indurated, blocky;

Dolomite (25%): light gray, tan, dark gray, very finely crystalline to chalky, occasional microcrystalline, common silty, dolomite calcareous to very dolomite calcareous in part, slightly cherty, trace angular dark black brown, and rare off white chert fragments, tight, no fluorescence cut;

Siltstone (25%): light gray, speckled in part, minor varicolored, dolomitic, part grading to silty dolomite, weak calcareous in part, rare sand grains, tight, no visible shows.

785-790

Shale (59%): green gray, gray, occasional red, blocky to platy, rare silty, slightly dolomitic;

Dolomite (25%): light to medium brown, microcrystalline, occasional very finely crystalline, occasional silty, part argillaceous, occasional shaly, minor bioclastic, tight intercrystalline questionable porosity, no shows;

Siltstone/Sandstone (15%): light to medium gray, occasional dark gray to brown gray, blocky, quartzose, well consolidated, minor to part very argillaceous to occasional shaly, spotty imbedded, glauconitic pellets, tight, no shows;

SAMPLE DESCRIPTIONS

Depth (m)

Sandstone with Quartz (1%): translucent, calcareous to dolomitic cement, minor silica, common massive, well consolidated, as calcarenite, common imbedded glauconitic pellets, trace pyritic nodules, no visible porosity, no shows.

790-795

Shale (90%): green, blocky to platy, rare silty, dolomitic to slightly calcareous, hard;

Dolomite (9%): light to medium brown, microcrystalline, occasional very finely crystalline, occasional silty, part argillaceous, occasional shaly, minor bioclastic, tight intercrystalline questionable porosity, no shows;

Siltstone/Sandstone (1%): light to medium gray, occasional dark gray to brown gray, blocky, quartzose, well consolidated, minor to part very argillaceous to occasional shaly, spotty imbedded, glauconitic pellets, tight, no shows.

795-800

Shale (90%): 95% light green, 5% light green gray to medium dark gray, common platy;

Dolomite (9%): light gray, trace light brown, part as dolomitic mudstone, moderately hard, very finely crystalline, part microcrystalline, tight, no shows;

Siltstone/Sandstone (1%): light to medium gray, occasional dark gray to brown gray, blocky, quartzose, well consolidated, minor to part very argillaceous to occasional shaly, spotty imbedded, glauconitic pellets, tight, no shows.

800-805

Shale (100%): light to dark green, waxy, dolomitic, platy to occasional blocky;

Siltstone (trace): dark to light gray, mottled brown in part, light gray, dolomitic, friable, no visible porosity;

Dolomite (trace): brown, variable gray, chalky, occasional microcrystalline, part as dolomitic mudstone, questionable porosity, no shows.

805-810

Shale (80%): light to dark green, speckled, waxy, dolomitic, platy to occasional blocky;

Dolomite (15%): brown, variable tan gray, predominant very finely crystalline, chalky, occasional microcrystalline, part as dolomitic mudstone, questionable porosity, no shows;

Siltstone (5%): dark to light gray, mottled brown in part, light gray, dolomitic, friable, no visible porosity.

SAMPLE DESCRIPTIONS

Depth (m)

---- MT. CAP – CLASTICS 811.0 m ----

810-815

Shale (50%): 95% light green, 5% light green gray to medium dark gray, common platy;

Dolomite (25%): light gray, light tan to buff, part as dolomitic mudstone, moderately soft, part very finely crystalline, trace sucrosic, trace microcrystalline, poor with trace good intercrystalline porosity, no shows;

Siltstone (25%): white gray, mottled tan, sandy to yellow quartzose, dolomitic to calcareous, part as lower very fine grains sandstone, occasional silty, tight with poor intergranular porosity to 4%, no visible shows;

Sandstone (trace): light gray, trace tan, predominant very fine grains, quartzose, subrounded, well sorted, common dolomitic to calcareous cement, rare silica cement, questionable porosity, questionable shows.

815-820

Shale (45%): light to dark green, common subvitreous luster, platy;

Dolomite (45%): brown, variable gray, chalky, occasional microcrystalline, part as dolomitic mudstone, questionable porosity, questionable cut;

Siltstone (10%): light gray to dirty white, part as lower very finely grained sandstone, weak quartzose in part, occasional

calcareous cement, common as dolomitic mudstone, trace pyritic, moderately soft, no or questionable porosity, no shows.

820-825

Dolomite (35%): buff, light tan to off white, moderately soft, part very finely crystalline, trace sucrosic, minor microcrystalline, poor with trace good intercrystalline porosity, no shows;

Shale (35%): light to dark green, common subvitreous luster, platy;

Siltstone (30%): light to medium gray, black gray, very dolomitic, part as dolomitic mudstone, tight;

Sandstone (trace): light gray, very fine to fine grains, quartzose, subrounded, well sorted, calcareous to dolomitic, spotty argillaceous, weak consolidated, poor to rare fair porosity to 7%, slow questionable spotty fluorescence cut.

825-835

Shale (60%): predominant light to medium green, dark gray green, slightly micromicaceous, slightly dolomitic, subfissile;

SAMPLE DESCRIPTIONS

Depth (m)

Dolomite (20%): buff, very finely crystalline, sandy in part, minor calcareous, occasional silty, poor porosity, no shows;

Siltstone (20%): light gray, tan, green gray, very fine grains quartzose in part, trace pyritic, tight, no visible cut;

Sandstone (trace): light gray, very fine to fine grains, quartzose, subrounded, well sorted, as above, spotty argillaceous, weak consolidated, poor porosity, no visible fluorescence cut.

835-840

Shale (60%): dark black green, green gray, dolomitic, silty in part, platy, as above.

Dolomite (20%): buff to tan, brown, tan, very finely crystalline, trace as dolomitic mudstone, silty in part, minor euhedral dolomitic and calcareous fragments, trace poor intercrystalline porosity, trace fractured porosity porosity, no shows;

Siltstone (20%): light gray, in part, tan gray, common very fine grains quartzose, minor spotty calcareous cement, dolomitic cement, trace sandy dolomitic fragments, as sandy calcarenite in part, common imbedded glauconitic pellets, tight, no shows.

840-845

Shale (90%): greenish gray, 50% vitreous lustre, common earthy, as above;

Trace glauconitic, minor pyritic;

Siltstone (5%): light gray, part medium gray and green gray, blocky, quartzose, spotty glauconitic, occasional part shaly, dolomitic, tight;

Dolomite (5%): light to medium brown, minor light gray, lower very finely crystalline, massive, no visible porosity, slightly silty to occasional sandy, slightly argillaceous, tight, no shows.

847.5-850

Sandstone and Siltstone (50%): light gray, very fine grains, quartzose, green gray, lower very fine grains, trace pyritic, dolomitic with trace calcite cement, well consolidated, tight;

Dolomite (25%): buff, very finely crystalline, occasional silty occasional sucrosic, common massive, rare fossils, slightly silty to occasional sandy, poor intergranular porosity, no visible fluorescence cut;

Shale (25%): dark gray green, subfissile to blocky, micromicaceous in part, common waxy lustre, dense.

850-852.5

Dolomite (50%): buff, tan, black, microcrystalline, part as dolomitic mudstone, questionable porosity, no shows;

SAMPLE DESCRIPTIONS

Depth (m)

Siltstone (30%): tan to gray white, dolomite matrix in part, dolomitic, friable in part, soft, poor intergranular porosity,  
no shows;

Shale (20%): medium gray, light to medium green, waxy in part, in part micromicaceous, subfissile to platy.

852.5-855

Dolomite (35%): dark gray, microcrystalline to very finely crystalline, wackestone in part, packstone in part, occasional silty, occasional calcareous, predominant dense and tight, trace poor intercrystalline porosity, no visible shows;

Siltstone (35%): as above, part as dolomitic mudstone;

Shale (30%): dark black gray, as above, cavings in part.

855-857.5

Shale (60%): 95% light green, 5% light green gray to medium dark gray, common platy;

Dolomite (20%): buff to amber, light gray, trace light brown, common microcrystalline, tight, no shows;

Siltstone/Sandstone (20%): light to medium gray, occasional dark gray to brown gray, blocky, predominant silty to lower very finely crystalline, quartzose, well consolidated, minor to part very argillaceous to occasional shaly, spotty imbedded, glauconitic pellets, tight, no shows.

857.5-862.5

Dolomite (65%): brown to tan, brownish gray, very fine to finely crystalline, microcrystalline, slightly silty, minor calcareous, tight with trace poor intercrystalline porosity, no shows;

Shale (30%): dark to medium gray, common gray black, trace medium black green, common subvitreous lustre, occasional micromicaceous, common platy, occasional subfissile;

Sandstone (5%): light gray, light tan, silty to lower very fine and rare fine grains, quartzose, subrounded, well sorted, dolomitic with spotty calcareous edges, trace glauconitic, spotty argillaceous, weak consolidated, poor intergranular porosity, no shows.

862.5-865

Siltstone (35%): light gray, speckled, rare varicolored, dolomitic, weak calcareous in part, trace glauconitic grains, tight, no visible (questionable) shows;

Dolomite (35%): brown to tan, brownish gray, very fine to finely crystalline, microcrystalline, slightly silty, minor calcareous, tight with trace poor intercrystalline porosity, no shows;

Shale (30%): dark to medium green, common gray, trace medium black green, common subvitreous to waxy lustre, occasional micromicaceous, common platy, occasional subfissile.

SAMPLE DESCRIPTIONS

Depth (m)

865-870

Shale (90%): medium to dark brown, dark gray, platy to subfissile, dolomitic, trace red siltstone stringers, occasional micromicaceous;

Dolomite and Siltstone (10%): light gray to buff, tan, predominant very fine grains, occasional argillaceous, no visible porosity, no visible shows.

870-872.5

Siltstone (60%): medium gray black, shaly in part, weak quartzose in part, slightly dolomitic, questionable porosity, no cut;

Shale (40%): medium gray black, trace varicolored, micromicaceous in part, occasional interbedded dolomite, subfissile.

872.5-877.5

Shale (80%): dark to medium gray, common gray brown, minor green, micromicaceous in part, slightly pyritic, trace subvitreous lustre, occasional micromicaceous, dolomitic to slightly calcareous in part, predominant subfissile;

Siltstone (10%): light to medium gray, sandy, trace imbedded sand grains, dolomitic, tight;

Dolomite (10%): buff to light gray, very finely crystalline to occasional sucrosic, sandy in part, trace as dolomitic mudstone, minor slightly calcareous, no visible porosity, no shows.

877.5-880

Shale (100%): light brown, trace dark to medium gray, trace gray brown, minor green, common micromicaceous, minor pyritic, trace subvitreous lustre, dolomitic to slightly calcareous in part, predominant subfissile;

Siltstone (trace): light to medium gray, sandy, trace imbedded sand grains, dolomitic, tight;

Dolomite (trace): buff to light gray, lower very finely crystalline, sandy in part, occasional as dolomitic mudstone, occasional weak calcareous, no visible porosity, no shows.

880-882.5

Shale (100%): light brown, trace gray black, trace green, as above, common micromicaceous, predominant subfissile;

Siltstone (trace): as above, common glauconite sandstone stringers, dolomitic to slightly calcareous, no visible porosity, no visible shows;

Dolomite (trace): buff to light gray, lower very finely crystalline, sandy in part, occasional as dolomitic mudstone, occasional weak calcareous, no visible porosity, no shows.

SAMPLE DESCRIPTIONS

Depth (m)

882.5-885

Shale (80%): light brown, trace gray black, trace green, as above, common micromicaceous, predominant subfissile;

Siltstone (10%): as above, sandy to very fine grains Sandstone in part, dolomitic to slightly calcareous, sandy with trace imbedded sand grains, occasional interbedded sandstone streaks, poor intergranular porosity, no visible shows;

Dolomite (10%subrounded): amber, lower very finely crystalline to microcrystalline, rare calcareous shadows, no visible porosity, no shows.

885-887.5

Shale (100%): light brown, trace gray black, trace green, as above, common micromicaceous, predominant subfissile;

Siltstone (trace): as above, common glauconite sandstone stringers, dolomitic to slightly calcareous, no visible porosity, no visible shows;

Dolomite (trace): buff to light gray, lower very finely crystalline, sandy in part, occasional as dolomitic mudstone, occasional weak calcareous, no visible porosity, no shows.

887.5-890

Shale (80%): light brown, trace gray black, trace green, as above, common micromicaceous, predominant subfissile;

Siltstone (20%): as above, sandy to very fine grains Sandstone in part, dolomitic to slightly calcareous, sandy with trace imbedded sand grains, occasional interbedded sandstone streaks, glauconite in part, poor intergranular porosity, no visible shows;

Dolomite (trace): amber, lower very finely crystalline to microcrystalline, rare calcareous shadows, no visible porosity, no shows.

890-892.5 to 895

Shale (55%): dark gray, dark green gray, micromicaceous, predominant subfissile, blocky, platy;

Siltstone (45%): light to medium gray, occasional dark gray, gritty in part, common quartzose, spotty glauconitic, part to very argillaceous to shaly in part, common laminations, consolidated, dolomitic cement, light petroleum odor on wash, poor intergranular porosity, weak cut.



SAMPLE DESCRIPTIONS

Depth (m)

895-897.5

Sandstone (55%): light gray, very fine grains, gritty in part, quartzose, well sorted, subrounded to subangular, calcareous to dolomitic, common glauconitic imbedded grains, occasional pyritic, occasional very calcareous, weak consolidated to friable in part, moderately to poor quartzose grains relief, dolomitic to silica, poor with occasional good intergranular porosity, occasional petroleum stain, weak spotty fluorescence, very slow spotty cut;

Shale (45%): dark gray, dark green gray, micromicaceous, predominant subfissile, blocky, platy.

897.5-902.5

Shale (55%): dark gray, dark green gray, micromicaceous, predominant subfissile, blocky, platy;

Siltstone (45%): light to medium gray, occasional dark gray, gritty in part, common quartzose, spotty glauconitic, part to very argillaceous to shaly in part, common laminations, consolidated, dolomitic cement, light petroleum odor on wash, poor intergranular porosity, weak cut.

902.5-905

Siltstone and Sandstone (50%): light gray, tan gray, very fine grains quartzose, spotty calcareous cement, slightly in part, common glauconitic imbedded grains, moderately to poor quartzose grains relief, dolomitic cement, occasional sandy dolomitic fragments, poor with trace good porosity streaks, questionable oil odor on wash, no shows;

Shale (50%): dark gray, minor greenish gray, as above;

Dolomite (trace): brown, variable gray, microcrystalline, tight;

Sandstone (trace): light gray, silty to lower very fine grains, dolomitic, no visible porosity, no shows.

905-907.5

Shale (55%): dark gray, minor dark green gray, micromicaceous, predominant subfissile, blocky, platy;

Siltstone (45%): light gray, in part, tan gray, part very fine grains quartzose, common as very finely grained sandstone in part, minor spotty calcareous cement, dolomitic cement, trace sandy dolomitic fragments, tight, no shows.

907.5-910

Dolomite (55%): amber, tan to light brown, very fine to finely crystalline, sandy, fossils, poor porosity, no shows;

Sandstone and Siltstone (45%): light to medium gray, occasional dark gray, very fine grains, common grading to sandstone, gritty in part, common quartzose, spotty glauconitic, part to very argillaceous to shaly in part, common laminations, consolidated, dolomitic cement, light petroleum odor on wash, poor intergranular porosity, weak cut.

SAMPLE DESCRIPTIONS

Depth (m)

910-912.5

Sandstone (50%): off white frosted, light gray, tan, quartzose, lower very fine to silty, quartzose, well sorted, subangular to subrounded, 15% friable to weak consolidated, dolomitic with common calcareous cement, trace silica cement, moderately high relief quartz in weak consolidated fragments, trace light brown oil stain to 10%, infer good porosity in friable (6 to 9%), questionable spotty green fluorescence, dull slow even milky cut;

Shale (40%): as above, micromicaceous, subfissile;

Siltstone (10%): light gray, part as dolomitic mudstone.

912.5-925

Sandstone and Siltstone (35%): light to medium gray, occasional dark gray, very fine grains, common grading to sandstone, gritty in part, common quartzose, spotty glauconitic, part to very argillaceous to shaly in part, common laminations, consolidated, dolomitic cement, light petroleum odor on wash, poor intergranular porosity, weak cut;

Shale (35%): dark gray, minor dark green gray, micromicaceous, predominant subfissile, sandy in part, blocky, platy;

Dolomite (30%): amber, tan to light brown, very fine to finely crystalline, sandy, fossils, poor porosity, no shows.

925-927.5

As above, increase consolidated sandstone to 70%.

927.5-930

Sandstone and Siltstone (35%): light to medium gray, occasional dark gray, very fine grains, common grading to sandstone, gritty in part, common quartzose, 5 to 10 to 15% imbedded glauconitic, weak consolidated, friable, questionable trace petroleum odor on wash, poor intergranular porosity, weak cut;

Shale (35%): dark gray, minor dark green gray, micromicaceous, subfissile;

Dolomite (30%): amber, tan to light brown, very fine to finely crystalline, sandy, fossils, poor porosity, no shows.

930-935

Siltstone (55%): light gray, speckled, very fine quartzose, common grading to very finely grained sandstone, dolomitic, weak calcareous in part, slightly silica, trace imbedded glauconitic grains, poor intergranular porosity, tight, no visible (questionable) fluorescence, weak spotty milky dull cut;

Dolomite (35%): light medium tan to amber, brown to tan, brownish gray, very fine to finely crystalline, microcrystalline, slightly silty, minor calcareous, tight with trace poor intercrystalline porosity, no shows;

SAMPLE DESCRIPTIONS

Depth (m)

Shale (10%): dark to medium green, common gray, trace medium black green, common subvitreous to waxy lustre, occasional micromicaceous, common platy, occasional subfissile.

935-937.5

Sandstone (35%): light gray, very fine to lower fine with rare medium grains, quartzose, abundant imbedded green glauconitic to 5%, well sorted, dolomitic, occasional weakly calcareous, clayey in part, strong consolidated, gritty in part, tight intergranular porosity, no visible fluorescence, questionable spotty cut;

Dolomite (30%): brown, tan, very finely crystalline, occasional as dolomitic mudstone, predominant dense, minor euhedral dolomitic and calcareous fragments, trace poor intercrystalline porosity, trace fractured porosity porosity, no shows;

Shale (25%): dark black green gray, dolomitic, silty in part, platy, as above;

Siltstone (10%): light gray, in part, tan gray, common very fine grains quartzose, minor spotty calcareous cement, dolomitic cement, trace sandy dolomitic fragments, tight, no shows.

937.5-940

Sandstone (80%): light gray, white, lower very fine to lower fine grains, subrounded, trace rounded, predominantly well sorted, occasional part silty, part grading to very finely grained siltstone, consolidated, silica and dolomitic cement, occasional weak calcareous, poor with fair intergranular porosity to 6%, trace spotty very light hydrocarbon stain, slight questionable oil odor on wash, white fluorescence, slow white cut;

Shale (20%): as above.

---- MT. CLARKE "A" SAND 940.5 m ----

940-942.5

Sandstone (50%): light gray, translucent, tan, fine to medium grains, subrounded, predominantly well sorted, weak consolidated to slightly friable, silica cement, spotty very weak silica overgrowths, occasional moderately high relief quartz fragments to 3%, common poor porosity, trace good intergranular porosity to 8%, questionable streaks to 10%, questionable spotty green fluorescence, immediate weak milky cut;

Siltstone (30%): light gray, speckled in part, trace calcareous to part dolomite fragments, part as dolomitic mudstone (questionable), poor porosity, no visible shows;

Shale (20%): medium glassy green, platy.

SAMPLE DESCRIPTIONS

Depth (m)

942.5-945

Sandstone (80%): clear, translucent, light gray, predominant fine with trace coarse grains, quartzose, subrounded to rounded, moderately well sorted, unconsolidated to very friable, trace scattered bituminous flakes, infer good porosity in unconsolidated, weak spotty green fluorescence, immediate weak milky spotty cut;

Shale (20%): medium glassy green in part, dark gray, predominant platy.

945-947.5

Sandstone (80%): translucent, clear, light gray, tan, predominant fine with trace grains, quartzose, subrounded to rounded, moderately well sorted, unconsolidated with 25% weak consolidated, infer good porosity in unconsolidated and friable, immediate fluorescence, good cut;

Shale (20%): medium glassy green in part, dark gray, predominant platy.

---- MT. CLARKE "B" SAND 949.5 m ----

947.5-950

Sandstone (95%): light brown, clear, translucent, tan, fine to lower coarse grains, quartzose, subrounded to rounded, moderately well sorting, predominant unconsolidated with 15% weak consolidated to friable, trace silica cement, spotty with common oil stain, good porosity to 17%, immediate fluorescence cut;

Shale (5%): as above.

950-952.5

Shale (60%): dark gray, sub fissile, slightly waxy, minor silty, spotty glauconite;

Sandstone (20%): light gray, tan gray, upper fine to medium grains, frosted quartz, unconsolidated, predominantly as above;

Siltstone (20%): light gray, quartzose, tight, no cut.

---- MT. CLARKE "C" SAND 955.0 m ----

952.5-955

Shale (60%): medium green, light gray, blocky to subfissile, well indurated, slightly silty, occasional massive;

Siltstone (20%): light gray, quartzose, spotty imbedded glauconite, slightly argillaceous, poor porosity, no visible shows;

SAMPLE DESCRIPTIONS

Depth (m)

Sandstone (20%): light to dark gray, very fine with common fine to medium grains, part silty, frosted and clear quartz, subangular to subrounded, well sorted, consolidated, no visible effective porosity, poor intergranular porosity, no shows.

955-957.5

Sandstone (55%): opaque, off white frosted, light gray, tan, quartzose, 85% unconsolidated as pebbles thus upper medium to very coarse grains, rounded and predominantly well sorted, 15% friable to weak consolidated thus fine to medium grains, subrounded to subangular, well sorted, dolomitic with trace calcareous cement, rare silica cement, moderately high relief quartz in weak consolidated fragments, trace light brown oil stain to 15%, infer good porosity in unconsolidated, 6 to 9% intergranular porosity in friable and weak consolidated fragments, questionable spotty green fluorescence, dull slow even milky cut;

Siltstone (35%): green, light gray, part as dolomitic mudstone;

Shale (10%): medium green, dark black green.

957.5-960

Sandstone (80%): light gray, clear, translucent, opaque, predominant fine to lower coarse grains, 100% quartzose, rounded to subrounded with common subangular, variable sorted, predominant moderately sorted, 80% unconsolidated, 20% loose, occasional moderately weak silica overgrowths, 1 to 2% disseminated pyrite, trace imbedded pyritic, occasional good quartz grains relief, trace spotty very light brown oil stain, variable porosity 6 to 10%, infer good to very good porosity in unconsolidated, questionable spotty green fluorescence, very slow even halo milky cut;

Siltstone (10%): white, light gray, soft, chalky in part, dolomitic, tight;

Shale (10%): green, black, platy.

960-962.5

Sandstone (60%): light gray, predominantly fine grains, common medium to lower coarse grains, frosted quartz, predominant subrounded, well sorted, silica and dolomitic cement, weak calcareous in part, friable to part weak consolidated, infer good porosity to 8%questionable, weak slow cut;

Shale (20%): green, black, platy;

Siltstone (20%): white, light gray, shaly in part, dolomitic, tight.

SAMPLE DESCRIPTIONS

Depth (m)

962.5-965

Sandstone (80%): light gray, clear, translucent, opaque, predominant fine to lower coarse grains, 100% quartzose, rounded to subrounded with common subangular, variable sorted, moderately well sorted, 80% unconsolidated, 20% loose to friable, occasional good quartz grains relief, trace spotty very light brown oil stain, variable good porosity infer to 15%, spotty green fluorescence, slow even halo milky cut;

Siltstone (10%): white, light gray, soft, chalky in part, dolomitic, tight;

Shale (10%): green, black, platy.

965-967.5

Sandstone (75%): light brown, light gray, translucent, trace varicolored, very fine to upper fine grains, trace upper medium, 95% quartz, 5% lithic, subrounded, predominantly well sorted, unconsolidated to friable, infer good porosity, abundant oil stain, immediate good streaming florescence, immediate halo good cut;

Shale (25%): as above, platy to blocky.

967.5-970

Sandstone (90%): brown, tan, light gray, fine to medium grains, quartzose with trace lithic fragments, subrounded, moderately well sorted, slightly calcareous to dolomitic, fairly clean, occasional heavy minerals, part unconsolidated, part consolidated to friable, infer porosity to 12% in quartz relief patches, infer good porosity to 15% in unconsolidated, abundant even oil stain, florescence as above, good cut as above;

Shale (10%): black, dark gray, as above, tabular to blocky.

970-972.5

Sandstone (100%): tan to speckled tan, light brown, light gray, dark tan with oil stain, fine to medium grains, trace coarse grains, quartzose, subrounded to rounded and subangular, predominantly well sorted, 100% unconsolidated, infer good intergranular porosity to 18%, immediate good green fluorescence, very good even halo milky cut;

Shale (trace): green, black, platy.

972.5-975

Sandstone (90%): light brown, light gray, trace tan with oil stain, fine to medium grains, trace coarse grains, quartzose, subrounded to rounded and subangular, predominantly well sorted, 95% unconsolidated, good quartz grains relief, infer good intergranular porosity to 18%, spotty good green fluorescence, very good even halo milky cut;

Shale (10%): green, black, platy.

SAMPLE DESCRIPTIONS

Depth (m)

975-977.5

Sandstone (90%): light gray, translucent, clear, fine to medium grains, occasional clear coarse rounded pebbles, 100% quartzose, rounded to subangular, unconsolidated, infer good to very good intergranular porosity, immediate spotty green fluorescence, dull slow cut;

Shale (10%): green, black, platy.

---- PROTERZOIC 978.0 m ----

977.5-980

Shale (100%): stained red, weathered;

Sandstone (trace): stained red, upper fine to upper very coarse pebbles, 100% quartzose, rounded to subrounded, 100% unconsolidated, infer good to very good intergranular porosity, no shows.

980-985

Shale (95%): stained red, weathered;

Sandstone (5%): stained red, upper fine to upper very coarse pebbles, 100% quartzose, rounded to subrounded, 100% unconsolidated, infer good to very good intergranular porosity, no shows.

985-990

Abundant cavings;

Shale (80%): red, trace medium to dark gray, silty, weathered, blocky, platy;

Shale (20%): black, slightly micromicaceous in part, subfissile.

990-995

Shale (95%): reddish, varicolored green in part, platy to blocky, slightly silty, earthy in part;

Siltstone (5%): red, mottled red black in part, blocky, questionable quartzose, questionable porosity, no shows.

995-1011

Shale (100%): red, common medium gray black, part soft, part well indurated, common very well weathered, blocky;

Siltstone (trace): red, light gray, bentonite in part, slightly argillaceous, trace interbedded sandstone and dolomite, trace interbedded shale, tight, predominant as cavings.

TOTAL DEPTH 1011.0 m

**APACHE PARAMOUNT LAC MAUNOIR E-35**

**DAILY MUD PROPERTIES**

**1) GEL CHEM SLURRY**

DATE	DEPTH (m)	DENSITY Kg/M3	WATER LOSS (cm3/30 min)	FILTER CAKE (mm)	pH	VISCOSITY (s/l)	PV/YP	GELS
05-02-26	145	1015	-	-	10.0	57	-	-
05-02-27	162	1050	-	-	9.5	87	-	-
05-02-28	224	1000	-	-	-	28	-	-
05-03-01	306	1000	-	-	-	28	-	-
05-03-02	405	1000	-	-	-	28	-	-
05-03-03	452	1000	-	-	-	28	-	-
05-03-04	452	1000	-	-	-	28	-	-
05-03-05	595	1040	-	-	9.0	36	-	-

**2) NaCl BRINE SATURATED MUD ( Mudded Up at 595m )**

DATE	DEPTH (m)	DENSITY Kg/M3	FILTRATE	FILTER CAKE (mm)	pH	VISCOSITY (s/l)	PV/YP	GELS
05-03-06	727	1245	9.0	1.5	10.0	42	13.0 / 12.87	2.0 / 3.0
05-03-07	902	1270	9.0	1	10.5	48	16.0 / 6.22	2.0 / 4.0
05-03-08	1110	1310	13.0	2	10.5	61	26.0 / 7.66	2.5 / 8.0
05-03-09	1011	1310	13.0	2	10.5	61	26.0 / 7.66	2.5 / 8.0
05-03-09	1011	1270	10.0	2	8.5	53	WireLine Logging Mud	
05-03-10	1011	1250	10.0	-	9.0	45	-	-



Company: APACHE  
 Field: LAC MAUNOIR  
 Well Name: ACL PARA MAUNOIR E-35  
 Target Depth: 937

Job Number: 855255  
 Magnetic Decl.: 28.95  
 K.B. Elevation: 539.3  
 Target N: 0 Target E: 0.00

Rig: AKITA 51  
 Proposed Azimuth: 0  
 Tie Into: 65  
 Target Radius: 30

No.	Survey Depth (m)	Incl (°)	Azimuth (°)	Course Lgth (m)	TVD (m)	S.S. (m)	VS (m)	Coordinates		Closure		DLS (°/30m)	Bid Rate (°/30m)	Wlk Rate (°/30m)
								N/S (m)	E/W (m)	Dist (m)	Ang (°)			
0	65.2	0.00	0.00	0	65.20	-845.00	0.00	0.00	0.00					
1	71.50	0.60	322.80	6.3	71.50	-467.80	0.03	0.03 N	0.02 W	0.03	322.80	2.86	2.9	1537.1
2	98.00	1.00	297.80	26.5	98.00	-441.30	0.24	0.24 N	0.31 W	0.39	308.42	0.59	0.5	-28.3
3	463.10	0.20	42.40	365.1	463.08	-76.22	2.20	2.20 N	2.70 W	3.48	309.22	0.09	-0.1	-21.0
4	490.90	0.70	247.40	27.8	490.88	-48.42	2.17	2.17 N	2.82 W	3.56	307.59	0.96	0.5	221.2
5	519.60	1.60	243.90	28.7	519.57	-19.73	1.93	1.93 N	3.34 W	3.86	299.98	0.94	0.9	-3.7
6	538.70	2.30	240.80	19.1	538.66	-0.64	1.62	1.62 N	3.92 W	4.24	292.52	1.11	1.1	-4.9
7	557.30	2.30	235.40	18.6	557.25	17.95	1.23	1.23 N	4.55 W	4.71	285.12	0.35	0.0	-8.7
8	576.50	1.90	223.50	19.2	576.43	37.13	0.78	0.78 N	5.09 W	5.15	278.72	0.92	-0.6	-18.6
9	595.60	1.40	219.50	19.1	595.53	56.23	0.37	0.37 N	5.45 W	5.46	273.89	0.81	-0.8	-6.3
10	614.70	0.80	216.60	19.1	614.62	75.32	0.08	0.08 N	5.68 W	5.68	270.84	0.95	-0.9	-4.6
11	633.40	0.50	151.70	18.7	633.32	94.02	-0.09	0.09 S	5.72 W	5.72	269.06	1.19	-0.5	-104.1
12	652.50	0.60	124.10	19.1	652.42	113.12	-0.22	0.22 S	5.60 W	5.60	267.72	0.44	0.2	-43.4
13	670.90	0.40	128.40	18.4	670.82	131.52	-0.32	0.32 S	5.47 W	5.48	266.68	0.33	-0.3	7.0
14	699.60	0.20	139.90	28.7	699.52	160.22	-0.42	0.42 S	5.36 W	5.37	265.55	0.22	-0.2	12.0
15	728.40	0.70	220.90	28.8	728.32	189.02	-0.59	0.59 S	5.44 W	5.47	263.82	0.73	0.5	84.4
16	747.70	1.40	228.00	19.3	747.61	208.31	-0.84	0.84 S	5.69 W	5.75	261.65	1.10	1.1	11.0
17	766.90	1.30	222.90	19.2	766.81	227.51	-1.15	1.15 S	6.01 W	6.12	259.16	0.24	-0.2	-8.0
18	785.70	0.80	210.70	18.8	785.61	246.31	-1.42	1.42 S	6.23 W	6.39	257.14	0.87	-0.8	-19.5
19	804.80	0.80	218.40	19.1	804.70	265.40	-1.64	1.64 S	6.38 W	6.58	255.58	0.17	0.0	12.1
20	823.20	1.00	224.80	18.4	823.10	283.80	-1.85	1.85 S	6.57 W	6.83	254.23	0.36	0.3	10.4
21	841.90	1.30	234.30	18.7	841.80	302.50	-2.09	2.09 S	6.86 W	7.17	253.02	0.57	0.5	15.2
22	861.10	1.50	238.40	19.2	860.99	321.69	-2.35	2.35 S	7.25 W	7.62	252.01	0.35	0.3	6.4
23	879.60	1.20	241.00	18.5	879.49	340.19	-2.57	2.57 S	7.62 W	8.05	251.34	0.50	-0.5	4.2
24	898.70	1.00	241.40	19.1	898.58	359.28	-2.75	2.75 S	7.95 W	8.41	250.90	0.31	-0.3	0.6
25	917.20	1.20	246.30	18.5	917.08	377.78	-2.91	2.91 S	8.26 W	8.76	250.63	0.36	0.3	7.9
26	936.30	1.60	250.10	19.1	936.17	396.87	-3.08	3.08 S	8.70 W	9.23	250.52	0.64	0.6	6.0
27	955.50	1.30	258.00	19.2	955.37	416.07	-3.21	3.21 S	9.16 W	9.71	250.67	0.56	-0.5	12.3
28	974.60	1.30	258.20	19.1	974.46	435.16	-3.30	3.30 S	9.59 W	10.14	250.99	0.01	0.0	0.3
29	997.00	1.40	263.00	22.4	996.86	457.56	-3.39	3.39 S	10.11 W	10.66	251.47	0.20	0.1	6.4
30	1011.00	1.40	263.00	14.0	1010.85	471.55	-3.43	3.43 S	10.45 W	11.00	251.82	0.00	0.0	0.0

## APACHE PARAMOUNT LAC MAUNOIR E-35

BIT RECORD

BIT	SIZE (mm)	MAKE	TYPE	JETS (mm)	SERIAL #	DEPTH IN (m)	DEPTH OUT (m)	DRILLED	HOURS	CONDITION	ROP (m/hr)
1	311.15	Hughes	GTS 18	3 x 20	6030693	65	162	97	14.50	8-8-WT-A-E-1-BT-HP	6.69
2	311.15	Hughes	GTS 28	3 x 20	6018949	162	452	290	88.25	1-1-NO-A-1-1-NO-TD	3.29
3	215.90	Hughes	HCM404Z	6 x 11.1	7002759	452	1011	559	60.25	5-4-NO-A-D-I-N0-TD	9.28

# **APACHE PARAMOUNT LAC MAUNOIR E-35**

## **Detailed Wireline Logging Report**

<b>Logging Company :</b>	<b>Schlumberger</b>	<b>Base:</b>	<b>Norman Wells</b>
<b>Logging Engineer :</b>	<b>Michel Lapointe</b>	<b>Unit #</b>	<b>3052</b>
<b>Elevations :</b>	<b>Ground :</b>	<b>534.10</b>	<b>Licence # :</b>
	<b>Kelly Bushing :</b>	<b>539.30</b>	<b>1075</b>
<b>Total Depth :</b>	<b>Drillers :</b>	<b>1011.00 m</b>	<b>Conductor Barrel:</b>
	<b>Loggers :</b>	<b>1010.7 m</b>	<b>65.20 m</b>
<b>Hole Size :</b>	<b>216.00</b>	<b>Casing Depth_Loggers:</b>	<b>451.50 m</b>
<b>Hole Orientation :</b>	<b>Vertical</b>	<b>Casing Depth_Drillers :</b>	<b>452.00 m</b>
<b>Maximum Deviation :</b>	<b>2.30 deg</b>	<b>Casing Size :</b>	<b>244.5 mm</b>
		<b>Casing Weight :</b>	<b>59.53 kg/m</b>

## **Mud Parameters**

**Mud Type :** NaCl BRINE SATURATED MUD

**Density :** 1270

**Viscosity :** 53

**PH :** 8.5

**Fluid Loss :** 10

**Salinity :** n/a      **Rmf :** n/a

**BHT :** 12 Deg C

## **Operations Summary**

**Hole Condition Prior to Logging :** very Good

**Circulation time after TD :** 5.5 hrs

**Number of Wiper Trips :** 1

**Details of Wiper Trips :** Wiper Trip to Casing Shoe

**Number of Runs in the Hole :** 2 WireLine Runs In Well.

**Succeeded :** 2      **Failed :** 0      **Total :** 2

## **Time Report**

<b>Loggers Called for :</b>	<b>05-03-09-0200</b>	<b>Logging Completed :</b>	<b>05-03-09-1830</b>
<b>Loggers Arrived :</b>	<b>05-03-09-0145</b>	<b>Loggers Released :</b>	<b>05-03-09-2045</b>
<b>Loggers Rigged Up :</b>	<b>05-03-09-0830</b>	<b>Recording Time :</b>	<b>8 hrs.</b>
<b>Loggers On Bottom :</b>	<b>05-03-09-1030</b>	<b>Total time on site :</b>	<b>19 hrs.</b>

## **Comments**

Repeats good. Service on "SITE" Excellent. No problems with tools.

**Future Casing Size :** 177.80 mm, 43.16 kg/m

<u>Run #</u>	<u>Tools Run</u>	<u>Log Runs</u>	<u>Intervals :</u>	<u>Scales:</u>
1	FMI, DSI, EMS, GR.		TD to Surface Casing, DSI and GR to Surface	1:240; 1:600
2	TLD, CNL, HRLA, CDT		TD to Surface Casing, Neutron and GR to Surface	1:240; 1:600

## DAILY PROGRESS SUMMARY REPORT

GEOLOGIST: Robert Reid, B. Sc.  
WELL NAME: APACHE PARAMOUNT LAC MAUNOIR E-35  
LOCATION: Lat: 67deg 14'27.628 / Long: 125deg 07'15.766"  
OPERATOR: APACHE CANADA LTD.

[illegible]